THE DEVELOPMENT AND EMPIRICAL EVALUATION OF A COMPETENCY MODEL OF TRAINER-INSTRUCTOR PERFORMANCE: AN ELABORATION ON A PARTIAL COMPETENCY MODEL OF TRAINER-INSTRUCTOR PERFORMANCE

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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OPSOMMING

As ‘n resultaat van apartheid, staar Suid-Afrika tans ‘n veelvoud van sosio-ekononiese uitdagings in die gesig. Hierdie sosio-ekonomiese uitdagings sluit in, maar is nie beperk tot, swak onderwys, nasionale vaardigheidstekorte, werkloosheid, ongelykheid in die werksplek, swak ekonomiese- en ontwikkelingsgroei, armoed, afhanklikheid van sosiale toelaes, swak implementering en toepassing van wetgewing en lae internasionale mededingendheid. Hierdie sosio-ekonomiese uitdagings is oorsaaklik onderling afhanklik en beinvloed mekaar dus onderling. Hulle beinvloed ook die produktiwiteit van die Suid-Afrikaanse werksmag.

Die huidige studie het geargumenteer dat swak onderwys Suid Afrika se huidige armoedeprobleem ten grondslag lê. Swak onderwys het tot gevolg dat minder mense kritieke vaardighede en kwalifikasies verwerf wat weer op sy beurt meebring dat minder mense indiensneembaar is. Met minder mense wat indiensneembaar is styg die werkloosheidsyfer en as gevolg daarvan styg die armoedekoers.

Regstellende ontwikkeling kan beskou word as een moontlike oplossing vir die huidige uitdagings wat Suid-Afrika in die gesig staar. Regstellende ontwikkelingsprogramme behoort deur sowel die regering as die privaatsektor ontwikkel, aangebied en ondersteun te word. As ‘n organisatioriese eenheid wat verantwoordelik is vir die vloei van werknemers in, deur en uit die organisasie, sowel as vir die instandhouding van werknemers, behoort Menslike Hupbronbestuur sulke opleidings- en ontwikkelingsprogramme te ontwerp en te implimenteer. Die oogmerk met regstellende ontwikkeling is om die indiensneembaarheid van voorheen benadeelde individue wat reeds die arbeidsmark betree het, te verhoog. Dit kan gedoen word deur hulle werksbevoegdheidspotensiaal te ontwikkel en daardeur hul bevoegdheid op die werksbevoegdhede te verhoog om sodoende hul produktiwiteit te verhoog. Dit kan dan ook die algehele prestasie van die organisasie verhoog en uiteindelik die hoë armoede-vlakke en middaadsyfer in Suid-Afrika verlaag.

Die primêre doel van hierdie navorsingstudie was om die bestaande parsiële Van der Westhuizen (2015) regstellende ontwikkeling opleier-instrukteur prestasie bevoegdheidsmodel uit te brei in ’n poging om die rol wat die opleier-instrukteur in die leerprestasie van regstellende ontwikkelingleerders beter te verstaan. Die beweegrede vir die navorsing was om die leerbevoegdheidspotensiaal en die leerbevoeghede van regstellende ontwikkeling leerders te verhoog deur die prestasie van die opleier-instrukteur te verhoog.

Die finale gereduseerde Wessels-Van der Westhuizen opleier-instrukteur bevoegheidsmodel het bestaan uit (a) vyf opleier-instrukteur latent veranderlikes soos voorgestel deur Van der Westhuizen (2015), naamlik, *leermotivering* (leerbevoegdheidspotensiaal latent veranderlike); *inspirerende professionele visie* (opleier-instrukteur-uitkoms latent veranderlike), *leerklimaaat* en *struktuur in die leermateriaal* (opleidingsituasie latente veranderlike), sowel as *fasiliteer van duidelikheid en begrip* (opleier-instrukteurbevoegdheid latente veranderlike); en (b) vyf nuut-bekendgestelde opleier-instrukteur latente veranderlikes, naamlik, *verskaf van formatiewe terugvoer* en *transformasionele opleier-instrukteurleierskap* (opleier-instrukteurbevoegdheid latente veranderlike) sowel as *opleier-instrukteur lewenslange leer*kapasiteit, *opleier-instrukteurkundige* en *opleier-instrukteur emosionele intelligensie* (opleier-instrukteur-bevoegdheidspotensiaal latente veranderlikes).

Die gereduseerde Wessels-Van der Westhuizen opleier-instrukteur strukturele model het aanvanklik redelike pasgehalte getoon, maar die benaderde pasgehate nulhipotese was nogtans verwerp. Hoë statistiese krag was ‘n probleem weens die groot steekproefgroote. Ses modelwysigings is aangebring in ‘n poging om benaderde pasgehalte te bereik. In die finale model (Model F) moes die die benaderde pasgehalte nulhipotese steeds verwerp word ten spyte van redelike pasgehalte. In die finale model is steun gevind vir 12 van die 15 oorspronklike baanspesifieke substantiewe navorsingshipoteses en ‘n totaal van vyf addisionele bane is by die oorspronklike model gevoeg wat al vyf bevestig is. Praktiese implikasies word bespreek en voorstelle vir toekomstige navorsing word gemaak.

ABSTRACT

As a result of apartheid, South Africa is currently faced with a myriad of socio-economic challenges. These socio-economic challenges include, but are not limited to, poor education, national skill shortages, unemployment, inequality in the workplace, poor economic and development growth, poverty, dependence on social assistance grants, poor implementation and execution of legislation, and weak global competitiveness. These socio-economic challenges and problems are causally related and thus influence each other. They also affect the productivity of South Africa's workforce.

The current study argued that the root of South Africa's current high poverty status is due to poor education. Poor education results in fewer people obtaining critical skills and qualifications, which further results in fewer people being employable. With fewer people being employable, the unemployment rate increases and as a result the poverty rate also increases.

Affirmative development can be viewed as one possible solution to the current challenges faced by South Africa. Affirmative development programmes should be developed, implemented, and supported by government as well as the private sector. As an organisational unit that is responsible for the flow of workers into, through and out of the organisation as well as the maintenance of the workforce Human Resource Management should design and implement such training and development programmes. The objective of affirmative development is to improve the employability of previously disadvantaged individuals who have already entered the labour market. This can be done through developing their job competency potential and thereby increasing their competence on the job competencies in order to enhance their productivity. This can then also improve the overall performance of the organisation and ultimately reduce the high poverty levels and crime rate in South Africa.

The primary objective of this research study was to elaborate on the existing partial Van der Westhuizen (2015) affirmative development trainer-instructor performance competency model in an attempt to better understand the role that the trainer-instructor plays in the learning performance of affirmative development trainees. The purpose of the research was to enhance the learning competency potential and learning competencies of these affirmative development trainees by enhancing the performance of the trainer-instructor.

The final reduced Wessels-Van der Westhuizen trainer-instructor competency model, consisted of (a) five trainer-instructor latent variables as proposed by Van der Westhuizen (2015), namely, *learning motivation* (learning competency potential latent variable); *inspiring professional vision* (trainer-instructor outcome latent variable), *learning climate* and *structure in the learning material* (training situational latent variables), as well as *facilitating clarity and understanding* (trainer-instructor competency latent variable); and (b) five newly introduced trainer-instructor latent variables, namely, *providing formative feedback* and *transformational trainer-instructor leadership* (trainer-instructor competency latent variables) as well as *lifelong learning trainer-instructor capacity*, *trainer-instructor expert* and *trainer-instructor emotional intelligence* (trainer-instructor competency potential latent variables).

The reduced Wessels-Van der Westhuizen trainer-instructor structural model initially showed reasonable fit, however, the close fit hypothesis was nonetheless rejected. High statistical power presented a problem due to the large sample size. Six model revisions were performed in an attempt to achieve close fit. In the final model (Model F) the close fit hypothesis still had to be rejected despite reasonable fit. In the final model 12 of the original 15 path-specific substantive research hypotheses were supported and a total of five additional paths were added of which all five were supported. Practical implications are also discussed and suggestions for future research are made.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 INTRODUCTORY ARGUMENT, RESEARCH INITIATING QUESTION AND RESEARCH OBJECTIVE

1.1 INTRODUCTION

1.1.1 ORGANISATIONS: AN OVERVIEW

An organisation is an intentionally formed, coordinated social unit that operates on a continuous basis, in order to achieve or reach strategic goals (Robbins, Judge, Odendaal, & Roodt, 2009). More specifically, an organisation is an entity comprised of people that work together, it utilises resources and exists to produce products or render services to their customers or clients with the aim of satisfying the needs of society.

The resources of an organisation can be classified into three broad groups: (a) *physical capital resources*, including physical technology, equipment, geographic location, access to raw materials and buildings; (b) *organisational capital resources*, including the organisation's formal reporting structure, planning, controlling, organising, informal relationships, trust and organisational culture; and (c) *human capital resources*, which represents the organisation's workforce (Barney, 1991; Grobler et al., 2012; Leask & Parnell, 2005).

The optimal usage and management of the organisation's human resources, specifically, leads to competitive advantage. Having a competitive advantage denotes that the organisation has implemented a value-creating strategy unique to that organisation and that cannot be easily replicated by other organisations (Barney, 1991). Organisations, therefore, have to produce unique products or render invaluable client care services in the most cost-effective and productive manner to gain this competitive advantage. Even if the organisation has the best physical and organisation capital, it will not be able to achieve these goals or objectives, if the organisation does not have the best performing human resources or human capital at its disposal. The current study interprets work performance as a structurally inter-related set of latent behavioural competencies structurally inter-linked with a structurally inter-related set of latent outcome variables (Myburgh, 2013).

1.1.2 HUMAN RESOURCE MANAGEMENT: THE DRIVING FORCE BEHIND EMPLOYEE PERFORMANCE

Organisations are managed, directed and operated by people (De Goede & Theron, 2010). These people include the employees, managers, and human resources managers (HRM). According to Kavanagh, Thite and Johnson (2014), Human Resource Management (hereafter only referred to as

HRM) is an essential part, or unit, within an organisation with the function of attracting, selecting, developing and retaining highly skilled and qualified individuals. The current study would prefer to subtly differ from Kavanagh et al. (2014) by not placing the emphasis in defining the function of HRM on the quality of an organisation's employees but rather on the quality of the performance of an organisation's employees. Although the former affects the performance of employees and the performance of collectives of employees (i.e., teams, departments, divisions) in the organisation, performance is not solely dependent on the quality of the employees.

An important purpose of HRM is the managing of the performance of an organisation's workforce, employees or human resources. Human capital is a term frequently used in HRM. Human capital denotes the training, experiences, intelligence, perceptions, knowledge, capabilities, relationships, and competencies of the organisation's employees (Barney, 1991; Grobler et al., 2012; Kavanagh et al., 2014). Human capital is thus a very important resource that can contribute to improved performance of the individual employee and through that can lead to improved production and enhanced services, which then ultimately leads to the organisation's success, if managed correctly.

Human resource interventions can be divided into two main categories, namely, flow and stock interventions, (De Goede, 2007; Milkovich & Boudreau, 1997). The first category, flow interventions or staffing, denotes the control of the flow of employees or human resources into, through and out of the organisation in an attempt to change the composition of the workforce (and thereby their performance) by adding, removing or reassigning employees, thus, ensuring sufficient and optimum quality and quantity of human capital. This category includes interventions such as recruitment, selection, placement, internal staffing/promotion, retention, turnover, dismissals and downsizing the organisation's human resources (De Goede, 2007; Milkovich & Boudreau, 1997; Theron, 2015a). The second category, stock interventions, denotes the maintenance and development of the current supply of human resources in an attempt to change the characteristics of the existing workforce in their current positions or the work situation itself with the aim of enhancing employee work performance. This category includes interventions such as training, motivation, compensation and labour relations, performance feedback or job redesign (Cross, as cited in De Goede, 2007; De Goede, 2007; Milkovich & Boudreau, 1997; Theron, 2015a).

1.2 THE CURRENT SOUTH AFRICAN CONTEXT

The work performance of employees[1] is not only influenced by person-centred characteristics (that which HRM targets through training and development programmes and other stock and flow

[1] In the current argument, the term employee should be interpreted more broadly as to also include applicants for employment and not only the organisation's current employees.

interventions) but it is also influenced by the environment or situation in which the employees find themselves. The environment or situation not only refers to the organisational context in which the employee works but also the home, neighbourhood, societal and national context in which the employee lives. The environment or situation, therefore, could be interpreted in terms of a set of intersecting circles [2] with the individual employee in his/her job intersecting with, and being influenced by, the home and cultural environments. These intersecting circles are depicted in Figure 1.1.

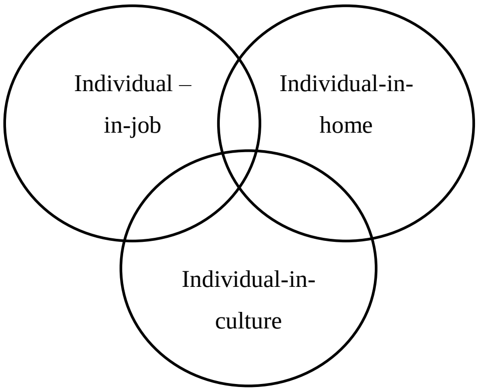

Figure 1.1. **Intersecting circles denoting an individual's environment**

Moreover, and very important when viewed from a South African perspective, the current work behaviour of an employee is not only an expression of the present environments or situations in which the employee currently operates but also an expression of the previous environments in which the employee worked and/or lived. The set of intersecting circles thus has a history that represents past work and life environments or situations. The effect of the latent variables that characterise the present and historical environments on performance (specifically the level of competence achieved on the latent behavioural competencies) is most likely mediated by malleable person characteristics (i.e., person-centred variables) that directly or indirectly affect performance. Such person-centred variables include but are not restricted to core self-evaluation (self-efficacy, self-esteem, locus of control, self-identity), crystallised abilities, hope, optimism and a variety of psychological states like psychological ownership, engagement, psychological empowerment, and job satisfaction. As a result, an employee's performance is influenced by a network of inter-linked person-centred and environment or situation-centred latent variables.

This line of reasoning suggests that employee performance was and currently still is influenced by South Africa's socio-political history, including apartheid, which represents an environment or

[2] Alternatively, a set of concentric circles increasing in radius could have been used to depict the fact that an employee in a specific job sits in a larger organisation that, in turn, is situated in a larger society. The current illustration is preferred because it places the emphasis more strongly on the individual employee and the fact that the individual employee is operating in different contexts or environments that can be depicted as circles or life domains. The important point is that the individual-in-work-position is not an isolated position but one that overlaps with and is influenced by the individual-in-home and by the individual-in-culture-group circles.

situation-centred latent variable. Apartheid policies and practices had far-reaching and deep-cutting effects on many 'Black' South Africans. It is, therefore, necessary to consider the past and present socio-political situation in order to understand the unique theoretical and practical issues and challenges faced by HRM operating in the current South African context (Van der Westhuizen, 2015). A brief overview of apartheid, a major contributor to the current issues and challenges in HRM, will be discussed in the following section.

Apartheid, a government policy of racial segregation, was enforced by the conservative Afrikaner-dominated National Party Government of South Africa (Cameron, 2003; Van Heerden, 2013). Under apartheid, the South African population was labelled and divided into four separate groups, namely, 'Blacks', 'Coloured', 'Indian and Asian' and 'Whites' (Cameron, 2003). However, the main theme of apartheid was to separate 'White' from the 'Non-white[3]'. The generic term for 'Non-white' is the word 'Black', which included Africans, Coloured, Indians and Chinese racial groups who were South African citizens, prior to 1994, during apartheid (Van der Westhuizen, 2015).

In South Africa, from 1948 to 1994, the rights and freedoms of 'Black' South Africans were limited (Cameron, 2003; Van Heerden, 2013). It can be argued that the limited right to education, a restriction through the implementation of the 1953 Bantu Education Act, has had the most profound impact on South Africa's economy and growth. According to Blamires (1955), a government spokesperson emphasised that the education system for Africans should focus more on 'practical', rather than 'academic' based education. This separate education system for 'Black' students deprived of them of access to decent education as well as other developmental opportunities that were readily available to 'White' students (Van Heerden, 2013). The 1953 Bantu Education Act created a gap in education, including obtaining skills and quality qualifications, between 'Black' and 'White'. Apartheid, therefore, is a contributor to South Africa's current lack of skilled workforce which, in turn, leads to the high unemployment rate and poverty and, ultimately, to the high degree of crime in South Africa.

Due to apartheid, specifically including the inequality in education, South Africa is now faced with a myriad of socio-economic challenges. These socio-economic challenges include, but are not limited to, poor education, national skill shortages, adverse impact, unemployment, inequality in the workplace, poor economic and development growth, poverty, dependence on social assistance grants, social unrest, crime, poor service delivery, poor implementation and execution of legislation, and weak global competitiveness (Van Heerden, 2013). These issues, socio-economic challenges and problems, are causally inter-related and thus have an effect on each other. They should thus not be seen as separate issues to be dealt with separately but rather as components of a single, complexly

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[3] The term 'Non-white' is in itself offensive since it makes 'White' the superior focal and reference point. The term 'Black' will, therefore, be used in the current study.

causally inter-related, problem. Some of these socio-economic challenges will be discussed in more detail in the following sections.

1.2.1 EDUCATION

The improvement of the quality of South Africa's educational system is a critical priority since education is known to play a key role in reducing or eliminating poverty-social inequality, reducing skills shortages and improving economic growth (McLoughlin & Dwolatzky, 2014; Taylor, 2007).

The post-apartheid government inherited a poor school system from the previous political dispensation. This poor school system included a relatively small number of well-run and well resources previously 'White' schools and a large number of poorly run and under-resourced former 'Black' schools. According to the President's Education Initiative (PEI) studies in the late 1990's (Taylor & Vinjevold, as cited in Taylor, 2009), the school system only allowed for a small portion of time in the actual classroom. When teaching and learning actually occurred, in the limited classroom time, it was hindered by poor teacher knowledge, poor curriculum coverage, low required cognition, and poor reading and writing exposure (Taylor, 2009).

The problematic nature of South African's current education system is reflected in the National Senior Certificate pass rates. As indicated in Table 1.1, the lowest pass rate achieved after the end of apartheid in 1994 was 47 percent in 1997. This indicates that only 47 percent of learners that were in Grade 12 in 1997 finished Grade 12. Indicating that more than half of that year's Grade 12 learners did not pass Grade 12. As indicated in Table 1.2, the highest pass rate of 78.2 percent was achieved in 2013. This could indicate that the quality of the education system has increased to some extent, as reflected in the progressively higher pass rates each year.

The increase in pass rate up until 2013 could, however, also be due to a lowered education standard set in place to ensure that more Grade 12 students pass high school, or Grade 12[4]. This is a trade-off. On the one hand, an increase in the pass rate provides school leavers, or Grade 12 learners, with more optimistic life chances and development opportunities (Taylor, 2009). More individuals can now continue their studies on a tertiary level, regardless of the quality of the school education system. On the other hand, lowering the standards of the school education system, simply to increase the percentage of learners passing, might not sufficiently enhance cognitive development to ensure success in their future and more challenging studies.

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[4] Oprah Winfrey stated that the standard of school education in South Africa is too low (Van Wyk, 2012). In addition, many academics and educational experts caution people against associating the higher Grade 12 pass rate, or growth in pass rates, with a healthy education system (Business Tech, 2015).

Regardless of whether the quality of the education system increased or whether the standards decreased, more than 20 percent of learners still do not pass Grade 12 each year. Alternatively stated, more than 20 percent of learners either have to repeat Grade 12 or leave school to find employment. The latter option leads to individuals entering the labour force without the proper qualifications and without the opportunity to further their education. According to Nzimande (2014a), South Africa has millions of youth or adolescences who leave school with a senior certificate or less and who cannot access opportunities for further education, even though they want to at a later stage. This, in turn, contributes to a large portion of unskilled workers and high unemployment rates.

Table 1.1

National Senior Certificate examination pass rates between 1994 and 2007

Year	National Senior Certificate pass rates	University Exemption rate
1994	58%	18%
1995	53%	15%
1996	54%	15%
1997	47%	12%
1998	49%	13%
1999	49%	12%
2000	58%	14%
2001	62%	15%
2002	69%	16%
2003	73%	19%
2004	71%	18%
2005	68%	17%
2006	66%	16%
2007	65%	15%

Note: Adapted from Department of Education (as cited in Taylor, 2009).

Table 1.2

National Senior Certificate examination pass rates between 2008 and 2015

Year	The National Senior Certificate pass rates	Qualified for bachelor's degree programme	Qualified for diploma programme
2008	62.6%	19.0%	23.0%
2009	60.6%	32.8%	39.1%
2010	67.8%	23.5%	27.2%
2011	70.2%	24.3%	28.5%
2012	73.9%	26.6%	29.9%
2013	78.2%	30.6%	30.8%
2014	75.8%	28.3%	31.3%
2015	70.7%	25.8%	28.5%

Note: (Republic of South Africa, 2010a; 2010b; 2013; 2015; Sukhdeo-Raath, 2015).

The problematic nature of South African's current education system is also reflected in the university exemption rate, which denotes the percentage of learners who passed Grade 12 and are allowed to further their studies at a university. As indicated in Table 1.1, the exemption rate was the lowest at 12 percent, in 1997 and again in 1999. This denotes that only 12 percent of those years' learners were allowed to study at a university. At the highest, 19 percent in 2003, denoting that only 19 percent of the learners that passed Grade 12 in 2003 were allowed to study at a university. As indicated in Table 1.1, the figures representing university exemption rate are extremely low, in the sense that more than 80 percent of school leaving Grade 12's did not have the opportunity to further their education at a university level. However, these figures only indicate university level entry and do not give a clear indication on other forms of tertiary education, such as enrolling in a short course or programme in order to obtain a certificate or diploma.

The university exemption rate can be split into percentage of learners qualifying for bachelor's degree programmes (leading to degrees such as honours, masters and doctoral degrees) and percentage of learners qualifying for diploma programmes (which provides the qualification of certain skills, but does not lead to attainment of a degree), as indicated by Table 1.2. The highest percentage of students qualifying for a bachelor's degree is only 32.8 percent in 2009. The highest percentage of students qualifying for a diploma programme is only 39.1 percent, also in 2009. These latter university exemption rate figures (Table 1.2) are more promising than the previously mentioned low university exemption rates (Table 1.1) in that, at best in 2009, 71.9[5] percent of learners did qualify for entering further education (either a bachelor's degree programme or a diploma programme). Therefore, only about 28 percent of the Grade 12 learners from the class of 2009 were left without the possibility of higher or further education. However, that was only for 2009 and the percentage of learners allowed to further their education was lower for the years to follow. This, in turn, results in a higher number of Grade 12 learners entering the labour force without the proper qualifications and with only minimum opportunities to further their education. Thus, only a small portion of around 50.7[6] to 61.4[7] percent of learners (after 2009) had the option of furthering their education in order to become part of the elite group of highly qualified South Africans. This state of affairs contributes to the skill shortage crises and the high unemployment rate.

It should be noted that these figures (university exemption rates and qualifying for bachelor's degree and diploma programmes) only indicate the percentage of individuals allowed access to higher education. These figures do not provide an indication of individuals who actually applied and started their higher, tertiary education nor does it indicate what percentage of those that started their tertiary education actually successfully completed it (this will be further discussed in section 1.2.2 Skill Shortages).

[5] The 32.8 percent of students qualifying for a bachelor's degree combined with the 39.1 percent of students qualifying for a diploma programme in 2009.
[6] The 23.5 percent of students qualifying for a bachelor's degree combined with the 27.2 percent of students qualifying for a diploma programme in 2010.
[7] The 30.6 percent of students qualifying for a bachelor's degree combined with the 30.8 percent of students qualifying for a diploma programme in 2013.

A further concerning fact regarding South Africa's education system is highlighted in the Global Competitiveness Report. This report is based on a competitiveness analysis on the Global Competitiveness Index (GCI), which is "…a highly comprehensive index for measuring national competitiveness, which captures the microeconomic and macroeconomic foundations of national competitiveness" (World Economic Forum, 2010, p. 4). Where *competitiveness* is defined as "…the set of institutions, policies, and factors that determine the level of productivity of a country" (World Economic Forum, 2010, p. 4). Competitiveness is compared across twelve pillars of competitiveness and each of the twelve pillars are comprised of a number of different indicators or sub-categories. One such pillar is *higher education and training*. According to the most recent Global Competitiveness Index (GCI) (2015-2016), South Africa's *higher education and training*[8] was ranked 83 out of 140 countries.

Table 1.3 provides a breakdown of the criteria or indicators that determine South Africa's ranking on higher education and training.

Table 1.3

The 5th Pillar: Higher education and Training

Title of indicator	2010–2011 South Africa's rank out of 139 countries	2012–2013 South Africa's rank out of 144 countries	2014-2015 South Africa's rank out of 144 countries	2015-2016 South Africa's rank out of 140 countries
Higher education and Training	75th	84th	86th	83rd
Secondary education enrolment, gross %	41th *	(93.8%) 53th	(101.9 %) 24th *	(110.8%) 12th *
Tertiary education enrolment, gross %	99th	(15.4%) 101th	(19.2 %) 93rd	(19.7%) 93rd
Quality of the educational system	130th	140th	140th	138th
Quality of math and science education	137th	143th	144th	140th
Extent of staff training	26th *	26th *	18th *	19th *

Note: (World Economic Forum, 2010; 2012; 2014; 2015).

* More favourable rankings: These are the indicators that provide a competitive advantage. Competitive advantages in this instance can be defined as "For those economies ranked lower than 50th in the overall GCI, any individual indicators with a rank of 50 or better are considered to be advantages" for those countries, such as South Africa (World Economic Forum, 2014, p. 102).

These aforementioned indicators provide a critical understanding of the key areas South Africa should focus on in order to improve the quality of the current education system. Some of these indicators will be briefly discussed below.

[8] *Higher education and training* represents one of the twelve pillars and is also sub-divided into a number of indicators, as indicated in Table 1.3.

Secondary education enrolment, gross % denotes the total enrolment or registration in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age (The World Bank, 2015a). Secondary education includes public schools, technical high schools, independent schools and home-schooling (National Planning Commission, n.d.). Secondary education is important since it lays the foundations for lifelong learning and human development (Trading Economics, 2015). South Africa has a favourable ranking 12th out of 140 countries, with 101.8 percent of learners registered to attend secondary school (World Economic Forum, 2015). Even though it will be more beneficial for South Africa if this ranking were to move up or improve, South Africa seems to be in a more favourable position compared to other countries when it comes to this indicator. This favourable ranking suggests the possibility that many children or learners go to secondary school or have access to schools, and should these learners finish school, they will have a better chance of gaining access to universities.

Tertiary education enrolment, gross % denotes the total enrolment or registration in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group continuing on from leaving secondary school (The World Bank, 2015b). Tertiary education or post-school education includes universities, universities of technology/Technicon, private higher education institutions, public and private further education and training colleges, workplace training, public and private adult learning centres and professional colleges (National Planning Commission, n.d.). Even though South Africa's rank has moved up/improved eight places from 101st (GCI of 2012-2013) to 93rd (GCI of 2014-2015), both out of 144 countries, South Africa still does not have a favourable rank (World Economic Forum, 2012; 2014). Only 19.2 percent of individuals register to further their education to tertiary level (World Economic Forum, 2014). This has increased slightly to 19.7 percent (World Economic Forum, 2015). This is still not a satisfactory number since it denotes that about 80 percent of individuals, who finish secondary or high school, did not enrol for tertiary education. These 80 percent will likely remain unskilled (in particular occupations). In order to reduce the high unskilled and unemployment ratings, South Africa will have to improve its low rank of 93rd place in the world. In other words, South Africa will have to increase the number of individuals who register to study at tertiary educational institutions.

Quality of the educational system is rated on a scale from one (not well at all) to seven (extremely well) in terms of "How well does the education system in your country meet the needs of a competitive economy?" (World Economic Forum, 2014, p. 458). South Africa has had a value of 2.2 for the last couple of years (World Economic Forum, 2012; 2014; 2015). This indicates that the quality of South Africa's educations system is poor or 'not well at all' rather than doing 'extremely well'. It also indicates that South Africa's education system has not improved in the last couple of years. This low value of 2.2 is supported by the poor National Senior Certificate pass rates and low ranking, of 83rd out of 140 countries, on the Global Competitiveness reports regarding the 5th Pillar: Higher education and Training. This poor quality of the educational system (in conjunction with the quality of the education) in South Africa is at the centre of most of the problems that South Africa is confronted with today. There is little point in working towards large enrolment and pass-rate percentages if the system does not provide its learners with a quality education that provides them with intellectual capital that is valued in the market. Stated differently, there is little point in working on certain superficial problems when there is a deeper, or more threatening, underlying problem.

Quality of math and science education is rated on a scale from one (extremely poor: among the worst in the world) to seven (excellent: among the best in the world) in terms of "In your country, how would you assess the quality of math and science education?" (World Economic Forum, 2014, p. 459). South Africa has a value of 1.9, indicating that the quality of South Africa's math and science education is extremely poor and among the worst in the world (World Economic Forum, 2014). This number has increased slightly to a value of 2.0 (World Economic Forum, 2015). However, this is still not nearly a satisfactory value, since the quality of South Africa's math and science is still among the worst in the world. This poor value, in turn, has a negative effect on the enrolment and attainment of degrees since math and science are prerequisites for many degrees. This lack of acceptance for tertiary studies, further, increases the high skill shortages and unemployment in South Africa. (This statement will be discussed in more detail later in section 1.2.2 Skill Shortages).

Extent of staff training is rated on a scale from one (not at all) to seven (a great extent) in terms of "In your country, to what extent do companies invest in training and employee development?" (World Economic Forum, 2014, p. 463). South Africa received a value of 4.9 over the last two years, indicating a moderately satisfactory extent of staff training (World Economic Forum, 2014; 2015). However, this also indicates that the extent of staff training in South Africa has not yet improved. South African companies are not yet investing enough in the training and development of their employees in an attempt to reduce the high skill shortage crisis.

Compared to the world, South Africa's education system is still not satisfactory, even after more than twenty years of democracy since apartheid, although it has seen some improvements over the years. Serious improvements still need to be made to the current education system, both in secondary and tertiary education. If the quality of South Africa's education system remains poor, so will the quality of our human resources. As a result, South Africa will continue experiencing a shortage of skilled and qualified individuals. This will also contribute to the, already, high unemployment rates, poverty and crime in South Africa. This poor quality of human resources that enter organisations puts more tension on the organisation's financial capital and, as a result, reduces profit. This tension on financial capital is due to the fact that organisations now have to spend more money and time training and developing higher quality human resources, that the education system failed to produce.

1.2.2 SKILL SHORTAGES

Skill shortages refer to scarce skills, which can be defined as follows: "…an absolute or relative demand: current or in future; for skilled; qualified and experienced people to fill particular roles/professions, occupations or specialisations in the labour market…" Critical skills refer to "…particular capabilities needed within an occupation…" (Kettledas, 2008, p. 1).

The aftermath of the 1953 Bantu Education Act is a major contributor to the phenomenon that mostly the 'White' minority of South Africans gained valuable skills, knowledge, and abilities (competency potential) while 'Black' South Africans were prevented from developing the requisite job competency potential (Van Heerden, 2013). This act contributed to the lack of job competency potential and qualifications among the majority of the South African population. It could be argued that there is a link between the poor quality of education, especially as a result of apartheid and the post-apartheid government's failure to purposefully address the apartheid educational legacy, and the lack of skills today.

Due to the poor quality of South Africa's current education system, as indicated by the Global Competitiveness reports of 2010-2011, 2012-2013, 2014-2015 and 2015-2016, skill shortages will continue to be a large and extensive problem for South Africa. It can also be argued that the current skill shortages will have a negative effect on unemployment rates in the South African economy, in the sense that due to a lack of (highly valued or scarce) skills individuals are now less employable. This, having a low chance of being employed and a high unemployment rate, could then, in turn, contribute to poverty.

In the annual report of 2008 regarding the 'Joint initiative on priority skills acquisition'(JIPSA), the following skill areas were listed as high priority: engineering and planning skills for 'network industries' including transport, communications, water and energy; city, urban and provincial planning and engineering skills; artisans and technical skills for infrastructure development and housing; management and planning skills in the education and health department; and enhancing mathematics, science and language competencies and skills in public schools (JIPSA, 2008). In 2014, the following occupations were in high demand: engineers, medical and health personnel, educators, artisans, and IT specialists. (Nzimande, 2014b). The following occupations were still in high demand for 2015: engineers, educators or teachers, managers, health personnel, technicians or artisans (Nzimande, 2016). For most of these occupations, or skills, the basic requirement is a proficiency in either mathematics or sciences or both, two subjects in which the current South African school system is not good at.

It can be argued that when the quality of the current education system is enhanced, especially with the focus on mathematics and physical sciences which are essential in order to obtain most degrees, more individuals will be accepted into universities. This will result in more individuals being equipped with the necessary skills to be more employable, especially in occupations that are in high demand. One can thus argue that the higher level of quality education at schools can reduce the high scarce skill shortages in South Africa and ultimately reduce the current high levels of unemployment.

1.2.3 ADVERSE IMPACT

An important point to raise is the fact that South Africa not only suffers from a general skill shortage but that the skills shortage is also, more often than not, related to race. Referring to Table 1.4, which denotes the percentage differences in skills between the 'Black' and 'White' workforce of South Africa, the 'White' workforce holds a higher percentage of skilled workers than the 'Black' workforce. The skills shortage is, thus, much more acute amongst 'Black' South Africans than amongst 'White' South Africans.

Table 1.4

The percentage differences in skills between the 'Black' and 'White' workforce of South Africa

	'Black' workforce in 1994	'Black' workforce in 2014	'White' workforce in 1994	'White' workforce in 2014
Skilled	15%	18%	42%	61%
Semi-skilled	42%	48%	55%	36%
Low-skilled	43%	34%	3%	3%

Note: (Statistics South Africa, 2014)

A consequence of the discriminatory apartheid policies and practices that prevented large numbers of 'Black' South Africans from developing the knowledge, skills, and abilities needed to succeed in the world of work is that a valid, fair selection procedure will create adverse impact against 'Black' South Africans. Adverse impact in personnel selection refers to the situation where a selection strategy affords members of a specific group a lower likelihood to be selected than members of another group. Adverse impact can be defined as a situation where there is a substantial difference in the selection ratios of groups that work to the disadvantage of members belonging to a certain group. Thus, one group is indirectly disadvantaged over another group during a selection process (Theron, 2015b). Adverse impact denies members of a specific group access to economic opportunity via employment. It thereby not only causes poverty to be more prevalent amongst members of a specific group, but it also means poverty in the face of affluence. The former, in turn, contributes to the high crime rate whereas the latter creates fertile conditions for social unrest in South Africa. Moreover, if it is assumed that fundamental talent and skills are not related to gender, age, race, culture or language then any adverse impact against any of these groups would imply a wastage of valuable resources. This wastage, in turn, impacts/inhibits economic growth (Theron, 2015b).

The negative consequences that flow from the disproportional distribution of knowledge, skills, and abilities across 'Black' and 'White' South Africans and the associated adverse impact that comes along with it, necessitates urgent steps to correct this disproportional distribution.

1.2.4 UNEMPLOYMENT

Unemployment refers to a situation in which an individual, who wishes to work or to be employed, cannot find a job. The unemployment rate denotes the total number of unemployed individuals as a percentage of the total number of the economically active labour force, those individuals willing and able to work (South African Reserve Bank, n.d.). In practice there are two sub-definitions of unemployment. The strict or narrow definition denotes only those individuals who actively try to find employment or jobs but cannot find a job. The elaborated or broad definition denotes all individuals who wish to be employed, whether they make an effort to actively find jobs or not (South African Reserve Bank, n.d.).

Economically active or Economically Active Population (EAP) is a concept related to unemployment and it includes people from age 15 to 64 who are either employed or unemployed, but actively seeking employment. The EAP assists employers, during the analysis of their workforce, to determine the degree or percentage of under-representation of designated groups in that particular organisation. EAP also guides employers in setting their numerical goals and targets, in order to achieve an equitable and representative workforce in that particular organisation (Republic of South Africa, 2014).

Table 1.5 indicates the highest and lowest unemployment rates for the period 2008 to 2015.

Table 1.5

South African unemployment rates[9]

Year	Lowest rate that year	Highest rate that year
2008	21.5%	23.2%
2009	23.0%	24.5%
2010	23.9%	25.4%
2011	23.8%	25.6%
2012	24.5%	25.2%
2013	24.1%	25.3%
2014	24.3%	25.5%
2015	24.5%	26.4%

Note: (Statistics South Africa, 2015; 2016)

[9] Includes only labour market activities of persons aged 15 to 64 years. Rates based on four quadrants.

As indicated in Table 1.5, even though the unemployment rate has fluctuated over the past seven years, it tended to increase from the lowest rate of 21.5 percent in 2008 to the highest it has ever been at 26.4 percent in the beginning 2015 (Statistics South Africa, 2015; 2016). These numbers, or rates, indicate the percentage of individuals who want to work or can work but are unemployed. Therefore, in 2015 there were about 26 percent (of a South African population of 54 960 000 individuals) (Statistics South Africa, 2015) who were not employed, who were not earning a living and who could not support themselves and their families. It could be argued that these, approximately 14 289 600, individuals may not have been able to afford providing their families with food, shelter or even education, and in order to survive, these individuals may even have resorted to crime.

Unemployment is one of South Africa’s biggest challenges and creating jobs or new employment options can be difficult. In an attempt to provide support to these unemployed individuals and their families the South African Government provides social grants. Social grants aim to improve standards of living and redistribute wealth in order to create a more equitable society. In other words, these grants are targeted at categories of people who are vulnerable to poverty, due to being unemployed, and in need of support from the state. It is the responsibility of the South African Social Security Agency (SASSA) to pay and administer social grants (Kelly & GroundUp Staff, 2014). However, in recent years a growing number of people have warned that the increase in grant recipient numbers is not sustainable. Ex-president Jacob Zuma said, a few years ago, that government cannot sustain a situation where social grants are growing all the time and think it can be a permanent feature (Ferreira, n.d.). The tax base that funds these social grants is simply too small to sustain the growth in social grants. Moreover, the low economic growth means that the rate at which the government’s revenue through taxes increases is lower than the rate at which social grants increase. Despite this looming fiscal crisis, social spending or grants has not decreased (Ferreira, n.d.). In fact, the government is currently increasing their social grant expenditure (Ndenze, 2016; Schreiber, 2016). Rossouw, Joubert and Breytenbach (2014) estimate that even if provision is made for a nominal growth in government earnings (9.9% per year over the period 2012–2017, 9.7% per year over the period 2018–2030 and 8.6% per year over the period 2031–2050), that spending on social grants and government remuneration will by 2026 already comprise 100.4% of government earnings if the historical growth trends in these two spending categories will be allowed to continue. This trend is depicted in Figure 1.2.

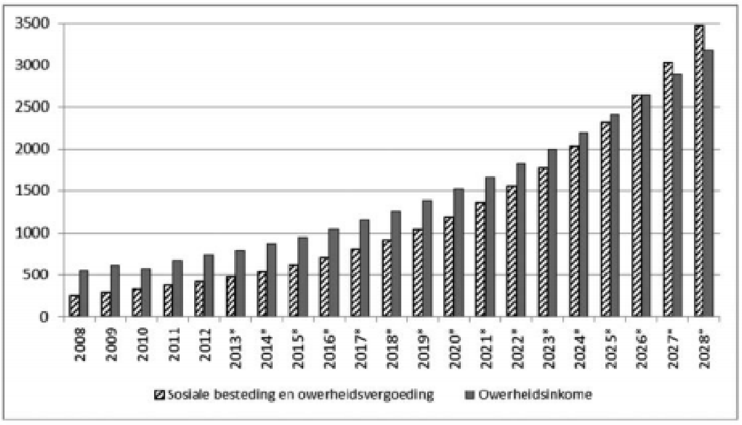

Figure 1.2. **Growth in spending on social grants and government remuneration compared to government earnings (R billion)**

(Rossouw et al., 2014, p. 155)

It can moreover be argued that the danger exists that these unemployed individuals can become dependent on these social grants from the government. This state of dependency could then reduce the desire to actively look for work or even to accept employment and thereby continuing to keep the unemployment rate high. Furthermore, weaning social grant dependents from the support of social grants may lead to political unrest (Theron, 2015b). Alternative solutions to the high unemployment rate should be pursued, such as attempting to create new job opportunities through encouraging entrepreneurs and enhancing the quality of the current education system. Enhancing the education system not only provides more opportunities for further education, it can also enhance cognitive functions. This, in turn, may allow individuals to seek and discover gaps in the current market for new business ventures.

1.2.5 POVERTY

Poverty is not an isolated socio-economic challenge; rather it is a serious result or outcome of other socio-economic problems and is therefore included in the discussion of the section on the current South African context.

Even over twenty years into democracy, South Africa is still being characterised as a highly unequal society in which too many people still live in poverty and unemployment (National Planning Commission, n.d.). South Africa has the most unequal income distribution in the world, with a Gini coefficient[10] remaining at around .7 since 2000 (Statistics South Africa, 2013). More specifically during 2005 and 2009 South Africa had an average Gini index of 6.5, the highest in the world (The

[10] A Gini index of 0 represents perfect equality, while an index of 100 (or 1) implies perfect inequality (Ehlers & Lazenby, 2010; The World Bank, n.d.). Explained in more detail it could be said that a zero Gini coefficient is where everyone has the exactly the same income and a Gini coefficient of one is where only one person has all the income and everyone else has a zero income.

World Bank, n.d.). This high Gini index or coefficient indicates that the majority of South Africans have little personal wealth that contrasts sharply with the large personal wealth of the small, but highly visible, affluent group of South Africans. With the majority having a low, or no, income indicates a serious poverty problem. Furthermore, the fact that they suffer from poverty in the face of affluence creates the potential for social unrest.

Countries with high poverty rates usually have a high crime rate as well since individuals with no income have to support themselves and their families in some way or another. South Africa is among the top ten countries, in the world, with the highest murder rate (ABC News Point, 2015). South Africa ranked fourth out of 120 countries in terms of a crime index (Numbeo, 2015).

On an older list of the world's poorest countries, South Africa is ranked 110th out of 191 countries (Aneki, 2014). On a current list of the world's poorest countries, South Africa is ranked 55th out of 126 countries (Focus Economics, 2018). It could be argued that the root of South Africa's current high poverty status is due to poor education, especially during apartheid since poor education results in fewer people obtaining critical skills and qualifications, which results in fewer people being employable. With fewer people being employable the unemployment rates increase and, as a result, the poverty rates also increase.

1.3 A POTENTIAL SOLUTION: AFFIRMATIVE DEVELOPMENT

Early interventions should ideally be implemented in an attempt to rectify past inequality and enhance employability. Examples of such early intervention include educating pregnant women on nutrition to ensure optimum development of their unborn children, providing pregnant and breastfeeding women with proper nutrition and supplements, providing young children with developmental and educational toys prior to going to school and educating parents on how to create a stimulus rich educational and developmental environment conducive to cognitive development and learning[11]. These interventions should fall under the control and management of the public sector or government. However, since this is not currently nationally implemented, the focus should rather fall on education and the education system in an attempt to create coinciding job competency potential distributions across all groups. This, in turn, will ensure that previously disadvantaged South Africans have the same probability of being selected into jobs than their previously advantaged counterparts.

[11] This is a crucial but sadly neglected priority. Studies have found a (negative) link between the socioeconomic status of a baby (e.g., poverty) and brain development and growth of such a child. Indications are that a stimulus poor early environment significantly inhibits brain development and that there is only a relatively small window of opportunity to undo the negative neurological consequences of under stimulation and neglect (Bhattacharjee, 2015).

South Africa's current social-economic challenges (e.g., adverse impact, high unemployment rates, and scarce skill shortages) can best be dealt with by (a) pro-actively addressing the inadequacies of the formal pre-primary, primary and secondary education system. South Africa cannot afford to continue wasting the vast reservoir of potential that lies in its previously disadvantaged youth. Addressing the shortcomings in the formal pre-primary, primary and secondary education system will, unfortunately, still leave numerous cohorts of 'Black' learners that have already passed through the apartheid education system or the malfunctioning post-apartheid education system with inadequate job competency potential. This lack of adequate job competency potential variables leaves them on unequal footing when competing with their more privileged 'White' counterparts. The knowledge, skills and abilities of previously disadvantaged 'Black' South Africans that have already left school can be enhanced, and can, as a result, then also address the shortages of scare skills, by (b) implementing training and development interventions (for both employees and potential employees), adult education, 'night school' classes (which are conducted after work for employees who do not have basic education), and basic education classes (incorporated into the employee wellness programmes where employees are encouraged to conclude their final national examinations) (Hoffman, as cited in Burger, 2012; Mahembe, 2014; Van Der Westhuizen, 2015). Such a two-pronged approach to development, if pursued with the necessary enthusiasm and commitment, could go a long way to ameliorate the complexly inter-related network of social-economic problems that South Africa currently faces as a result of apartheid. This development initiative is known as affirmative action development or simply affirmative development (Van der Westhuizen, 2015).

The current South African Government implemented affirmative action, through the Employment Equity Act No.55 of 1998, to rectify inequality in the workplace as a consequence of apartheid. Affirmative action attempts to ensure that qualified people from designated groups ('Black' people, women and people with disabilities) have equal opportunities in the workplace. Designated groups must, therefore, be equally represented in all job categories and levels (Republic of South Africa, n.d.). The efforts of government alone, however, cannot improve the skills shortage crisis currently faced by South Africa. The effort and investment of the private sector, businesses and organisations are also required if progress is to be made. More specifically, organisations can assist by training and developing not only their own human resources but also offer previously disadvantaged individuals' access to training and development opportunities (Van Heerden, 2013; Van der Westhuizen, 2015). Training and development of human resources leads to an increase in cognitive functioning, or the ability to use reasoning and intellect in areas other than learning programmes, as well as an increase in skills. In order for skills development and training, such as affirmative development interventions, to be successful, there has to be a partnership or collaboration between the government, the private sector and the general society (Van Heerden, 2013; Van der Westhuizen, 2015). This partnership provides maximum investment opportunities, maximum knowledge and resources as well as a wide range of possible solutions and ideas to jointly address the socio-economic challenges facing the country. More specifically the government should focus on the education sector (i.e., education prior to employment). Afterwards, the private sector should focus on training and development within organisations (i.e., furthering the skills of those already employed).

The responsibility for improving education and development should consequently be shared by government and the private sector alike. HRM, in particular, should focus its energy and resources on improving adult education. Adult education denotes the education and training of the organisation's current[12] employees, through utilising programmes such as affirmative development. HRM has to design and implement training and development programmes to enhance their current employees' knowledge, skills and abilities in order to increase the supply of scarce skills. By offering training opportunities to employees, South African businesses and companies can play their part in reducing the prevalence of scarce skill shortages and high unemployment (George, Surgey, & Gow, 2014). This increase in skills in their employees may lead to an increase in productivity, which could lead to an increase in profit. This, in turn, also brings with it the promise of economic growth in the wider economy of South Africa (George et al., 2014). Developing employees to obtain scarce skills can lead to the economic growth of South Africa. This economic growth, in turn, can provide South Africa with a competitive advantage. Through educating employees, organisations can now not only make these employees more employable and productive but can also reduce the high scarce skill shortage in South Africa. This could ultimately reduce unemployment and poverty.

It is in the best interest of both the government and organisations to invest in South Africa's labour force. The previously discussed set of inter-related socio-economic problems, in which South African HRM operates, are not conducive to doing business. Moreover, the failure to address the inadequacies in the South African education system enhances the need for affirmative development. This is especially true of those high potential individuals that have left school without their potential being developed (Van der Westhuizen, 2015). Affirmative development programmes should be utilised since these programmes aim to improve the job competencies and job competency potential latent variables of adult employees, to ultimately enhance job performance, work productivity and improve their employability (Burger, 2012; Van der Westhuizen, 2015).

Affirmative development programmes require employees to retrieve prior learned responses and knowledge and apply it to unfamiliar/novel stimuli during the training programme. The insight

[12] Or in case of a two-stage selection process to enhance the knowledge, skills and abilities of currently unemployed individuals (i.e., potential future employee) in order to increase the supply of scares skills in the labour market and enhance the employability or probability of these employees to be selected for the job.

derived from transfer subsequently needs to be automated (Taylor, 1994). This, in turn, allows employees to utilise the newly derived knowledge and solve novel problems in a real work situation that they previously were unable to solve (De Goede & Theron, 2010). Affirmative development programmes can thus be viewed as a deliberate intervention implemented by organisations, through the guidance of HRM, in order to address current and/or expected future shortcomings in competency potential variables, such as knowledge, or attitudes (Van der Westhuizen, 2015). Consequently, an important requirement of any affirmative development programme is that these programmes should be substantial enough to equip an individual, with knowledge and skills, for entry into a specific job (Mahembe, 2014).

According to Van Heerden (2013), there are millions of disadvantaged Black individuals who require access to training and development opportunities as well as opportunities to enhance and/or acquire scarce skills. However, organisations can only accommodate a select few individuals at that specific time, due to scarce resources, time limitations and the costs associated with developing and implementing affirmative development programmes (De Goede & Theron, 2010; Van Heerden, 2013). Only those previously disadvantaged individuals that show sufficient learning potential to benefit from affirmative development opportunities should be selected for affirmative development programmes (Van Heerden, 2013). In order to maximise return on investment organisations must be able to select from an enormous pool of affirmative action candidates those candidates who: (a) will best match the learning programme and the organisation, (b) will actually complete the programme and not drop out, (c) would be suitable to be permanently employed at the organisation and (d) would be able to offer their newly gained skills to the benefit of the organisation (Van Heerden, 2013).

Selecting candidates, that show potential for affirmative development, provide additional questions or options, such as (a) is the organisation going to develop the people on the job (while they have already committed to them or after selection for the job has occurred) or (b) is the organisation going to develop them off the job first (before selection into the job has occurred) and then decide, after the training and development programme, who should be selected for the job and only then develop them further (Theron, 2015b). The current study acknowledges the legitimacy of both options but argues that the latter option has the potential for having a larger impact on the fundamental problem that affirmative development attempts to remedy.

In line with the latter option, a two-stage selection process includes two distinct but sequentially linked selection procedures with two different outcomes (De Goede, 2007). The first selection is into the training and development programme, selecting those affirmative development candidates that have a sufficiently high probability of successfully completing the programme and passing the summative evaluation at the end of the programme. The objective of selection into the affirmative development programme is to predict the training evaluation score, given measures of learning potential. During the affirmative training and development programme, the trainee is developed to enhance their learning performance and job potential. The extent to which classroom learning took place and the requisite job potential (i.e., job competency potential) developed is evaluated preferably via a competency-based evaluation[13].

The main aim of any affirmative development and training programme is to elevate previously disadvantaged South Africans' standing on the *job competency potential latent variables* that they were prevented from developing due to a lack of opportunity and quality education during apartheid and that caused them to underperform on the job. A summative evaluation conducted at the end of the affirmative development programme should, therefore, determine whether learners' standing on the *job competency potential latent variables* has improved. This improvement should be to such a degree that they would be able to successfully cope with the job demands they will encounter on the job. Hence there is a need during the post-development summative evaluation for a simulation of the job to determine whether learners can successfully transfer their newly developed knowledge, skills, and abilities onto novel job-relevant problems. If so, it would imply that the affirmative development programme has to some degree succeeded in narrowing the difference between the criterion distributions of disadvantaged and privileged South Africans, which, in turn, reduces adverse impact. A second selection, selection into the job, involves selecting those future employees that have a sufficiently high probability of succeeding on the job from an applicant pool that now contains both candidates from the development programme as well as other candidates that did not need the development programme (De Goede, 2007; Burger, 2012; Theron, 2015b). Both groups should now perform equally well on the job in question. This two-stage selection process is thus in line with the thinking of the EEA[14] (Van Heerden, 2013).

Selection for a job, the development and implementation of affirmative development programmes and selection for affirmative development programmes have become important focus areas for HRM and researchers in Industrial Psychology. The study of and research on learning potential (*learning competency potential*), learning performance (*learning competencies*) and knowledge, skills and abilities obtained through training (*learning outcomes* or *job competency potential*) are important. They have to be considered to gain an understanding of all the factors that influence whether or not

[13] The term competency-based evaluation is used here to refer to assessment in which the trainee needs to demonstrate that he/she has successfully automated the newly attained knowledge, skills and abilities developed in the training programme by successfully transferring it onto novel but job-relevant problems.

[14] Especially the following section in the Employment Equity Act (Republic of South Africa, 1998, p. 22):
For purposes of this Act, a person may be suitably qualified for a job as a result of any one of, or any combination of that person's (a) formal qualifications; (b) prior learning; (c) relevant experience; or (d) capacity to acquire, within a reasonable time, the ability to do the job.

an individual will be successful when placed in an affirmative development, skills development and subsequently in a job that the affirmative development programme serves (Van Heerden, 2013).

It could further be argued that the malleable *learning competency potential latent variables* influencing learning performance are, in turn, influenced by the level of competence that the trainer-instructor achieves on a structurally interlinked set of *trainer-instructor competencies*. The latter, in turn, is determined by a structurally interrelated set of *trainer-instructor competency potential* and *training situational latent variables*. As a result, the learning potential model and the trainer-instructor performance competency model were developed and will be discussed in the next sections.

1.3.1 THE LEARNING POTENTIAL MODEL

Learning potential, according to Taylor (as cited in De Goede & Theron, 2010), denotes the current person characteristics that determine the success with which learners on a training or development programme obtain and master new intellectually demanding knowledge and skills. Learners on a learning programme master new intellectually demanding knowledge and skills through specific *learning competencies* that constitute learning behaviourally. An individual's learning potential thus represents their potential for learning new knowledge and skills (i.e., *learning outcomes* or *job competency potential*) by utilising their current capacity during training and development (i.e., *learning competency potential*). Learning potential more specifically refers to whether, or not, individuals currently possess the qualities (*learning competency potential*) to succeed at learning, when given the opportunity to learn (Theron, 2015b). A learning potential competency model or performance@learning competency model describes what constitutes learning performance by describing the structural relations between the *learning competencies* and *learning outcomes* and by describing how the *learning competency potential* (and *learning situational*) *latent variables* structurally combine to determine learning performance. Hence, learning potential competency models should be consulted in order to gain a better understanding of all the variables (*learning competency potential*, *learning situation*, *learning competencies* and *learning outcomes*) that influence and constitute the success of affirmative development programmes.

De Goede's (2007) learning potential model is a first-generation research study on learning potential and its influence on learning performance. Subsequent research on the learning potential model included elaborations such as additional non-cognitive factors or latent variables (Burger, 2012; Mahembe, 2014; Du Toit, 2014), additional latent variables and feedback loops (Van Heerden, 2013), psychological capital (Prinsloo, 2013), and positive psychology and situational latent variables (Pretorius, 2014).

The learning potential competency model provides information on how learning in affirmative development programmes influences job performance as well as what influences the learning needed to ultimately increase job performance. The learning potential competency model achieves the former in that the *learning outcome latent variables* are the malleable *job competency potential latent variables* that determine the level of performance on the *job competency latent variables*.

1.3.2 THE TRAINER-INSTRUCTOR PERFORMANCE MODEL

Van der Westhuizen (2015) argued that research on learning potential at Stellenbosch University has, thus far, exclusively focussed on the structural relations between the *learning competencies* comprising learning, the *person-centred learning competency potential latent variables* that determine the level of competence achieved on the *learning competencies* (Burger, 2012; De Goede, 2007; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013) and, albeit to a significantly lesser extent, *situational latent variables* that determine the level of competence achieved on the *learning competencies* (Pretorius, 2014). However, learning performance is not solely determined by person-centred latent variables and situational characteristics. Additionally, training and learning is also influenced by the trainer-instructor of the affirmative development programme (Van der Westhuizen, 2015).

Berry, Johnson and Montgomery (2005) believe that the heart of school improvement initiatives can be found in quality teachers. England's, UK, Secretary of State for Education Michael Gove said "The single most important thing in education is improving the quality of the educational experience for each child by investing in higher-quality teaching…" (Bassett, Haldenby, Tanner, & Trewhitt, 2010, p. 35). Trainer-instructors or teachers are typically the most salient people in the training setting, even in more learner-centred training or development programmes, since they define most of the learning tasks, provide assistance, generate formal and informal performance situations (such as tests), define the major standards for evaluation of learning performance, provide students with feedback (verbal or written), and they also react to students' behaviour and performance with different emotions (Ziegler, Dresel, & Stoeger, 2008). It could therefore be argued that the teacher's or trainer-instructor's role, performance and behaviours during a learning and development programme can have a major impact on the learning performance and success of the trainee or learner[15]. The teacher or trainer-instructor does so by influencing the learners' or trainees' standing on the malleable

[15] Learners and trainees both refer to those individuals that are undergoing some form of learning. For the purpose of this study, learners, more specifically, refer to younger individuals (e.g., individuals of school going age) and form part of the learning potential competency models. Trainees, on the other hand, refer to adult/post-school learners (e.g., individuals in a training or development programme as part of an organisation) and form part of the trainer-instructor performance competency model.

learning competency potential latent variables and *learning situational latent variables* that determine learning performance.

By influencing their learners' or trainees' learning ability, teachers or trainer-instructors can thus contribute to the improvement and enhancement of the current poor quality of education in South Africa. One way in which the current education system can be enhanced is thus by training and developing teachers. Highly trained teachers are needed, and especially so in the subjects with teacher shortages include languages, mathematics, science, technology and the arts (National Planning Commission, n.d.). Ultimately, teachers and trainer-instructors need to be competent in the *trainer-instructor competencies* that are instrumental in affecting the *trainer-instructor outcomes* (or *learning competency potential*) they are expected to achieve. To achieve the required level of competence in the *trainer-instructor competencies* the standing of the trainer-instructor on the *trainer-instructor competency potential latent variables* needs to exceed a minimum threshold. These *trainer-instructor competency potential latent variables* include subject knowledge and language proficiency but extend far beyond these.

In order to influence learning performance (by influencing the malleable latent variables constituting learning potential) through the enhancement of trainer-instructor performance a better understanding of the trainer-instructor and their role in the training and learning programme or affirmative development programme should be gained. In other words, research should be conducted on the *trainer-instructor competency potential*, *trainer-instructor competencies* and *trainer-instructor outcomes* and the manner in which these latent variables are structurally inter-related. Van der Westhuizen's (2015) partial affirmative development trainer-instructor competency model was a first-generation research study on trainer-instructor performance. This study focused on *trainer-instructor's competencies* and *trainer-instructor outcomes*, which has an influence on the learning performance of his/her trainees, through the influence of the *trainer-instructor competencies* on the malleable *learning competency potential latent variables* of the trainee (or then the *trainer-instructor outcome latent variables*).

The partial competency model developed by Van der Westhuizen (2015) explicates the *trainer-instructor competencies* and *trainer-instructor outcomes* that constitute trainer-instructor performance and the manner in which these latent variables are structurally related. Her model does not explicate the *trainer-instructor competency potential latent variables* and the manner in which they structurally map on or influence the *trainer-instructor competencies*. Nor does her model explicate the *training situational variables* that directly, or in interaction with *trainer-instructor competency potential latent variables*, determine the level of competence that trainer-instructors achieve on the competencies. In addition, she had to reduce the partial trainer-instructor competency model that emerged via theorising from her literature study by excluding specific *trainer-instructor competencies* and *trainer-instructor outcome latent variables* from the trainer-instructor performance structural model that was empirically tested.

1.4 THE RESEARCH-INITIATING QUESTION

Given the introductory argument, that poor quality education is at the root of South Africa's current socio-economic challenges and that trainer-instructors have a significant impact on trainees' or learners' learning success, the research-initiating question driving this study consequently is:

Why is there variance in the performance of affirmative development trainer-instructors?

Additional research questions, flowing from the research-initiating question that will have to be addressed in order to answer the research-initiating question are:

What constitutes affirmative development trainer-instructors' performance? In other words, what are the trainer-instructor outcomes that the affirmative development trainer-instructor is expected to achieve, which competencies are instrumental in achieving these outcomes and how are these trainer-instructor competencies and outcome latent variables structurally related?[16]

The research initiating question in essence asks which *trainer-instructor competency potential latent variables* and *training situational latent variables* determine the level of competence that trainer-instructors achieve on the *trainer-instructor competencies* and, indirectly through those, the level of competence they achieve on the *outcome latent variables*, as well as how are these *trainer-instructor competency potential latent variables*, *training situational latent variables*, *competency latent variables* and *outcome latent variables* structurally related or how do they influence each other?

1.5 THE RESEARCH OBJECTIVES

In an attempt to address the foregoing research initiating questions, the proposed study focused on the following areas, or more specifically the objectives of the study are:

a) To expand and/or modify the trainer-instructor competency model as developed by Van der Westhuizen (2015) by identifying *trainer-instructor competency potential latent variables* and possibly by identifying additional *trainer-instructor competency latent variables*, by identifying additional *trainer-instructor outcome latent variables* and *training situational latent variables* as well as identifying additional pathways between existing latent variables

[16] This question has been posed and to a reasonable degree been answered by van der Westhuizen (2015).

not addressed by the Van der Westhuizen (2015) model, in order to design a comprehensive affirmative development trainer-instructor competency model.

b) To empirically test the fit of this elaborated affirmative development trainer-instructor competency model.

The overall objective was, consequently, to develop and empirically test an elaborated affirmative development trainer-instructor competency model which depicts a network of core *trainer-instructor competency potential latent variables*, *trainer-instructor competencies*, *trainer-instructor outcomes* and *training situational latent variables* that affect the learning success of the trainees (learning outcomes and the level of competence achieved on the learning competencies) via the malleable *learning competency potential latent variables* (which at the same time constitute the trainer-instructor outcomes).

CHAPTER 2 LITERATURE STUDY

2.1 INTRODUCTION

The aim of this chapter was to develop a comprehensive affirmative development trainer-instructor competency model comprising a structurally interrelated set of *trainer-instructor competency potential latent variables*, *training situational latent variables*, *trainer-instructor competency latent variables* and *trainer-instructor outcome latent variables*. This model can eventually be sequentially structurally linked with a comprehensive learning potential competency model (comprised of the learner's *learning competency potential latent variables*, *latent learning competencies* and *learning outcome latent variables*) derived from a series of cumulative research studies on affirmative development learning performance (Burger, 2012; De Goede, 2007; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013).

In order to lay the foundation for the derivation of the affirmative development trainer-instructor competency model, contextual information has to be presented. Firstly, an overview of competency modelling is provided in section 2.2, which includes an explanation of the term competency, defining a competency model and its four elements or domains, followed by a discussion of the value of sequentially linking different competency models. Secondly, an overview of the affirmative development trainer-instructor competency model is discussed in paragraph 2.3, which includes the definition of the term trainer-instructor and discussions on the proposed and empirically tested partial trainer-instructor competency model developed by Van der Westhuizen (2015). Thirdly, the proposed Wessels-Van der Westhuizen trainer-instructor competency model is discussed in paragraph 2.4. Lastly, a detailed discussion of the proposed Wessels-Van der Westhuizen trainer-instructor competency model latent variables is presented from paragraph 2.5 to paragraph 2.8.

In these latter paragraphs, path-specific substantive hypotheses were derived through theorising. The full Wessels-Van der Westhuizen affirmative development trainer-instructor competency model that emerged from this theorising is depicted as Figure 2.7 in section 2.10.

The research-initiating question, as stated in Chapter 1, was purposefully formulated as an open-ended question to allow the theorising in Chapter 2 to give rise to the research problem and the research hypotheses. Research only really stands a chance of gaining a valid understanding of the psychological mechanism that regulates and underpins trainer-instructor performance through committed, extended, unrestrained scholarly theorising aimed at answering the research-initiating question. When the research problem and research hypotheses are formulated at the outset of the study it makes it extremely unlikely that the research will result in a valid description of the psychological mechanism that regulates trainer-instructor performance because it marginalises fluid intelligence-driven, problem-solving, scholarly, theorising. When the research problem and research hypotheses are formulated at the outset of the study there is a very real possibility that latent variables that do not play a central role in the psychological mechanism that regulates trainer-instructor performance will be artificially forced into the research hypotheses while latent variables that are critical components in the mechanism may be omitted. Moreover, that the richly inter-connected structural relations that exist between the components of the psychological mechanism will never find their way into the research hypotheses. Latent variables have to earn their inclusion in the overarching substantive hypothesis that is offered as an answer to the research-initiating question. They do so by being indispensable in the construction of a plausible psychological mechanism that can account for the variance in trainer-instructor performance.

2.2 AN OVERVIEW OF COMPETENCY MODELLING

The objective of the current study was to develop and test an affirmative development trainer-instructor competency model. The current study attaches a specific interpretation to the terms competency model and competency modelling. Its interpretation of these terms is, however, rather unique. The current study interprets a competency model as a four-domain structural model[17] that describes how a structurally interrelated set of *competency potential latent variables* and a structurally interrelated set of *situational latent variables* influence an individual's level of competence on a structurally interrelated set of *competencies* (i.e., *competency latent variables*) and how these, in turn, influence a structurally interrelated set of *outcome latent variables*. Some degree of semantic confusion exists in the literature on the connotative meaning of competencies and consequently also on the connotative meaning of a competency model.

2.2.1 DEFINING COMPETENCIES

The terms 'competence' and 'competency' became popular in the late 1980's and in the 1990's since they could be utilised to set goals for assessment and development interventions (Cheng, Dainty, & Moore, 2003). However, there are differences in the meaning and/or definitions of these terms across different countries. Many human research management practitioners are therefore uncertain what these terms actually entail and this lack of clarity causes confusion (Albanese, Mejicano, Mullan, Kokotailo & Gruppen, 2008; Cheng et al., 2003; Garavan & McGuire, 2001; Kennedy, Hyland, & Ryan, n.d.; Le Deist & Winterton, 2005; Moore, Cheng, & Dainty, 2002).

[17] A four-domain structural model can be contrasted with a three-domain structural model which describes how a structurally interrelated set of *competency potential latent variables* that influence an individual's level of competence on a structurally interrelated set of *competencies* (i.e., *competency latent variables*) and how these, in turn, influence a structurally interrelated set of *outcome latent variables*.

In terms of one *broad* interpretation, competencies denote those knowledge, skills, abilities, attitudinal values, a set of behaviours and other characteristics of an individual that are needed to perform a job or task successfully, that will enhance employability, and that are instrumental for reaching desired organisational results, outcomes or goals, while at the same time considering the nature of the task and the organisational context (Coetzee & Schreuder, 2010; Grobler et al., 2012; Schreuder & Coetzee, 2011). This interpretation should, however, be criticised as being overly broad in that it considers both behaviours and person characteristics as competencies.

Competencies can, conversely, be defined more specifically in terms of one of two possible narrower views. The first narrow view defines competencies as attributes (causally) related to success. This narrow interpretation is primarily an American view. The second narrow view defines competencies as the common abstract theme in bundles of behaviours (causally) related to success. This latter view is primarily a British view. The latter interpretation is also the one utilised in the current study. Confusion, regarding competencies, is further aggravated in that the term ‘success’ in these two views refers to different phenomena (Theron, 2015a).

In the first, American, *narrow* view competencies refer to those personal attributes or characteristics which include malleable person characteristics like knowledge, skills and abilities acquired through training, and non-malleable person characteristics like cognitive intelligence, personality and interests. Klemp (as cited in Boyatzis, 1982, p. 21) stated that job competency is “an underlying characteristic of a person which results in effective and/or superior performance in a job”. Employees’ standing on these competencies (i.e., their personal characteristics) determine the effectiveness with which the behavioural tasks required for a job are performed. In the first, American, *narrow* view of job success therefore refers to the effectiveness with which the behavioural tasks comprising a job are performed and is not focused on the job outcomes (Adam, 2004; Campion et al., 2011; Coetzee & Schreuder, 2010; Garavan & McGuire, 2001).

In the second, British, *narrow* view competencies refer to the abstract theme shared by a relatively stable set of observable behaviours. What the British refer to as competencies is, thus, what the Americans describe as (job) success. The level of performance achieved on the competencies (i.e., behaviours) determine the extent to which the outcomes or desired results are achieved for which the job exists (Bartram, 2012; Le Deist & Winterton, 2005; Van der Westhuizen, 2015; Zacarias & Togonon, 2007). The second, British, *narrow* view job success, therefore, refers to the level of performance that is achieved on the outcomes that the job incumbent is held accountable for.

Since the two narrow views interpret the term competencies differently it follows that the term competence will also be interpreted differently. The term competence generally denotes the ability to do something well or effectively (Collins English Dictionary, n.d.). In terms of the first, American, *narrow* view the term competence refers to the phenomenon that the levels that an individual has attained on the competencies (i.e., person characteristics that determine the effectiveness with which behavioural tasks comprising the job are performed) is sufficiently high to ensure that job success is achieved (i.e., the effectiveness with which behavioural tasks comprising the job are performed is regarded as satisfactory). In terms of the second, British, *narrow* view the term competence refers to the phenomenon that the levels that an individual has attained on the competencies (i.e., the behavioural task that constitute the job) is sufficiently high to ensure that job success is achieved (i.e., the levels of the outcomes that the behavioural tasks are instrumental in achieving are performed are regarded as satisfactory).

For the purpose of the current research study the second narrow or British interpretation of competencies, competency modelling and competence will be used.

2.2.2 DEFINING COMPETENCY MODELLING

The definition of competency models or competency modelling partly depends on the two viewpoints regarding competencies (Van der Westhuizen, 2015). If competencies refer to person characteristics, or the American narrow view, then competency models denote the collection or cluster of individual knowledge, skills, abilities and other characteristics needed for effective performance in a specific job. However, if competencies refer to the British narrow view then competency modelling would include a collection of behaviours needed for effective performance or achieving certain outcomes. These models will develop differently and will also look slightly different from each other (Campion et al., 2011; Van der Westhuizen, 2015). In both instances, a competency model is often understood to essentially refer to a list of structurally interlinked competencies (person characteristics or observable behaviours).

The SHL Universal Competency Framework (UCF) interprets the term competency model as an explanatory model of performance at work (performance@work competency model) which defines and explains the relationships between competency potential, competency requirements, competencies and outcomes (Bartram, 2012). This model offers a solution to the semantic confusion regarding competencies and competency modelling (Van der Westhuizen, 2015).

According to the UCF, the elements of the framework include:

a) "Competencies' defined as sets of desirable behaviours" (Bartram, 2012, p. 5). In the business environment competencies are behaviours that support the attainment of organisational objectives and goals.

b) "Competency potential, which is seen to derive from individual dispositions and attainments" (Bartram, 2012, p. 4) as well as "Competency potential': the individual attributes necessary for someone to produce the desired behaviours" (Bartram, 2012, p. 5).

c) "Competency requirements': the demands made upon individuals within a work setting to behave in certain ways and not to behave in others… contextual and situational factors in the work setting will also act to direct an individual's effort and affect the individual's ability to produce the desired sets of behaviour…" (Bartram, 2012, p. 5). Stated differently "Competency requirements or the demands made upon people to display certain behaviours and not to display others. These requirements can be both facilitators of, and barriers to, effective performance in the workplace. They can also be explicitly encouraged through line manager instruction, or implicitly through organisational norms and values" (Bartram, 2012, p. 4).

d) "Results': The actual or intended outcomes of behaviour, which have been defined either explicitly or implicitly by the individual, his or her line manager or the organisation" (Bartram, 2012, p. 5).

The UCF **"…**is a single underlying construct framework that provides a rational, consistent and practical basis for the purpose of understanding people's behaviours at work and the likelihood of being able to succeed in certain roles and in certain environments" (Bartram, 2012, p. 2). The UCF points to ways in which people and their work setting interact. The UCF also has implications for how performance in the workplace can be managed (Bartram, 2012). The UCF focuses on describing or measuring performance@work and considers measures of personality, ability and motivation as important determinants of performance@work. The focus is on describing people in terms of competency and competency potential constructs and discussing how people fit, or misfit, the competency requirements in the job or workplace (Bartram, 2012). Competency potential in the UCF refers to the American interpretation of competencies, competencies in the UCF refers to job success in the American interpretation of competencies and results in the UCF refers to job success in the British interpretation of competencies.

The UCF could, however, be criticised for not sufficiently acknowledging that performance is complexly determined and for neglecting the role of *situational latent variables*. The first limitation, that of complexity, can be addressed by integrating the UCF's interpretation of competency modelling with structural equation modelling. The second limitation, neglecting the role of the situation or environment, can be addressed by adding *situational latent variables* as a fourth domain to said equation model.

A competency model is thus, in terms of this modified interpretation, in essence a complex nomological network of causally interrelated latent variables depicted as a four-domain structural model. These four domains, each representing a structural model in their own right, denote *competency potential latent variables* and *situational latent variables* that determine the level of competence on certain *competency latent variables* which, in turn, determine the level of competence on certain *outcome latent variables* (Chikampa, 2013; Dunbar, Theron, & Spangenberg, 2011; Myburgh, 2013). Competency modelling, in turn, then refer to the process of constructing, through theorising, such a structural model, empirically evaluating its fit and testing the statistical significance of the estimates of the freed model parameters.

2.2.3 THREE SEQUENTIALLY LINKED COMPETENCY MODELS

In terms of the quadruple bottom line (Cambridge, 2013; Elkington, 1994; W. ElMaraghy, & H. ElMaraghy, 2014; Lawler III, 2014) organisations exits to make a profit, to give back to the community in which they operate, take care of the planet and ensure fair treatment of all employees (including training and development of employees). One way of enhancing the profit margin (i.e., the bottom line) is to enhance the performance of the organisation's employees. Employee performance can be seen as a, complexly determined, structurally inter-related set of latent behavioural *job competencies* and *job outcome latent variables*. The level of competence that employees achieve on the *job competency latent variables* and *job outcome latent variables* are not the outcome of a random event, but rather the outcome of the systematic working of a structurally inter-related set of *job competency potential latent variables* and *job situational latent variables*. The **performance@work** competency model makes explicit what constitutes job performance (by identifying the *job competencies* and *job outcomes* and the structural relationships that exist between them) and it describes the nature of the psychological mechanism that regulates job performance by describing the structural relations that exist between *job outcomes*, *job competencies*, *job competency potential* and *job situational latent variables*. ***Job outcomes*** or *job outcome latent variables* include those final organisational goals such as the quantity and quality of output (e.g., production of goods) and client satisfaction. The level of competence that employees achieve on the *job outcomes* are determined by the level of competence they achieve on ***job competencies*** or *job competency latent variables*, such as planning, analysing, communicating and innovating as those desired job behaviours that support the attainment of the *job outcomes*. The level of competence achieved on the *job competencies*, in turn, is determined by employee's standing on ***job competency potential latent variables*** as those malleable (individual attainments like knowledge, skills and crystallised abilities) and non-malleable person characteristics (dispositions like fluid intelligence, personality and values) that determine job performance. The level of competence achieved on the *job competencies* and, to some extent, the level of *job outcomes* is determined or influenced by ***job situational latent variables*** that determine job performance (Saville & Holdsworth, as cited in De Goede, 2007; Theron, 2015a). *Job situational* *latent variables* refer to those malleable situational characteristics (job characteristics, pay and organisational culture) and non-malleable situational characteristics[18] (organisation location) that determine job performance. *Situational latent variables* or situational characteristics can have a main effect on the level of competence achieved on the *job competency potential latent variables* and on the *job competency latent variables*, as well as moderate the effect of *job competency potential latent variables* on the level of competence achieved on the *job competencies* (Mahembe, 2014; Van der Westhuizen, 2015)

The **learning potential competency model (performance@learning competency model)** describes what constitutes (classroom[19]) learning performance (by identifying the *learning competencies* and *learning outcomes* and the structural relationships that exist between them) and the nature of the psychological mechanism that regulates learning performance by describing the structural relations that exist between *learning outcomes*, *learning competencies*, *learning competency potential* and *learning situational latent variables*. The learning potential competency model articulates with the performance@work competency model in that the performance@work model's malleable *job competency potential latent variables* are the ***learning outcomes*** or *learning outcome latent variables* of the learning potential competency model. In other words, *learning outcome latent variables* such as knowledge, skills or self-efficacy are at the same time the malleable *job competency potential latent variables*. Through successful learning, new (post-development) knowledge, skills and abilities are developed (i.e., *job competency potential*) that, in turn, will influence, when referring to performance@work model, the level of competence that is achieved on the *job competencies*. *Learning outcomes* are influenced by ***learning competencies*** or *learning competency latent variables*. For example, *transfer of learning* (a *learning competency*) can influence the success achieved on the *learning outcomes*. *Learning competencies*, in turn, are influenced by ***learning competency potential latent variables*** (specific individual attainments and dispositions). For example, being *conscientiousness* (a *learning competency potential*), which involves being hard-working, will influence the time spent on learning (e.g., *time-cognitively engaged* which is a *learning competency*) (De Goede, 2007; Theron, 2015a). The level of competence achieved on the *learning competencies* and, to some extent, the level of *learning outcomes* is determined or influenced by ***learning situational latent variables*** that determine learning (Saville & Holdsworth, as cited in De Goede, 2007; Theron, 2015a). *Learning situational latent variables* refer to those malleable situational characteristics (rewards, feedback, motivational posters) that determine or influence learning performance (Burger, 2012; Du Toit, 2014).

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[18] Relatively few situational latent variables can truly be considered non-malleable.

[19] It is not denied that learning competencies also form part of the job competencies. Learning cannot be restricted to the classroom. The *learning competency potential latent variables* therefore also hold relevance for the performance@work competency model.

The **trainer-instructor competency model (trainer@work competency model)** describes what constitutes trainer-instructor performance (by identifying the *trainer-instructor competencies* and *trainer-instructor outcomes* and the structural relationships that exist between them) and the nature of the psychological mechanism that regulates trainer-instructor performance by describing the structural relations that exist between *trainer-instructor outcomes, trainer-instructor competencies, trainer-instructor competency potential* and *training situational latent variables*. The trainer-instructor performance competency model, in turn, articulates with the learning potential competency model in that the learning potential model's malleable *learning competency potential latent variables* are at the same time the ***trainer-instructor outcomes*** or *trainer-instructor outcome latent variables* of the trainer-instructor performance model. In other words, *trainer-instructor outcome latent variables* such as *inspiring professional vision* and *accurate role perception* (Van der Westhuizen, 2015) are at the same time malleable *learning competency potential variables*. *Trainer-instructor outcomes* such as a highly motivated learners (i.e., *learning motivation*) with high *academic self-efficacy*, a *mastery learning goal orientation* and high *meta-cognitive knowledge* (Du Toit, 2014; Van Heerden, 2013) will, in turn, (as malleable *learning competency potential latent variables,* when referring to the performance@learning model) influence or enhance *time cognitively engaged* (a *learning competency*). *Trainer-instructor outcomes* are influenced by the level of competence that trainer-instructors achieve on ***trainer-instructor competencies*** or *trainer-instructor competency latent variables*. For example, creating or *fostering psychological safety and fairness* (a *trainer-instructor competency*) will influence the *learning climate* (a *trainer-instructor outcome*). *Trainer-instructor competencies* are determined or influenced by ***trainer-instructor competency potential latent variables***. For example, *trainer-instructor expertise* (a *trainer-instructor competency latent variable*) will influence *providing formative feedback* (a *trainer-instructor competency latent variable*). The level of competence achieved on the *trainer-instructor competencies* and, to some extent, the level of *trainer-instructor outcomes* is lastly determined or influenced by ***training situational latent variables*** that determine or influence the trainer-instructor's performance and trainees' learning (Saville & Holdsworth, as cited in De Goede, 2007; Theron, 2015a). *Training situational latent variables* refer to those malleable situational characteristics (learning climate or classroom, learning material, teaching methods) that determine or influence the trainer-instructor's performance and the trainees' learning performance.

In the end, it can be argued that the three models, namely the affirmative development trainer-instructor competency model, the learning potential competency model and the job competency model are sequentially linked and thus influence each other in the order that they have been referred to. For the purpose of this research, the focus will fall on the trainer-instructor's competency model (*trainer-instructor competency potential latent variables, trainer-instructor competency latent* *variables*, *trainer-instructor outcome latent variables and training situational latent variables*) and their influence in the trainees' learning success, in order to ultimately influence job performance.

2.3 AN OVERVIEW OF THE TRAINER-INSTRUCTOR COMPETENCY MODEL

A number of studies have focused on the development and elaboration of a learning potential competency model (Burger, 2012; De Goede, 2007; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013). These research studies (Burger, 2012; De Goede, 2007; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013) were all motivated by the conviction that private sector organisations should get involved in the identification of South Africans with learning potential that have been denied the opportunity to unfold that potential and to develop the potential via in-house learnership or affirmative development programmes. These studies were moreover motivated by the realisation that an attempt to ensure the success of learners/trainees on these programmes require a valid understanding of the determinants of learning performance and the manner in which they structurally combine to affect classroom learning performance. The aforementioned learning potential models all focused on the student's or learner's learning performance as a final criterion or *outcome* for any educational, training and development programme (De Goede, 2007). They, therefore, focused on what *competency potential* the learner needs and the *competencies* the learner needs to display in order to enhance *classroom learning performance*[20] and/or *learning performance during evaluation*[21], which should ultimately enhance work performance.

The preceding argument on the three sequentially linked competency models, however, convincingly argued that the trainer-instructor and the level of competence he/she displays on an array of *trainer-instructor competencies* constitute influential determinants of *classroom learning performance* via its effect on the malleable *learning competency potential latent variables* and the malleable *situational latent variables* that affect the level of competence that learners achieve on the *latent learning competencies*.

The introductory argument, in addition, more broadly argued that one way in which the current education system can be enhanced is by training and developing teachers. Teachers and trainer-

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[20] *Classroom learning performance* denotes those learning behaviours that take place during training and development opportunities and programmes (Prinsloo, 2013). It should, however, not be restricted to the activities occurring within the classroom only. *Classroom learning performance* also refers to behaviours occurring outside the classroom with the aim of finding meaningful structure in learning materials and retaining that insight to memory (Van Heerden, 2013).

[21] *Learning performance during evaluation* denotes the learning that occurs when an individual has to apply their classroom-learned knowledge, to a new problem or challenge, following any classroom learning opportunity or after a training and development programme (Prinsloo, 2013). In other words, *learning performance during evaluation* involves transfer of the newly derived insight, that has been retained in memory, onto new (learning and work) problems related to but qualitatively distinct from those problems encountered in the classroom (Van Heerden, 2013). The results of learning performance measures, such as tests or exam results, will report on the trainee or students' *learning performance during evaluation*, which will indicate the extent to which an individual has achieved academic success as a result of or within the context of school or classroom (Prinsloo, 2013).

instructors are an important element in guiding, facilitating and enhancing a learner's or trainee's classroom learning. They do so by influencing the malleable learner or trainee *competency potential latent variables* that determine the level of competence that that learner or trainee achieves on the *competencies* that constitute classroom learning. Pretorius (2014) also recommended that research should be conducted on the performance and competencies of the trainer-instructor as well as how the trainer-instructor can influence the trainee's learning.

Van der Westhuizen's (2015) affirmative development trainer-instructor performance competency model was a first-generation research study on how the trainer-instructor's performance (i.e., *trainer-instructor competency latent variables* and *trainer-instructor outcome latent variables*[22]) influence malleable trainee or learner *learning competency potential latent variables,* and through those, the *learning competencies* that constitute *classroom learning performance*, that then influence learning outcomes such as *post-development crystallised knowledge* that, in turn, act as *job competency potential*.

The purpose of any affirmative development training programme is to achieve specific results or learning outcomes, namely a sufficiently high standing on the malleable *job competency potential latent variables,* that will allow the affirmative development trainee (i.e., previously disadvantaged individuals) to display competence on the *job competencies* that he/she was previously unable to achieve. Although the trainer-instructor cannot directly install or insert knowledge and abilities (*competency potential*) into trainees' memories, the trainer-instructor can create the situational conditions and/or ensure a positively/favourably impact on the *learning competency potential latent variables* that will affect classroom learning. This will, ultimately, lead to the enhancement/improvement in the knowledge, skills and abilities (*learning outcomes*) required to display competence on the *job competencies* (Van der Westhuizen, 2015).

Affirmative development trainer-instructors aim to develop in affirmative development trainees the *learning competency potential* and the *learning competencies* needed to be successful in their learning, studies and development programmes in order to perform in their jobs. The *learning outcomes* that trainer-instructors, ultimately, aim to affect are the *job competency potential* and *job competencies* the individual requires to effectively perform their job in the work setting (Van der Westhuizen, 2015).

In short, *learning outcomes* can only be achieved if certain learning behaviours are displayed (*learning competencies*) which are influenced by the presence or absence of person-centred or

[22] Van der Westhuizen (2015) did not identify *situational latent variables* as a separate domain in her research, rather the three *situational latent variables* where identified or classed under *trainer-instructor outcome latent variables*).

situation-centred characteristics (*learning competency potential variables* comprising of malleable attainments or non-malleable, stable, dispositions and most likely malleable characteristics of the learning environment). The trainer-instructor aims to affect or influence the level of these malleable person-centred and/or situation-centred characteristics (*learning competency potential*) in order to influence the learning behaviours (*learning competencies*) which, in turn, affects *learning outcomes* (Van der Westhuizen, 2015).

The trainer-instructor ultimately wants to improve the work performance, through the attainment of knowledge, skills and abilities (*job competency potential*) of individuals which, in turn, will improve their employability. Attainment of *job competency potential*, in order to improve work performance (i.e., the level of competence achieved on the *job competencies*), occurs through learning, training and development interventions and programmes (educational events), especially affirmative development programmes (Van der Westhuizen, 2015).

Educational events or programmes are complex multifaceted interactions set against a backdrop of constant changes in the environment that are also influenced by many other factors (Hutchinson, 1999). The level of learning performance a learner or trainee can attain as a result of an educational event is thus determined by many different factors and especially many different latent variables. These factors and latent variables form a nomological network that characterise the trainee, the context in which they learn as well as their trainer-instructor (Van der Westhuizen, 2015). However, before any further explanation and descriptions can be given to these latent variables, the concept of the trainer-instructor needs to be defined.

2.3.1 THE TRAINER-INSTRUCTOR

According to Rae (2002), the concept 'trainer' has a wide range of meanings, which stems from the type of function that the 'trainer' performs, namely, the workplace instructor, the instructor, the trainer/tutor, the facilitator, the consultant/adviser, the trainer of trainers, the training designer and the training manager (Rae, 2002).

Rae (2002, p. 25) defined a trainer in the following manner "Someone who facilitates the learning of others including responsibilities for managing, organising, advising on, developing or carrying out training." Van der Westhuizen (2015) argued that, given all the various titles and descriptions, there is no universal, clear-cut definition for trainers. Trainers are often called or referred to as instructors, skills development facilitators or just facilitators, learning skills coordinators, human resource supporters, teachers, human research development practitioners, to name but a few (Rae, 2002; Van der Westhuizen, 2015).

Van der Westhuizen (2015, p. 46) coined the term 'trainer-instructor' and defined it in the following, broad, manner "…the affirmative development trainer-instructor will be defined as a person who facilitates the learning of previously disadvantaged individuals in the classroom to achieve the attainment of deficit competency potential latent variables and competencies" (Van der Westhuizen, 2015, p. 46). A trainer-instructor should, therefore, create conditions and act in a manner that will hone the malleable *learning competency potential variables* of trainees so as to allow the attainment of deficit *job competency potential latent variables* and *latent job competencies* and to ensure the trainees become proficient, for the benefit of both the organisation and individual alike (Rae, 2002; Van der Westhuizen, 2015). The trainer-instructor is thus a resource of significant importance in any affirmative development programme (Van der Westhuizen, 2015).

2.3.2 THE PARTIAL VAN DER WESTHUIZEN (2015) TRAINER-INSTRUCTOR COMPETENCY MODEL

Van der Westhuizen (2015) elaborated the original De Goede (2007), Burger (2012) and Van Heerden (2013) learning potential models by adding *trainer-instructor competencies* and *trainer-instructor outcome latent variables*. Although Van der Westhuizen (2015) only formally discussed the aforementioned three learning potential models, the partial Van der Westhuizen (2015) affirmative development trainer-instructor performance competency model complements the following existing Burger (2012), De Goede (2007), Du Toit (2014), Mahembe (2014) and Van Heerden (2013) learning potential structural models. The full[23] Van der Westhuizen (2015) affirmative development trainer-instructor performance competency model included the following latent variables:

a) De Goede's (2007) original cognitive learning potential latent variables: 'learning competency potential' including *abstract thinking capacity* and *information processing capacity*, 'learning competencies' including *transfer of knowledge* and *automisation*, and the 'learning outcome' *performance during evaluation*;
b) 'learning competency potential latent variables': *conscientiousness* (Burger, 2012; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013), *learning motivation* (Burger, 2012; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden), *academic self-efficacy* (Burger, 2012; Du Toit, 2014; Mahembe, 2014; Prinsloo, 2013; Van Heerden, 2013), *meta-cognitive knowledge* (Du Toit, 2014; Mahembe, 2014; Van Heerden, 2013), and *learning goal orientation* (Mahembe, 2014; Van Heerden, 2013);
c) 'learning competency latent variables': *time cognitively engaged* (Burger, 2012; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013), *academic self-leadership*

[23] The term 'full' refers to the inclusion of all the latent variables in the partial Van der Westhuizen (2015) affirmative development trainer-instructor performance competency model, based on Van der Westhuizen's (2015) theorising.

(Burger, 2012; Du Toit, 2014; Mahembe, 2014; Prinsloo, 2013), and *meta-cognitive regulation* (Du Toit, 2014; Mahembe, 2014; Van Heerden, 2013);

d) additional 'trainer-instructor competency latent variables': *providing inspirational motivation*, *clarifying learning conceptions and requirements*, *demonstrating individual consideration*, *fostering psychological safety and fairness*, *stimulating interest and involvement*, *providing autonomy support*, *enhancing student self-efficacy*, *promoting a mastery climate*, as well as *facilitating clarity and understanding* (Van der Westhuizen, 2015);

e) additional 'trainer-instructor outcome latent variables': *learning climate*, *classroom goal structure*, *structure in the learning material*, *inspiring professional vision*, and *accurate role perception* (where the first three represents 'training situational latent variables') (Van der Westhuizen, 2015).

The full Van der Westhuizen (2015) affirmative development trainer-instructor competency model is depicted in Figure 2.1, below.

Van der Westhuizen (2015) decided to reduce the original full Van der Westhuizen (2015) affirmative development trainer-instructor competency model in order to:

a) reduce the burden of completing a very lengthy and cognitively taxing questionnaire on the participants,

b) avoid the logistical problems and challenges associated with operationalising the two learning competency latent variables (De Goede & Theron, 2010) and

c) formally acknowledge that the level of competence that the trainer-instructor achieves on the *trainer-instructor competencies* directly influence the learners standing on the malleable *learning competency potential latent variables* rather than on the non-malleable *learning competency potential latent variables*, *learning competencies* and *learning outcome outcomes* (Du Toit, 2014; Van Heerden, 2013; Van der Westhuizen, 2015).

As a result of the aforementioned reasons, Van der Westhuizen (2015) decided to remove the following latent variables from the original full Van der Westhuizen (2015) affirmative development trainer-instructor competency model: *transfer of learning/knowledge*, *automisation*, *information processing capacity*, *abstract reasoning capacity*, *learning performance during evaluation*, *time cognitively engaged*, *academic self-leadership*, *meta-cognitive regulation*, as well as *facilitating clarity and understanding*, *structure in the learning material*, *clarifying learning conceptions and requirements*, *accurate role perception*, *conscientiousness* and *meta-cognitive knowledge* (Van der Westhuizen, 2015).

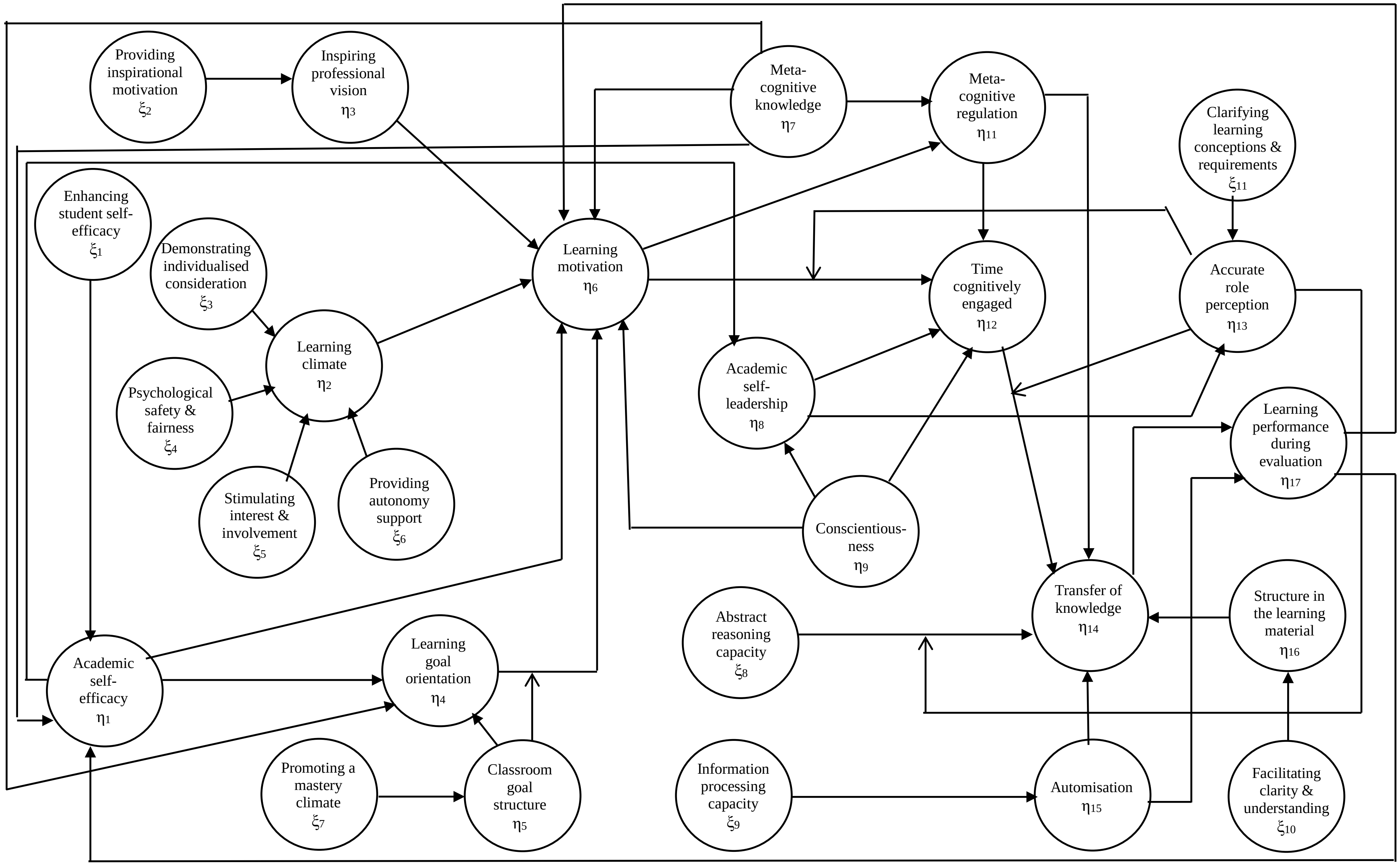


Figure 2.1. **The full Van der Westhuizen (2015) affirmative development trainer-instructor competency model**

The reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model is depicted in Figure 2.2 below. This reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (i.e., the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance structural model) was subsequently empirically tested.

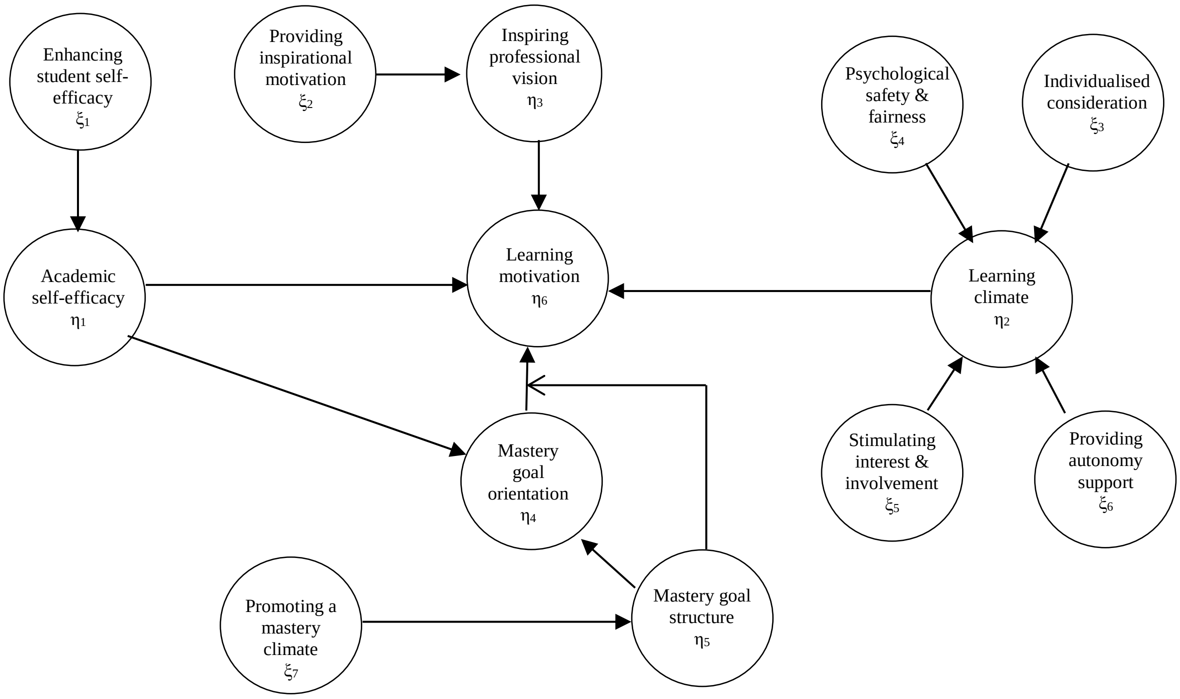


***Figure 2.2*. The reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model**

2.3.3 EMPIRICALLY TESTING THE REDUCED VAN DER WESTHUIZEN (2015) TRAINER-INSTRUCTOR PERFORMANCE STRUCTURAL MODEL

The reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (i.e., the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance structural model) was fitted by utilising structural equation modelling ran through LISREL 8.8[24]. Prior to fitting the comprehensive LISREL model[25] the measurement model reflecting the manner in which the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance model was operationalised was fitted in order to determine if the operationalising of the latent variables was successful.

[24] LISREL is an abbreviation of Linear Structural Relationships and it is a computer programme that is designed for empirically testing structural equation modelling (SEM) (Vieira, 2011).

[25] The comprehensive LISREL model refers to the combined measurement model and structural model. The measurement model demonstrates how each latent variable is measured by the indicator it is earmarked to measure (i.e., how each latent variable is operationalised) (Vieira, 2011). The measurement model thus depicts the relationships between the observed variables and the latent variables. The structural model demonstrates the characteristics or and the relationships between the latent variables, such as the direction of the effects latent variables are hypothesised to exert on each other (Vieira, 2011).

The goodness of fit statistics for the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance measurement model returned a statistically significant Satorra-Bentler Scaled Chi-Square (χ^2) ($p < .05$). Thus, the fitted measurement model was unable to reproduce the observed sample covariance matrix in the sample to a degree of accuracy that could be explained in terms of sampling error only. Van der Westhuizen's (2015) exact fit null hypothesis (H_{01a}: RMSEA = 0) was therefore rejected ($p < .05$).

The Root Mean Square Error of Approximation (RMSEA) value, for the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance measurement model, was .0487. This indicated a good fit in the sample. The p-value of .691 for Test of Close Fit null hypothesis was sufficiently large enough to not reject the close fit null hypothesis (H_{01b}: RMSEA $\leq .05$). This warranted the interpretation of the measurement model parameter estimates.

Examining the magnitude and the slope of the regression of the observed variables (i.e., indicator variables) on the latent variables that they are earmarked to represent provides an indication of the validity of the various indicator measures. Thus, if a measure is developed to provide a valid reflection of a specific latent variable, then the slope of the regression of X_i on ξ_i, in the fitted measurement model, has to be substantially large and statistically significant (Diamantopoulos & Siguaw, 2000). As a result, the unstandardised $\mathbf{\Lambda_x}$ matrix for the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance measurement model was analysed and it was found that all the indicator variables loaded significantly on the latent variables that they were earmarked to reflect (Van der Westhuizen, 2015). The completely standardised lambda matrix was subsequently analysed and three completely standardised factor loadings (i.e., slope) were considered not large enough[26], namely MasteryGO2, Res _2 and Res _4. Thus, although all the lambda null hypotheses were rejected, not all the factor loadings were regarded as sufficiently large to convincingly support the claim that all latent variables were successfully operationalised through the indicator variables that were designed to represent them.

This finding was corroborated by the squared multiple correlations (R^2) of the indicator variables. The R^2 denotes the amount of variance in the indicator variable that is accounted for by the latent variable it was earmarked to measure in the measurement model (Van der Westhuizen, 2015). Van der Westhuizen (2015) mentioned that large R^2 values (> .50) are desirable since this implies that the indicator variables assigned to the specific latent variable are valid. According to Van der Westhuizen's (2015) research, three squared multiple correlations were lower than .50, namely, MasteryGO2, Res _2 and Res _4. This indicates that these three indicators did not fully succeed as valid measures of the latent variables they were earmarked

[26] Factor loading estimates are considered satisfactory if the completely standardised factor loading estimates exceeded .71 (Hair, Black, Babin, Anderson, & Tatham, 2006).

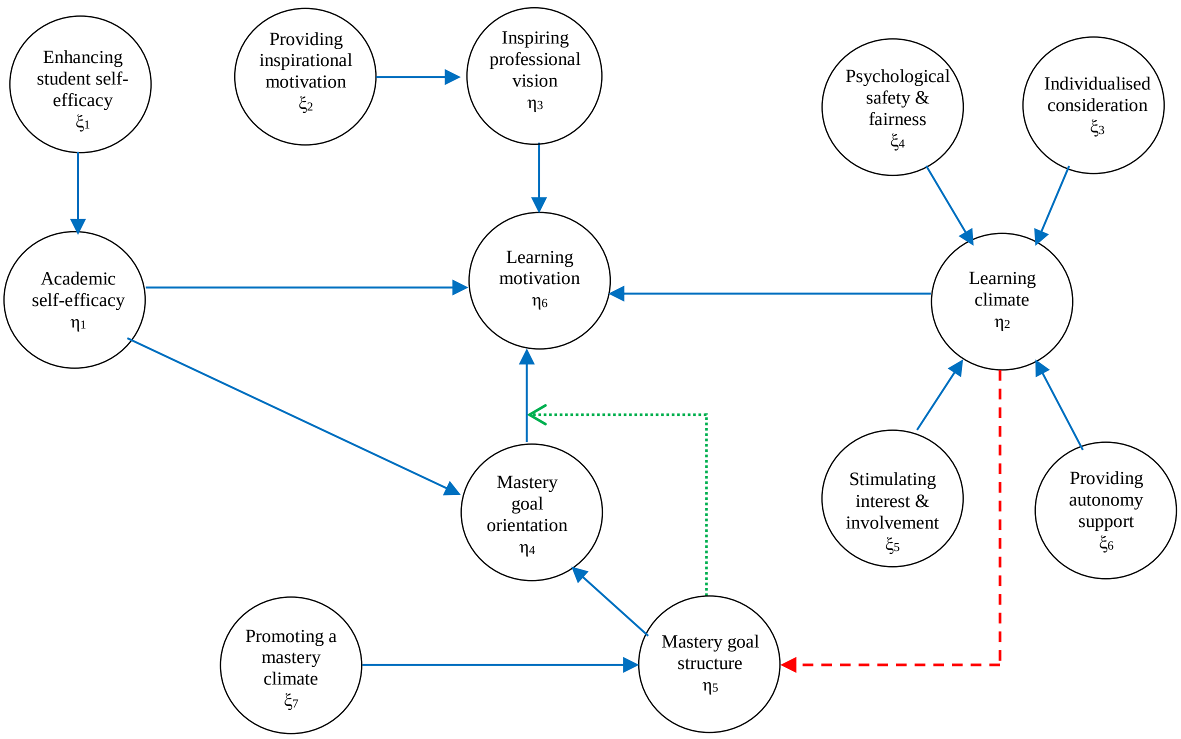
to measure. It is worthy of note that two of the three problematic items involve the *mastery goal structure* x *mastery goal orientation* latent interaction effect in the model.

The theta-delta matrix represents the measurement error variance in the items (Theron, 2016). Stated differently, it represents the percentage of variance in the indicator variable due to random and systematic measurement error that cannot be explained in terms of the latent variable the indicator variable was earmarked to represent (Van der Westhuizen, 2015). In terms of the completely standardised theta-delta matrix, the three aforementioned indicators indicated unsatisfactory (high) error variance. In terms of the unstandardised theta-delta matrix, Van der Westhuizen (2015) found that all the indicators were statistically significantly plagued by measurement error ($p < .05$).

In conclusion, although there is some doubt about the validity with which some of the indicator variables measure their represented latent variable, Van der Westhuizen (2015) stated that the results of the overall fit assessment implied that good measurement model fit was achieved. That it was, therefore, permissible to proceed to empirically test the structural relationships she hypothesised between the latent variables as illustrated in the reduced Van der Westhuizen (2015) affirmative development trainer-instructor performance model, depicted in Figure 2.2.

The goodness of fit statistics for the reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model A, depicted in Figure 2.2) did not show good fit. The exceedance probability for Model A associated with the Satorra-Bentler χ^2 fell below the critical value of .05 ($p < .05$). The probability of obtaining the sample RMSEA estimate of .0631 (reasonable fit) under close fit null hypothesis was also sufficiently small to question the close fit null hypothesis. As a result, both Van der Westhuizen's (2015) null hypothesis of exact fit (H_{02a}: RMSEA = 0) and null hypothesis of close fit (H_{02b}: RMSEA $\leq$ .05) were rejected. Additionally, all, but one, of the path coefficients or structural model parameter estimates were statistically significant. The only insignificant path coefficient was that of the latent interaction effect in which *mastery classroom goal structure* moderates the effect of *mastery goal orientation* on *learning motivation*. It should be noted that two of the indicators that provided reason for concern served as indicators of the *mastery goal structure* x *mastery goal orientation* latent interaction effect. Van der Westhuizen (2015), however, decided to retain this insignificant path since the modification indices were calculated for a model containing all of the original hypotheses. After examination of the modification indices, it was decided to include only one additional path between *learning climate* and *mastery goal structure*, in an attempt to improve the fit[27]. Model A, with no paths removed and only one path added (*learning climate* to *mastery goal structure*) was empirically tested again as Model B, depicted in Figure 2.3 (Van der Westhuizen, 2015).

[27] Van der Westhuizen (2015) argued the theoretical rationale underpinning the proposed path.



Statistically significant path coefficients (supported)
Statistically insignificant path coefficients (unsupported, yet retained)
Newly added path (not yet tested)

***Figure 2.3.* The revised reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model B)**

The goodness of fit statistics for the revised reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model B, depicted in Figure 2.3) did not show good fit. The exceedance probability associated with the Model B Satorra-Bentler χ^2 value was sufficiently small to question the exact fit null hypothesis ($p < .05$). The probability of observing the sample RMSEA estimate of .0585 (reasonable fit) under the close fit null hypothesis was likewise sufficiently small to question the close fit hypothesis ($p < .05$). As a result, both Van der Westhuizen's (2015) null hypothesis of exact fit (H_{02a}: RMSEA = 0) and null hypothesis of close fit (H_{02b}: RMSEA $\leq$ .05) was rejected again. Model B was, therefore, again unable to reproduce the observed covariance matrix to a sufficient degree of accuracy to make the model and its parameter estimates plausible[28]. All structural model path coefficients or parameter estimates were statistically significant, including the path coefficient associated with the newly added path between *learning climate* and *mastery goal structure*. However, the path coefficient associated with the path between *promoting a mastery climate* and *mastery goal structure* became negative, which was previously positive (in Model A), and was now in conflict with the originally hypothesised positive

[28] It needs to be considered that the power associated with the test of exact and close fit was extremely high even when assuming an effect size under the close fit H_a of .60 (Van der Westhuizen, 2015).

influence[29]. After examination of the modification indices, Van der Westhuizen (2015) decided to include one additional path between *inspiring professional vision* and *learning climate*, in an attempt to improve the fit. The inclusion of the one additional path was grounded in a strong, substantive theoretical argument that supported the addition of this path (Van der Westhuizen, 2015). Van der Westhuizen (2015), also, decided to retain the negative path since the additional path added may change this negative path back to a positive path and, as a result, no paths were removed. Retaining the path that became negative was grounded in a methodologically reasonable, albeit theoretically contestable, argument (Van der Westhuizen, 2015). Model B, with no paths removed and only one path added (*inspiring professional vision* to *learning climate*) was empirically tested again as Model C, depicted in Figure 2.4 (Van der Westhuizen, 2015).

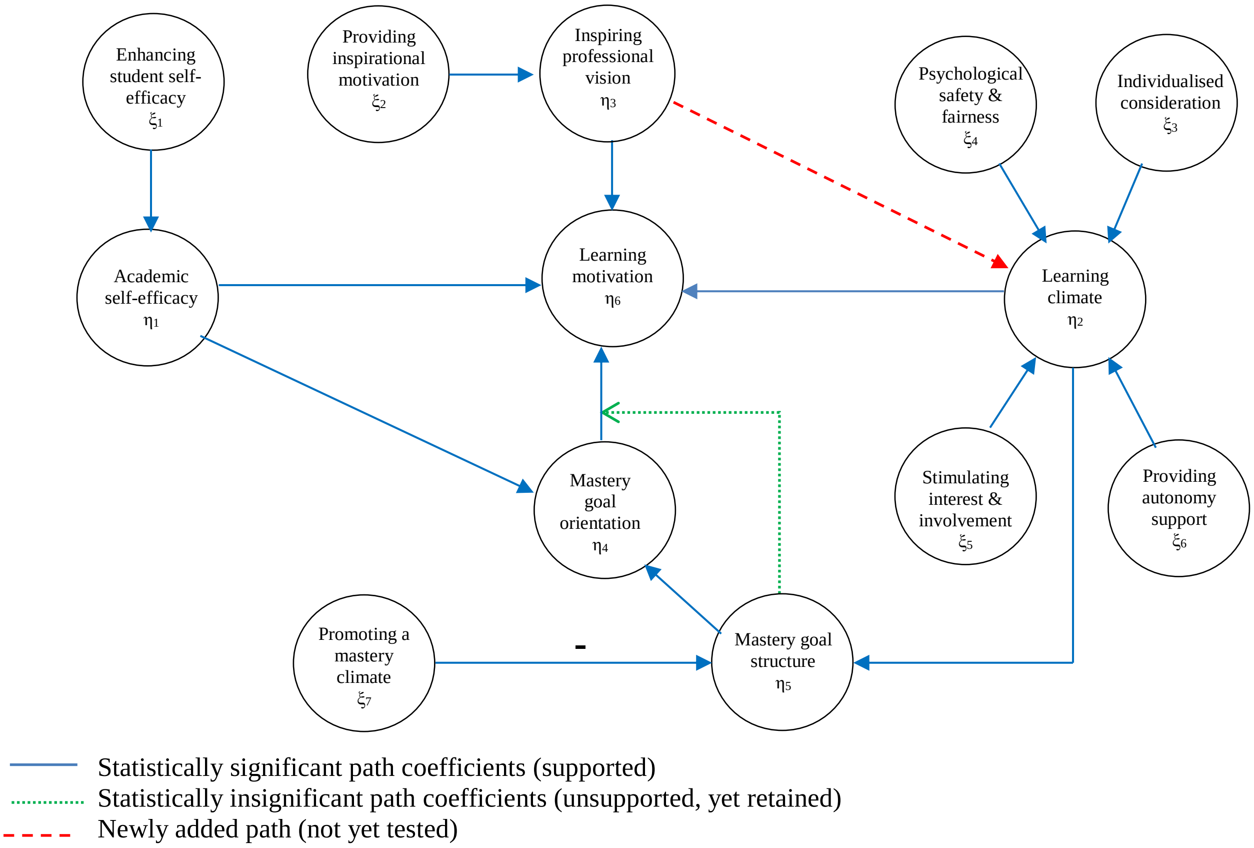


***Figure 2.4.* The revised reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model C)**

The fit of the revised reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model C, depicted in Figure 2.4) improved with the inclusion of the latest additional path (*inspiring professional vision* to *learning climate*). Model C returned an exceedance probability

[29] The previously positive path between *promoting a mastery climate* and *mastery goal structure* has become negative after the inclusion of the additional path from *learning climate* to *mastery goal structure* (Van der Westhuizen, 2015). The finding makes methodological sense. A frequently overlooked consideration when interpreting structural model path coefficients is that when any endogenous latent variable in the structural model (η_j) is hypothesised to be influenced by two or more latent variables (η_i and/or ξ_i), the path coefficient estimates should be interpreted as partial regression coefficients in a standard multiple regression model. These path coefficients, therefore, reflect the influence of η_i on η_j when holding constant the influence of the other latent variables in the regression model (or structural equation) on η_j and on η_i. The effect of *promoting a mastery climate* on *mastery goal structure* without controlling variance in these two variables that it might share with *learning climate* is not the same as the effect of *promoting a mastery climate* on *mastery goal structure* when holding constant the influence of *learning climate* constant (i.e., statistically remove the variance it explains in η_j and η_i). It is the theoretical explanation as to why the removal of variance in *promoting a mastery climate* and *mastery goal structure*, that can be explained by *learning climate*, would change the path coefficient from positive to negative that is elusive (Theron C.C., personal communication, 24 November 2016).

associated with the Satorra-Bentler χ^2 that was sufficiently small to question the exact fit null hypothesis ($p < .05$). The conditional probability of observing a sample RMSEA estimate of .0529 (reasonable fit) under the close fit null hypothesis was .105 and therefore sufficiently large not to question the close fit null hypothesis in the parameter ($p > .05$). As a result, Van der Westhuizen's (2015) null hypothesis of exact fit (H_{02a}: RMSEA = 0) was still rejected. However, the null hypothesis of close fit (H_{02b}: RMSEA $\leq .05$) was not rejected. Model C, thus, achieved close fit ($p > .05$). Almost all of the structural model path coefficients were statistically significant (including the path coefficient for the newly added path *inspiring professional vision* to *learning climate*) except for two path coefficients. The two paths that were insignificant were *inspiring professional vision* to *learning motivation*[30] and the moderating effect of *mastery classroom goal structure* on the relationship between *mastery goal orientation* and *learning motivation* (Van der Westhuizen, 2015). Additionally, the path between *promoting a mastery climate* and *mastery goal structure* remained negative. Van der Westhuizen (2015) decided to retain all the paths, those that were significant as well as those that were insignificant, since the addition of a new path added might result in this path becoming significant in the future. The modification indices suggested that the inclusion of one additional path between *mastery goal structure* and *inspiring professional vision* would improve the model fit even further. The inclusion of this additional path was grounded in a strong, substantive theoretical argument that supported the addition of this path (Van der Westhuizen, 2015). Model C, with no paths removed and only one path added (*mastery goal structure* to *inspiring professional vision*) was empirically tested again as Model D, depicted in Figure 2.5 below (Van der Westhuizen, 2015).

[30] The previously significant path between *inspiring professional vision* and *learning motivation* became insignificant after the inclusion of the additional path from *inspiring professional vision* to *learning climate* (Van Der Westhuizen, 2015).

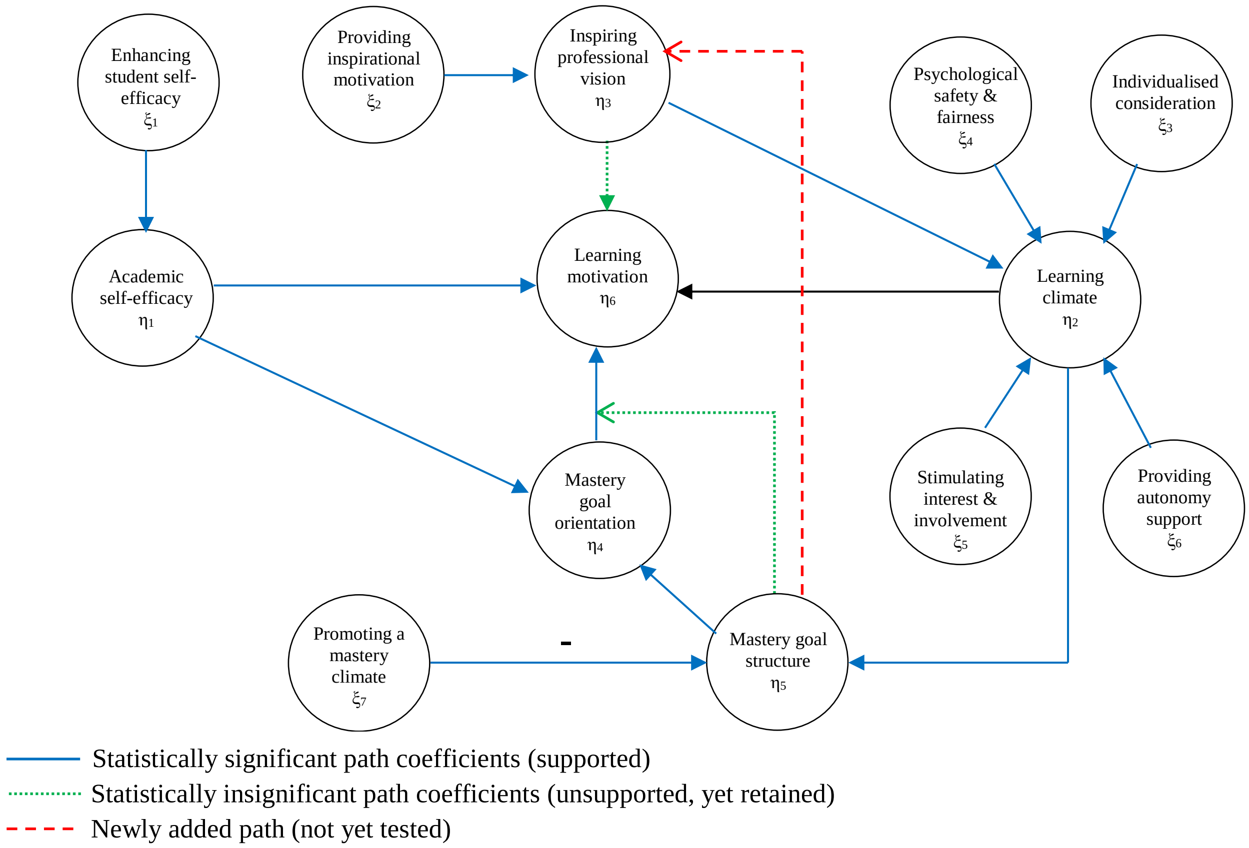


Figure 2.5. The revised reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model D)

The goodness of fit statistics for the final reduced Van der Westhuizen (2015) affirmative development trainer-instructor competency model (Model D, depicted in Figure 2.5) fitted the data well. The exceedance probability associated with the Satorra-Bentler χ^2 value calculated for Model D was sufficiently small ($p < .05$) to question the exact fit hypothesis. The conditional probability associated with the sample RMSEA estimate of .0523 (reasonable fit) was sufficiently large (.159) not to question the close fit null hypothesis ($p > .05$). As a result, Van der Westhuizen's (2015) null hypothesis of exact fit (H_{02a}: RMSEA = 0) was rejected. The structural model (Model D) was, therefore, not able to reproduce the observed covariance matrix to a degree of accuracy, in the sample, that can be explained by sampling error only (Van der Westhuizen, 2015). However, the null hypothesis of close fit (H_{02b}: RMSEA $\leq .05$) was not rejected. In conclusion, Van der Westhuizen's (2015) stated that the results of the overall fit assessment seem to suggest that good model fit was achieved for the final model, Model D.

Moreover, almost all of the path coefficient estimates were statistically significant (including the newly added path *mastery goal structure* to *inspiring professional vision*) except for two hypotheses. The first path that was found to be insignificant was *inspiring professional vision* to *learning motivation*. Van der Westhuizen (2015) argued that since this first path is based on sound theory it should be retained as a path in Model D and that future studies should re-test this path in order to obtain more conclusive evidence whether the hypothesis should be rejected or not (Van der Westhuizen, 2015). The second path that was found to be insignificant was the moderating effect of *mastery classroom goal structure* on the relationship between *mastery goal orientation* and *learning motivation.* Van der Westhuizen (2015) argued that the removal of the latter path, which also has a strong theoretical foundation, purely based on the insignificant result of one study is a rather stringent criterion. Therefore, future studies should rather include this path and re-test this hypothesis to obtain more conclusive evidence whether this latter path should be rejected or not (Van der Westhuizen, 2015). Additionally, and according to Van der Westhuizen (2015) somewhat unexpectedly, the path from *promoting mastery classroom goal structure* to *mastery goal structure* was found to be statistically significantly negative. This relationship became negative as a result of the, additional, inclusion of the path from *learning climate* to *mastery goal structure* (Van der Westhuizen, 2015).

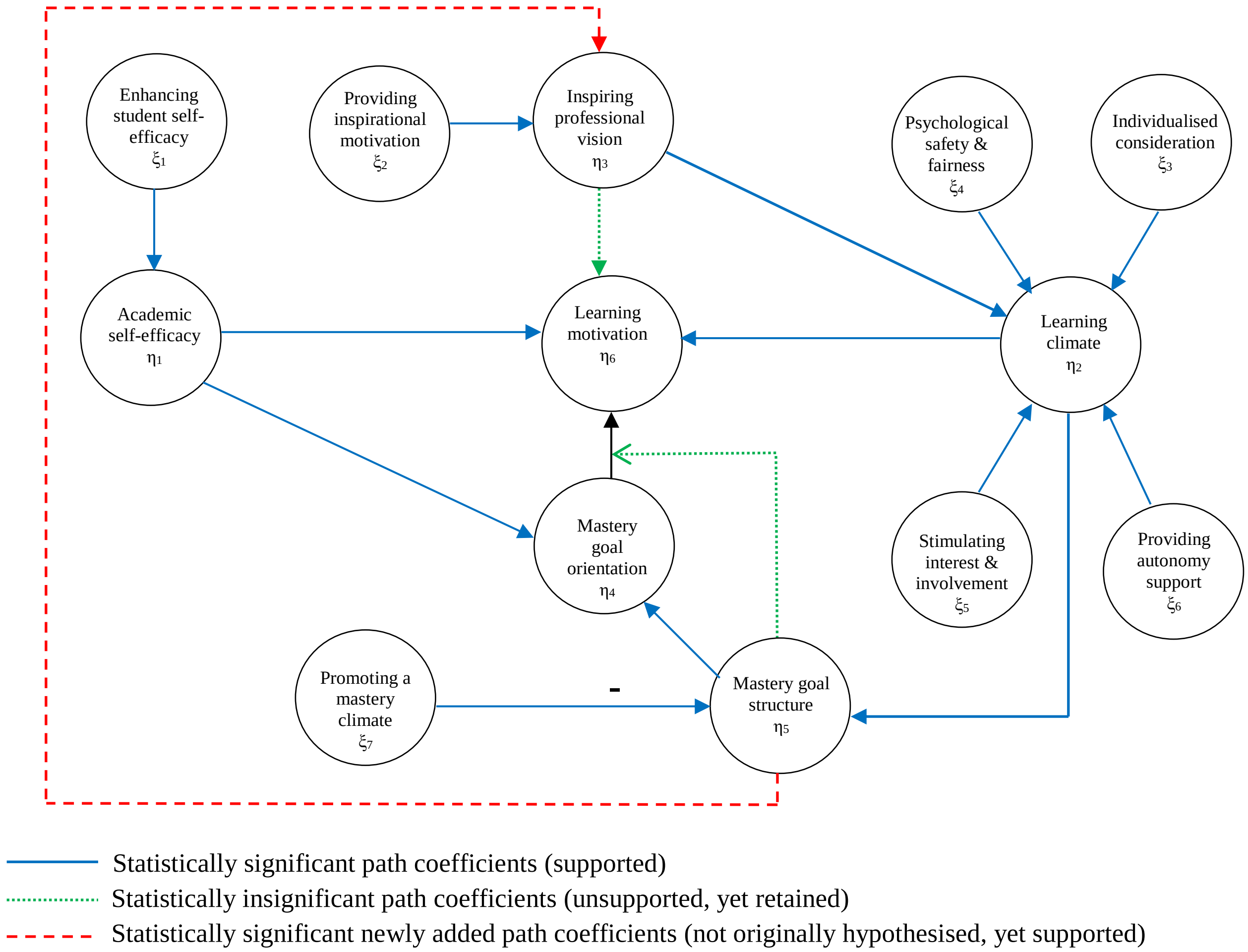


Figure 2.6. **The final reduced Van der Westhuizen (2015) trainer-instructor competency model (i.e., Model D)**

In the end, as indicated in Figure 2.6, support was found for the following hypotheses:

- *academic self-efficacy* had a statistically significant positive effect on *learning motivation* [this hypothesis was also supported by Burger (2012), Du Toit (2014), Prinsloo (2013) and Van Heerden (2013)];
- *academic self-efficacy* had a statistically significant positive effect on *mastery goal-orientation*;
- *mastery goal orientation* had a statistically significant positive effect on *learning motivation*;

- *mastery goal structure* had a statistically significant positive effect on *mastery goal orientation* and on *inspiring professional vision*;
- *learning climate* had a statistically significant positive effect on *learning motivation* and on *mastery goal structure*;
- *inspiring professional vision* had a statistically significant positive effect on *learning motivation*;
- *enhancing student self-efficacy* had a statistically significant positive effect on *academic self-efficacy*;
- *individualised consideration, fostering psychological safety and fairness, stimulating interest and involvement* and *providing autonomy support* all had a statistically significant positive effect on *learning climate*;
- *providing inspirational motivation* had a statistically significant positive effect on *inspiring professional vision*; and
- *promoting mastery classroom goal structure* was found to have a statistically significant *negative* influence on *mastery goal structure* (although it was originally hypothesised to have a positive influenced) (Van der Westhuizen, 2015).

Van der Westhuizen (2015) suggested that future studies should include the latent variables in her original model but that were excluded from the reduced model[31], namely 'trainer-instructor competency latent variables' *clarifying learning conceptions and requirements* and *facilitating clarity and understanding*, as well as 'trainer-instructor outcome latent variables' *accurate role perception* and *structure in the learning material*, should be included and tested during future studies. Additionally, Van der Westhuizen (2015) proposed that future studies should include *mastery goal structure* as a dimension of *learning climate* (Van der Westhuizen, 2015). The argument that Van der Westhuizen (2015) made for the consideration of *mastery goal structure* as a dimension of *learning climate* in future studies was based on past literature. James, Joyce and Slocum (as cited in Van der Westhuizen, 2015) included *mastery goal structure* and *learning climate* as climate variables. Miller and Murdoch (as cited in Van der Westhuizen, 2015) included *goal structure* as a dimension of *learning climate*.

2.4 THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR COMPETENCY MODEL

Learning performance is complexly determined with many variables influencing it (Burger, 2012). Since it is the final outcome for any educational, training and development programme it is important to understand what determines the level of learning performance that is achieved and how these latent

[31] Those latent variables removed from the original full Van der Westhuizen (2015) affirmative development trainer-instructor competency model, depicted in Figure 2.1.

variables characterising the trainee the learning context, the trainer-instructor's performance and the training context determines and influences it.

The Van der Westhuizen (2015) trainer-instructor competency model was only a partial competency model, in that it included only *trainer-instructor competency latent variables* and *trainer-instructor outcome latent variables*. The Wessels-Van der Westhuizen trainer-instructor competency model elaborated on the partial Van der Westhuizen (2015) trainer-instructor competency model (that could also be referred to as the Van der Westhuizen (2015) trainer-instructor performance structural model) by adding *trainer-instructor competency potential latent variables*, additional *trainer-instructor competency latent variables* and placing *training situational latent variables* in a separate domain.

The existing Van der Westhuizen (2015) model was elaborated on in an attempt to gain a more complete description of what constitutes trainer-instructor performance as well as the nature of the psychological mechanism that regulates trainer-instructor performance. The objective was therefore to gain insight into the manner in which the trainer-instructor characteristics influence the success with which the trainer-instructor has an impact on the trainee's learning potential by influencing malleable *learning competency potential latent variables*. The findings of this research study might shed some light on how to better the current poor quality of the South African school system and enhance the success with which other learning or development programmes, specifically affirmative development programmes get learners to complete and pass the programmes. It was previously mentioned that many learners who participate in skills development opportunities or affirmative development programmes often do not finish their learning course or programme due to mismatches between the learners' and the learnership programmes' expectations, a high absenteeism rate among learners, poor attitudes and lack of respect from learners as well as a sense of entitlement from the learners (Van Heerden, 2013). These issues might also be addressed by ensuring optimum trainer-instructor performance focused on clearly stating what is expected of the trainee and what will be expected in terms of programme outcomes and/or focused on motivating trainees to attend classes.

In developing the existing partial Van der Westhuizen trainer-instructor competency model into a fully-fledged affirmative development competency model (i.e., the Wessels-Van der Westhuizen trainer-instructor competency model) the original Van der Westhuizen (2015) trainer-instructor competency model was consulted as a point of departure.

The original Van der Westhuizen (2015) affirmative development trainer-instructor competency model complements the existing Burger (2012), De Goede (2007) and Van Heerden (2013) learning potential structural models. This demonstrates the complexity of human behaviour and learning as well as the structural linkages between the learning potential competency model (performance@learning competency model) and the trainer-instructor competency model (trainer@work competency model). However, the focus of the current research was on the trainer-instructor's performance and how the trainer-instructor can directly influence the malleable learning potential of their trainees. As a result, the following *learning potential latent variables* that are not directly influenced by the trainer-instructor, in accordance with Van der Westhuizen's (2015) research as previously discussed, was not considered for the purposes of this research (i.e., was not included in the Wessels-Van der Westhuizen model): *transfer of learning/knowledge*, *automisation*, *information processing capacity*, *abstract reasoning capacity*, *learning performance during evaluation*, *time cognitively engaged*, *academic self-leadership*, *meta-cognitive regulation*, *conscientiousness* and *meta-cognitive knowledge.*

- The following latent variables, from the original Van der Westhuizen (2015) affirmative development trainer-instructor competency model, thus form the basis or point of departure for the Wessels-Van der Westhuizen model: Learning competency potential latent variables: *learning motivation, master learning goal orientation* and *academic self-efficacy;*
- Trainer-instructor outcome latent variables [32]: *inspiring professional vision*, *accurate role perception*, *mastery classroom goal structure*, *learning climate*, and *structure in the learning material*;
- Trainer-instructor competency latent variables: *providing inspirational motivation*, *clarifying learning conceptions and requirements*, *fostering psychological safety and fairness*, *demonstrating individualised consideration*, *stimulating interest and involvement*, *providing autonomy support*, *enhancing student self-efficacy*, *promoting a mastery climate*, and *facilitating clarity and understanding*.

The latter latent variables were consequently investigated through in-depth and systematic theorising.

2.5 LEARNING COMPETENCY POTENTIAL LATENT VARIABLES

The discussion on the latent variables comprising the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model will commence with a short discussion of the *learning competency potential latent variables* as a foundation for the development of the Wessels-Van der Westhuizen trainer-instructor competency model. Although the focus of this research study was exclusively on trainer-instructor performance, these *learning competency potential latent variables* are very important since Van der Westhuizen's (2015) research was developed based on these *learning potential latent variables*. Consequently, these *learning competency potential latent variables* are woven into the fabric of some of the *trainer-instructor outcome latent variables*, such *learning climate* and *mastery classroom goal structure*. This also ensures that the trainer@work competency model remains clearly structurally linked to the performance@learning competency model.

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[32] The Van der Westhuizen (2015) trainer-instructor competency model did not contain a separate fourth domain for situational latent variables. As a result, *mastery classroom goal structure*, *learning climate*, *structure in the learning material* was placed in the *trainer-instructor outcome latent variable* domain.

2.5.1 LEARNING MOTIVATION

Training motivation explained additional variance in training outcomes and learning over and beyond the effects of cognitive ability (Colquitt, LePine, & Noe, 2000). Research has also repeatedly shown that learning will only occur when trainees have both the ability and the motivation to acquire and utilise new skills (Wexley & Latham, as cited in Van der Westhuizen, 2015). Motivation is an important learner characteristic which influences learning and instruction and is a crucial element in setting and attaining goals (Du Toit, 2014; Holton, 1996; Pintrich, Cross, Kozma & McKeachie, as cited in Colquitt et al., 2000). *Motivation to learn* can prepare trainees to receive the maximum benefits from training and development programmes. Trainees are prepared by stimulating their attention and increasing their receptivity to new ideas. Motivated students or individuals are thus more receptive to learning (Nunes, 2003).

Research has consistently revealed a positive relationship between *motivation to learn* and *learning performanc*e or learning success across a variety of settings (Colquitt & Simmering, 1998; Hicks & Klimoski, 1987; Pintrich, 2003; Van Heerden, 2013; Wolff & Brechmann, 2015). However, this relationship is not a direct one, since *motivation to learn* only brings the individual to the act of learning it does not directly influence *learning performance* as an outcome. Nevertheless, *learning motivation* is an important *learning potential latent variable* that will motivate the trainee or learner to learn. It ultimately ensures the trainee's or learner's success in his/her learning programme. More importantly, from the perspective of the current study, *learning motivation* is an important trainer-instructor outcome latent variable through which the competence that the trainer-instructor displays on the trainer-instructor competencies affect the level of competence that the learner achieves on the learning competencies that constitute learning. Learning motivation is an important learning competency potential latent variable through which the trainer-instructor affects learning performance.

Learning motivation or the *motivation to learn* denotes a desire or intention, on the part of the trainee or learner, to engage in and invest high levels of consistent effort or energy in order to learn and master the content or training material of the training and development programme (Ames, 1992a; Burger, 2012; Colquitt et al., 2000; Hicks & Klimoski, 1987; Nunes, 2003; Tziner, Fisher, Senior, & Weisberg, 2007).

According to training literature, it is a generally recognised and accepted fact that *learning motivation* is influenced by both individual and situational characteristics (Colquitt et al., 2000). Certain learners appear to be naturally or intrinsically enthusiastic about learning and can, as a result, sustain motivation to learn by themselves. Other learners' *motivation to learn* has to be stimulated by the environment in order to ensure there is a motivation to learn (Colquitt et al., 2000; Van der Westhuizen, 2015). Pintrich (2003) found that, over time, learners' understandings and perspectives about motivation become more distinguished. With age, they develop more complex meanings and comprehensions of ability, intellect, effort and interest (Pintrich, 2003). Pintrich (2003) argued that teachers, through their instructions to learners, influence their learner's motivation to learn. Van der Westhuizen (2015) identified, based on literature, various behaviours that trainer-instructors can engage in to enhance or positively influence trainee's learning motivation, namely providing supportive and formative feedback, assigning appropriate difficulty level tasks, creating an open and positive atmosphere for learning, helping students feel valued in the learning community as well as assisting trainees to find personal meaning and significance in the learning material. Additionally, the trainer-instructor can label training as play (Webster & Martocchio, 1993) or make use of blended learning condition, for example, distance learning together with traditional face-to-face teaching and instructions (Klein, Noe, & Wang, 2006) in order to enhance learning motivation.

Based on the aforementioned discussion, *learning motivation* is malleable and indirectly under the influence of the trainer-instructor (Van der Westhuizen, 2015) via the effect of the trainer-instructor competencies on *learner competency potential latent variables*. This conviction essentially forms the latent variable on which the reduced Van der Westhuizen trainer-instructor performance structural model pivots.

2.5.2 MASTERY LEARNING GOAL ORIENTATION

In terms of goals, it should be noted that goal setting and goal orientation are two different, but related, constructs (Latham, Seijts, & Slocum, 2016; Seijts, G. P. Latham, Tasa, & B. W. Latham, 2004). They differ in origin. Goal setting research originates from organisational psychology; and goal orientation originates from educational psychology. They differ in terms of focus and tasks. Goal setting research is focused on motivation and includes straightforward tasks with an emphasis on effort and persistence whereas goal orientation is focused on ability and includes more complex tasks with the emphasis on the acquisition of knowledge and development of skills (Seijts et al., 2004).

Goal orientation theory is based on social-cognitive theory of achievement motivation and is predominantly studied in the domain of education (Svinicki, as cited in Du Toit, 2014). Farr, Hofmann and Ringenbach (as cited in Van Heerden, 2013, p. 53) defined goal orientation as "…a mental framework that determines how individuals interpret and respond to achievement situations". Goal orientation theory assesses the individual trainee's dispositional or situational goal preferences and the reasons why trainees engage in their academic work and achievement situation (Du Toit, 2014; Payne, Youngcourt, & Beaubien, 2007). Goal orientation predicted or is positively associated with accomplished academic achievement[33], learning, effort, commitment and performance (Bulus, 2011; Payne et al., 2007; Sideridis, 2005; Van Dam, 2015) and negatively related to anxiety and depression (Sideridis, 2005).

According to Meece, Blumenfeld and Hoyle (1988), goal orientation denotes the trainees' set of behavioural intentions that determine how they approach and engage in learning activities. Goals related to learning can

[33] Academic achievement is a very important indicator of learning and understanding in all educational systems (Sedaghata, Abedinb, Hejazic, & Hassanabadi, 2011).

be differentiated based on whether learning is perceived and valued as an end in itself or as a means to a goal external to the learning task. Research has revealed that trainees will pursue different achievement goals depending on their individual needs, competencies or on the demands of the situation. These different goals influence trainees' choice of achievement tasks, meanings and attributions for academic success as well as the selection of learning or problem-solving strategies (Meece et al., 1988).

Goal setting literature and research focuses on the content of goals and its influence on self- regulation activities (e.g., self-set goals or feedback seeking) and the subsequent performance of such goals and activities. Goal orientation literature and research focuses on two distinct traits that influence motives for competence, namely, performance and learning goal orientations (Latham et al., 2016).

Dweck and Leggett (1988) argued that the type of goals individuals pursue will create the framework or structure within which they interpret and respond to events. Related to learning or educational events or within the domain of intellectual achievement there are two categories of goals, namely, performance goals and learning goals. ‘Performance goals’ are related to individuals who are concerned with gaining favourable judgments or assessments of their competence. This creates a competence judgment response, which then creates a vulnerability to the helpless. In other words, helpless children or students pursue performance goals where they seek to establish the adequacy of their ability or competence. They, therefore, view achievement situations as tests or measures of competence on which they seek to be judged competently (Dweck & Leggett, 1988). ‘Performance goals or a performance goal orientation are also known as ego- or social orientated goals since students experience learning merely as a means to an end, external to the task, or to gain favourable judgements (Ames, 1992b; Dweck & Leggett, 1988; Van der Westhuizen, 2015). ‘Learning goals’ are related to individuals who are concerned with increasing their competence on certain competencies. This creates a competence enhancement response, which then creates or promotes the mastery-oriented pattern. Mastery-oriented individuals will view achievement situations as opportunities to increase their competence and will pursue those goals that will allow them to acquire new skills or extending their mastery (Dweck & Leggett, 1988). Learning goals or a learning goal orientation is also known as mastery- or task-orientated goals since students experience learning as a valued end in itself, such as newly gained competencies, developing new skills or obtaining a sense of mastery (Ames, 1992b; Dweck & Leggett, 1988; Van der Westhuizen, 2015). During challenging achievement situations, helpless children will be pursuing performance goals in an attempt to prove their ability, gain recognition or enhance their egos (Bulus, 2011; Dweck & Leggett, 1988). Whereas the mastery-oriented children will pursue learning goals in an attempt to improve or enhance their abilities in order to become better individuals (Dweck & Leggett, 1988).

The focus of this research study fell on ‘learning goals’ since the aim of this research was to enhance the trainee’s knowledge, skills and abilities (through the influence of specific trainer-instructor *competency potential latent variables*, *training situational latent variables*, *trainer-instructor competency latent* *variables* and *trainer-instructor outcome latent variables*) and since learning goals have more positive outcomes on learning, than performance goals. Those individuals with learning goals are more likely to view their efforts as a means or strategy for activating or establishing their ability for mastery or leads to mastery orientation (Button, Mathieu, & Zajac, 1996; Dweck & Leggett, 1988). Furthermore, this research focused on goal orientation, as supposed to goal setting, since the research is within the educational setting and the attainment of new knowledge and development of skills and since goal setting focuses more on performance goals (Latham et al., 2016; Seijts et al., 2004). *Mastery learning goal orientation*, therefore, denotes the trainee's learning goal orientation, (i.e., learning goals within a goal orientation theory) that leads to a mastery orientation. Individual trainees that are mastery-orientated are focused on developing new skills and improving their own level of competence or skills (Ames, 1992a).

Van Dam (2015) suggested that workplace goal orientation can be enhanced through training and development programmes and activities. Organisations can optimise their employees' work setting, through workplace goal orientation, by creating situations that will enhance employee learning, performance and error-management (Van Dam, 2015). However, trainer-instructors should keep in mind that different people will make or have different goals, especially when selecting students into groups for cooperative activities which includes making goals (Wiesman, 2012). Changes in trainees' goal orientations, as they progress and develop through school, are influenced by socialising experiences (Gernigon & Le Bars, 2000; Schunk, 1999; Van der Westhuizen, 2015; Xiang & Lee, 1998). Trainer-instructors must provide learning environments that allow trainees to perceive that their effort is an important and valuable contribution in achieving their goals (Xiang & Lee, 1998) Trainer-instructors, therefore, have a great influence on trainee motivation by promoting goal-oriented behaviours (Wiesman, 2012).

Learning motivation is tied to progress towards a goal. In other words, the discrepancy between the current level of performance and the ideal level of performance (i.e., goal) is thought of as a source of motivation (Dweck & Leggett, 1998; Van Heerden, 2013). Trainees will then work to narrow this discrepancy or gap. When they see that they are making progress, towards this goal, they will be more motivated to continue (Van Heerden, 2013). Research has found that *learning goal orientation* influences *learning motivation* (Colquitt & Simmering, 1998; Klein et al., 2006; Wiesman, 2012). Van der Westhuizen (2015) also found support for this path her research, in Model A, Model B, Model C and Model D.

Hypothesis 2[34]

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery learning goal orientation* will positively influence *learning motivation*.

[34] Where hypothesis 1 indicates the overarching substantive research hypothesis.

2.5.3 ACADEMIC SELF-EFFICACY

Bandura (1986) argued that knowledge and skills are not always enough to accomplish certain tasks or performances. Even when people know what to do and even when they possess the requisite abilities to perform successfully, they do not always perform optimally. This is because self-referent thoughts have a mediating effect on the relationship between knowledge and actions or performance. How people think about and judge their capabilities, knowledge and skills as well as their self-perceptions of their efficacy or effectiveness will ultimately affect their motivation and behaviour (Bandura, 1986). Self-efficacy can, therefore, be described as an individual's belief in or judgement of their capability to perform a specific task, reach specific goals and outcomes, and the ability to organise and execute certain courses of action in order to attain certain types of performances (Bandura, 1986; Coetzee & Schreuder, 2010). It also includes the belief that one can overcome obstacles and accomplish difficult tasks (Coetzee & Schreuder, 2010). Self-efficacy does not focus on existing skills and knowledge, but rather on how the individual judges or beliefs they can do with those skills and knowledge (Bandura, 1986).

According to the social cognitive theory, on which self-efficacy is based, individuals are not purely driven by inner forces nor are they automatically shaped and controlled by external forces. Rather, people's functioning is influenced by behaviour, cognitive other personal factors and environmental events which all interact. The interactive nature of these factors is known as triadic reciprocity or reciprocal determinism (Bandura, 1986). As a result of this reciprocal determinism, a number of factors influence an individual's self-efficacy or a number of factors are needed to create a desired effect (Bandura, 1986). This indicates that self-efficacy can be enhanced when the desired factors are present.

When learners perceive support from their teacher and when there is respect in the classroom learners become inclined to feel confident about their academic and learning skills (Patrick, Kaplan, & Ryan, 2007). Wu (2016) conducted a study on students' math self-efficacy and found that math teacher support was positively related to student math self-efficacy[35]. *Academic self-efficacy* is thus a malleable *learning competency potential latent variable*. Trainer-instructors can enhance trainees' *academic self-efficacy* by linking new work to recent successes, teaching learning strategies, reinforcing effort and helping them create personally important goals (e.g., Ormrod, 2000; Pajares, 2003; Pajares & Schunk, 2001; Pintrich & Schunk, 2002; Schunk, 1999; Zimmerman, 2000; all cited in Margolis & McCabe, 2003). Evans (as cited in Van der Westhuizen, 2015) argued that by providing students with supportive feedback the trainer-

[35] Wu (2016) suggested that teachers might need to change their teaching style, as a result of this study, by establishing an educational environment (e.g., teacher support) that focuses on improving student self-efficacy. Improving student self-efficacy will then, in turn, enhance students' math achievement. Although this study included teachers and students from the United States and Shanghai, China, the participle of enhancing learner self-efficacy, in order to enhance learner math achievement, is also valid in the South African context. The current educational system does not lead to high levels of achievement, or even passing, when it comes to maths. Maths, as it was earlier discussed in Chapter 1, is an essential prerequisite for many University degrees. A similar argument can be made regarding learner self-efficacy and their science achievement. In that learners who are more self-efficacious, or those who engage more in self-efficacy building experiences, are more capable of succeeding, engaging in and pursuing a greater quantity and diversity of science-related activities (Chen, Tutwiler, Metcalf, & Kamarainen, 2016).

instructor can enhance the student's self-confidence. Additionally, social interactions and trainer-instructors that uses authentic real-life tasks and that provide less direct instructional guidance can all enhance a trainee's or student's academic self-efficacy (Alt, 2015).

An individual that believes that they have control over their own learning and development will most likely achieve more success in their learning and academic pursuits and activities (Alt, 2015; Van der Westhuizen, 2015). Self-efficacy is positively related to training outcomes (Colquitt et al., 2000), learning performance (Fisk & Warr, 1996) and to learning-self efficacy (Potosky & Ramakrishna, 2002). A trainee's or learner's belief in their efficacy to regulate and control their own learning (i.e., to master academic activities) determine their goals, their level of motivation as well as their academic accomplishments (Bandura, 1993). Wu (2016) stated that, according to the literature on self-efficacy in the school context, it is clear that the student's self-efficacy strongly affects the student's academic performance. It can, therefore, be argued that *academic self-efficacy* is an important *learning competency potential latent variable* that will, ultimately, ensure the trainee's or learner's success in their learning programme.

Academic self-efficacy partly depends on the degree of perceived similarities among tasks since students' perceptions of similarity between problems or tasks increases, the generalisation of their *academic self-efficacy* judgments between the tasks also increased (Bong, 1997). In other words, when faced with a new task the individual would turn to knowledge and memory of a past, but similar, task in order to complete this new task. The knowledge of a similar task already completed will then enhance the individual's belief that he/she can do it again. This belief, in turn, can increase motivation to continue learning. Self-efficacy, therefore, can create powerful motivational effects (Bandura, 1997). This statement is supported by Nunes's (2003) findings that self-efficacy had moderate to strong relationships with *motivation to learn*; support by Colquitt and colleagues' (2000) research that found that self-efficacy is positively related to *motivation to learn*; and supported by Pintrich's (2003) research that stated that learners are *motivated to learn* due to their self-efficacy beliefs. Van der Westhuizen (2015) also found support for this path in her research, in Model A, Model B, Model C and Model D.

Hypothesis 3

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *learning motivation*.

When people are closely engaged in their performance they will be motivated to set themselves goals of progressive improvement, even if they are not encouraged or forced to do so. Dweck (as cited in Payne et al., 2007) argued that individuals with a strong learning goal orientation tend to believe that their performance can be improved through effort. These beliefs of effort leading to higher performance are facilitated by higher levels of self-efficacy. In other words, general self-efficacy can be seen as an antecedent of learning goal orientation, whereas specific self-efficacy (task-specific self-efficacy) can be as an outcome of learning goal orientation (Payne et al., 2007). Van der Westhuizen (2015) found support for this path, that general self-efficacy can be seen as an antecedent of learning goal orientation, in her research, in Model A, Model B, Model C and Model D.

Hypothesis 4

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *mastery learning goal orientation*.

2.6 TRAINER-INSTRUCTOR OUTCOME LATENT VARIABLES

As part of the discussion on the latent variables comprising the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model and serving as a foundation for the development of the full Wessels-Van der Westhuizen trainer-instructor competency model the following section will focus on the *trainer-instructor outcome latent variables* as defined in the current research[36]. The current research makes a clear distinction between *trainer-instructor outcome latent variables* and *training situational latent variables*.

2.6.1 INSPIRING PROFESSIONAL VISION

Affirmative development candidates, those individuals already employed, will probably be in their early life/career stage or middle life/career stage (Van der Westhuizen, 2015). Early life/career stage, according to Schreuder and Coetzee (2011), includes individuals around the ages of 25 to 45 and is characterised by physical and cognitive development at its peak. Some key early life/career stage tasks and challenges include upskilling oneself, continuously furthering one's qualification, becoming employable, becoming career resilient, finding a place in and also contributing to society, establishing your own identity, achieving independence and earning a living (Schreuder & Coetzee, 2011). Middle life/career stage, according to Schreuder and Coetzee (2011), includes individuals around the ages of 45 to 50 and is characterised by the conscious thought of ageing and mortality. This, latter stage, also includes physical changes and decline. Some key middle life/career stage tasks and challenges include achieving one's goals, gaining recognition, refining ones' identity, sustaining employability and upskilling oneself or further development (Schreuder & Coetzee, 2011). The need to remain employable and successful, through overcoming and excelling at some early life/career and early life/career tasks and challenges, forms the motivational bases for continuous learning, training and education. In turn, by continuously increasing skills, knowledge and abilities through gaining additional qualifications will not only enhance employability it will also assist in establishing the individual's identity and status. It can thus be argued that *motivation to learn* is not only an applicable prerequisite for learning success but also a prerequisite for career and life success.

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[36] In other words, trainer-instructor outcome latent variables will remain outcomes rather than becoming learning competency potential latent variables.

Learning motivation, as previously discussed and related to affirmative development learning programmes, denotes the trainee's desire to learn as well as the willingness to spend time and effort on the learning tasks which, in turn, leads to higher learning performance. *Learning motivation* plays an important role in leading to the success of any training and development programme (Nunes, 2003). The factors and goals that have an influence on *learning motivation* will differ from person to person as well as across different age groups and stages in the individual's life. One such difference can be attributed to the individual's current life and career stage (Van der Westhuizen, 2015). According to Frontiera and Leidl (2010), motivation can be a useful tool for trainers, just as it is an important tool for trainees, to ensure success in any learning activity or programme. Motivation is not only an important element in enhancing learning performance it can also increase employee productivity and satisfaction (Frontiera & Leidl, 2010). Consequently, it is crucial to gain more understanding on how to enhance *learning motivation*.

Frontiera and Leidl (2010) suggested that motivation can be understood through four key concepts, namely vision, goals, action items and stories. (a) Vision denotes a reflection of human possibility or ideas of ambitious achievements and goals. A vision of what could be or an ideal future state worth striving for will stimulate the necessary energy and motivation to move forward and grow in order to achieve those ideas and goals (Frontiera & Leidl, 2010). (b) Goals, that are well reasoned and that strategically reflect the larger vision will also influence motivating which, in turn, will influence and enhance continual effort. Goals can serve as mile markers or measures, on the journey towards the ultimate vision (Frontiera & Leidl, 2010). (c) Action items, identified during the development of an action plan, can be seen as the keys to unlocking goals which, in turn, is an important step toward accomplishing the larger vision (Frontiera & Leidl, 2010). (d) Stories, as well as history, can enhance motivation by reminding individuals of what has been in the past and that it can be done again as well as the odds people have had to overcome can provide inspiration (Frontiera & Leidl, 2010). However, since action items and stories do not constitute quantities and can vary in magnitude, they are difficult to quantify, since the impact of goals (i.e., *mastery learning goal orientation*) on motivation (i.e., *learning motivation*) was already discussed previously, only vision was discussed further.

A vision denotes "…a highly desirable future end state…" (Gardner & Avolio, 1998, p. 39) that is "…important for building commitment and motivating followers, groups or organisations" (Barnett & McCormick, 2003, p. 55) and can, therefore, provide a sense of purpose and direction to individuals or groups as well as an anticipated picture of the future (Barnett & McCormick, 2003). However, an individual's desirable future image or their professional vision is not set in stone. Rather it can change over time through interactions with other self-concepts, revisions of their ideal self or during the process of learning (Dörnyei, 2014; You & Chan, as cited in You, Dörnyei, & Csizér, 2016; You et al., 2016).

In order for a training and development programme to be successful[37] the trainer-instructor has to create a clear vision of which training goals need to be accomplished, what they want their trainees to accomplish and what their trainees can actually accomplish (Van der Westhuizen, 2015). For example, if a student can develop a well-established and clear ideal future self, such as becoming successful a business person (i.e., becoming professional), then this image (i.e., professional vision) can act as a self-guide or motivation to accomplish such a goal (Dörnyei, 2014). As a result, in the context of affirmative development programmes, the trainer-instructor needs to create a professional vision for their trainees to accomplish. This professional vision entails the trainees, or novices, seeing themselves as professionals within a specific field or vocation and living out their full potential, which then creates a positive image of themselves as successful employees (Van der Westhuizen, 2015; Yokotani, Mitani, Okuno, Hasegawa, & Sato, 2014). For the purposes of this research study, *inspiring professional vision* denotes "…*a positive professional vision in the mind of the trainee that inspires effort and a desire to learn*" (Van der Westhuizen, 2015, p. 110).

In terms of the cognitive theory, according to Van der Westhuizen (2015), the motivational power of a vision can assist the trainees, and employees, in seeing the relevance and value of the training activities and tasks. Seeing training and learning as valuable will motivate trainees to continue their learning and gain further competencies. This, in turn, will lead to the attainment of learning and development goals and ultimately achieving the vision of becoming a professional individual (Van der Westhuizen, 2015). In essence, a vision is closely related to mental imagery (i.e., seeing with one's mind's eye) and if it is used within a motivational context then this imagery is associated with subsequent behaviour, such as engagement in the learning process (You et al., 2016). As a result, a learner's vision of their future self-image or the learner's professional vision motivates that learner to learn and, in turn, become that envisioned professional (Dörnyei, 2014; Yokotani et al., 2014; You et al., 2016). Van der Westhuizen (2015) found support for the pathway between *inspiring professional vision* and *learning motivation* in her research, in Model A and Model B but no support was found for this path in Model C and D.

Hypothesis 5

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning motivation*.

2.6.2 ACCURACY OF ROLE PERCEPTION

The current study, in agreement with Van der Westhuizen (2015), proposes that the accuracy of learner's perceptions, as to what exactly learning entails, is a malleable *trainer-instructor outcome latent variable* that could be influenced by the behaviour of the trainer-instructor. However, this *trainer-instructor outcome latent variable* was not acknowledged by the reduced Van der Westhuizen (2015) trainer-instructor competency model.

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[37] A training and development programme is successful when it can enhance the *learning performance* of trainees.

Shuell (1986) suggested that learning is an active, constructive, cumulative and goal-oriented process. The active component of learning denotes the fact that the student is required to do certain things while at the same time process incoming information in order to learn the material in a meaningful manner. The constructive component of learning denotes the fact that new information must be elaborated on and related to other relevant information in order for the student to be able to retain simple information and understand complex material. Learning is also cumulative, denoting that all new learning builds upon or utilises the student's prior knowledge in a manner that will determine how much is learned in the end. Finally, learning is goal-oriented in that learning is most likely to be successful if the learner is aware of the goal that they are working towards and that they possess expectations that are appropriate for the attaining of desired learning outcomes (Shuell, 1986; Shuell, 1988).

Learning psychologists have discovered that what the student or trainee does during their learning process has an influence on the extent to which they learn. Thus, the student or trainee themselves mediate the relationship between the stimulus (e.g., learning material) and the response (e.g., what was learnt) (Van der Westhuizen, 2015). Although learning processes can be initiated either by the trainer-instructor or the trainee, it is the trainee that must essentially carry out these learning process themselves (Van der Westhuizen, 2015). Van der Westhuizen (2015, p. 143), therefore, argued that it is clear from this discussion that learning is, "…to a large extent, the result of what happens in the mind of the student".

For students to take an active role in a learning situation, they will need to have clarity regarding the learning criteria or outcomes that have to be met and an accurate perception of their role in the whole learning process (Mostafa, 2015; Shuell, 1988; Van der Westhuizen, 2015). 'Roles' denote those set of expected behaviours attributed to an individual occupying a given position within a group, job or occupation (Bergh & Theron, 2009). Role clarity and role ambiguity are two concepts that are related to possessing an *accurate role perception* (Van der Westhuizen, 2015). 'Role perception' denotes an individual's understanding of what their job or role entails and how they should behave in a given situation (Bergh & Theron, 2009). 'Role clarity' denotes the degree to which an individual is certain or clear about how he/she is expected to perform a given job or task (Shoemaker, as cited in Ryan, 2012). Role ambiguity, on the other hand, occurs when an individual has a poor or unclear understanding of his/her role expectations (Chang & Goldman, as cited in Van der Westhuizen, 2015). Many factors can have an influence on role ambiguity, including poor communication and feedback (Van der Westhuizen, 2015).

According to Lyons (1971), the concept of role clarity, or role ambiguity, can be operationalised in two ways. First, objective role clarity denotes the presence, or absence, of adequate role-relevant information due to either the restriction of or to the variations in the quality of relevant information. Second, subjective role clarity denotes the feeling that an individual has sufficient, or insufficient, amounts of role-relevant information. However, both types of role clarity have been found to relate to satisfaction and reduced tension (Lyons, 1971). Porter and Lawler (as cited in Van der Westhuizen, 2015, p. 144) defined *accurate* *role perception* as “the direction of effort which describes the kinds of activities and behaviours the individual believes they should engage in to perform their job successfully”. The accuracy of role perceptions, rather than the individual's role perceptions *per se*, is of the greatest importance for learning. Role perceptions would, along with ability, according to the expectancy theory of motivation (Porter & Lawler, as cited in Van der Westhuizen, 2015), moderate the effect of motivation on performance (Van der Westhuizen, 2015).

It is likely that the student’s perception of their role in the whole learning process will have an influence on their learning performance in the classroom and during evaluation (Van der Westhuizen, 2015). Zirbel (2006) argues that there are two misconceptions of the process of learning, namely, the fact that students have a preconceived idea of what their lecturer should be like and that students often believe a good lecturer to have all the answers to everything. Lecturers present students with knowledge and concepts (e.g., information from a certain school subject), if these concepts are well presented or taught (by the lecturer) and well connected (by the students) then deep understanding can occur. Deep understanding thus denotes the ability of the student to recall as many as possible connected concepts, of a specific subject, simultaneously and where each of these separate concepts holds a deep meaning in themselves. When the student can make further connections between all the separate concepts and when students can create new concepts, based on previous knowledge and concepts, then deep thinking occurs. Deep learning will, thus, not occur if students are ‘spoon fed’ or merely given the answers. Stated differently, a perceived idea that the lecturer will do all the work in the classroom and during the learning process, such as giving clear and logical arguments and where the student merely passively listens, will not lead to deep learning. Instead, students should also play a role, or play their role, in the classroom and learning process by actively listening, by critically thinking about the given argument or concepts presented and solving problems on their own in order to make sense of the new material and concepts, which then leads to making connections between the different concepts (Zirbel, 2006). A trainee’s view or opinion of their trainer-instructor’s role perception will have an impact on their ability to conduct deep learning and retaining the new knowledge.

Van der Westhuizen (2015) proposed that the aforementioned arguments made by Zirbel (2006) do not imply that the trainer-instructor should not provide clear arguments or refrain from assisting students with answers when they are faced with learning problems. Rather, the trainer-instructor can play an essential role in shaping the role perceptions regarding learning and methods of problem solving of their trainees. In addition, trainer-instructor feedback on trainees’ attempts at finding solutions or answers can assist in cultivating the appropriate orientation and perception to problem-solving (Van der Westhuizen, 2015).

The accuracy of an employees’ role perception will ultimately impact their job performance (Porter & Lawler, as cited in Van der Westhuizen, 2015). Similarly, the accuracy of a trainee’s perception of learning will impact their learning performance (Van der Westhuizen, 2015). The accuracy of an employee’s role perception will to a significant degree depend upon the extent to which their manager conveyed an accurate image of the role that the employee is expected to play in the job (Porter & Lawler, as cited in Van der Westhuizen, 2015). Similarly, the trainer-instructor has a significant impact on the extent to which trainees acquire an accurate perception of learning as well as of their role in the learning process. Therefore, the words, actions and examples set by the trainer-instructor will guide the trainees to which interpretation of learning should be adopted and internalised (Van der Westhuizen, 2015). Having an *accurate role perception* denotes "…students having clear and accurate beliefs of the activities, behaviours and responsibilities required by them in the learning process to learn successfully" (Van der Westhuizen, 2015, p.149).

2. 7 TRAINING SITUATIONAL LATENT VARIABLES

The current research acknowledges that performance is complexly determined and therefore added a fourth domain to the competency model, namely, *situational latent variables*.

2.7.1 MASTERY CLASSROOM GOAL STRUCTURE

As previously discussed, *motivation to learn* is an important prerequisite for learning success, employee productivity and satisfaction as well as for career and life success (Frontiera & Leidl, 2010; Schreuder & Coetzee, 2011) and should thus be understood in terms of what influences it. Although it was previously mentioned that *inspiring professional vision* influences a trainee's *learning motivation*, it is not, however, the only way in which a trainer-instructor can influence a trainee's *learning motivation*. Understanding *learning motivation*, or how to enhance an individual's *learning motivation*, can also be examined by means of the concept of goal orientation (Dragoni, 2005). However, *mastery learning goal orientation* is a *learning competency potential latent variable* in the learning potential model or, more specifically, how the individual trainee influences their own *learning motivation* (Du Toit, 2014; Meece et al., 1988; Payne et al., 2007), and thus does not explain how the trainer-instructor influences the trainee's *learning motivation*. Therefore, the latent variables that characterise the learning context and that can be influenced by the trainer-instructor that influences the malleable *mastery learning goal orientation* latent variable (Dahling & Ruppel, 2016; Maurer et al., as cited in Kooij & Zacher, 2016) should be examined and understood.

Research on goal orientation suggested that leadership and classroom climate perceptions are likely antecedents to state goal orientation since state goal orientation and achievement goals are responsive to situational influences or situational demands (Alkharusi, 2010; Dragoni, 2005; Dweck & Leggett, 1988). Achievement goal theorists suggest that the classroom environment (the structures of the classroom, the perceived motivational climate or the characteristics of the classroom) in which the trainee is involved can shape or influence their individual goal orientation (Gano-Overway & Ewing, 2004; Skaalvik & Federici, 2016). Research has found that trainees' perceptions of the motivational climate are related or transmitted to their dispositional goal orientations (Cury et al., as cited in Van der Westhuizen, 2015; Ntoumanis & Biddle, 1998). Therefore, the classroom or the trainee's perception of the classroom will influence their *mastery learning goal orientation*. Furthermore, the achievement goal theory framework can be utilised to explain and understand how teachers can use and create a classroom (or the motivational climate) environment to enhance student motivation and impact the student's academic goal orientations and achievement strategies (Gano-Overway & Ewing, 2004). Trainer-instructors, thus, play a major role in the emphasis placed on the type of learning and goals trainees adopt (Dragoni, 2005). Additionally, trainees' goal orientation changes as they progress through school, since the perceived motivational climate created by the trainer-instructor may represent a socialisation influence on the trainee that can alter their goal orientations over time or due to changes in their motivation (Alkharusi, 2010; Gano-Overway & Ewing, 2004; Van der Westhuizen, 2015).

Although, based on achievement goal theory, trainees adopt personal achievement goals (i.e., *mastery learning goal orientation*), they also adopt classroom achievement goals as each learning environment has a pre-existing goal structure (Urdan, 2004; Van der Westhuizen, 2015). The adoption of personal mastery goals or master-orientated learning goals is therefore influenced in part by cues, or goal-related messages, in the achievement context (Ames, 1992b). Urdan (2004) referred to this concept as classroom goal structure. Stated differently, these goal-related messages that trainees perceive in a classroom comprise the classroom goal structure that, in turn, influence the student's goal formulation (Urdan, 2004).

Classroom goal structure was defined by Murayama and Elliot (2009, p. 432) as "competence-relevant environmental emphasis made salient through general classroom practices and the specific messages that teachers communicate to their students." Wolters (2004, p. 236) stated that "goal structure describes the type of achievement goal emphasised by the prevailing instructional practices and policies within a classroom, school, or other learning environment." In essence, classroom goal structure denotes those signals (i.e., classroom instructional practices or messages) that trainees receive from their trainer-instructors about what is important in school (Murayama & Elliot, 2009; Skaalvik & Federici, 2016; Wolters, 2004). Examples of instructional practices or messages include the types of tasks assigned (e.g., design tasks for variety and interest), the grading procedures, the degree of autonomy trainees receive, the way trainees are grouped into small groups, how trainer-instructors model the required behaviours, provide continual guidance, reinforce appropriate behaviour, present reasonable challenges to individual students, not punishing students for honest mistakes, avoiding the comparison of students with each other, promote independent thinking, and allowing students some choice regarding their learning activities (Ames, 1992b; Dragoni, 2005; Skaalvik & Federici, 2016; Wolters, 2004).

Similar to the two types of individual goal orientations, namely, performance goal orientation or learning/mastery goal orientation (Ames, 1992b; Dweck & Leggett, 1988), literature has also identified two types of classroom or motivational climates, namely, a mastery-orientated climate and a performance-oriented climate, that describe the social environment in school classrooms and sport (Halvari, Skjesol, & Bagøien, 2011). Furthermore, these mastery or performance climates are related to how others (e.g., trainer-instructor, coach or parent) structured the learning environment (Roberts, as cited in Halvari et al., 2011). In a physical education setting, for example, a mastery-orientated climate involves the trainer-instructor promoting learning and providing a supportive atmosphere or environment that enhances learning effort (Halvari et al., 2011). A mastery-orientated climate thus influences a trainees' mastery-orientated goal formation. Conversely, a performance-oriented climate involves trainer-instructors promoting competition, rivalry and normative comparison of students (Halvari et al., 2011). A performance-orientated climate thus influences a trainees' performance-orientated goal formation.

Similar to the two types of classroom climates, namely, mastery-orientated climate and a performance-oriented climate, there are two distinct classroom goal structures, and as in accordance with the two goal orientations, namely, mastery goal structure (or task-involving climates) and performance goal structure (or ego-involving climates) (Ames, 1992b; Lau & Nie, 2008; Midgley et al., 1998; Murayama & Elliot, 2009; Newton, Duda, & Yin, 2000; Skaalvik & Federici, 2016; Van der Westhuizen, 2015).

A 'mastery goal structure' can be described by the following key characteristics: a classroom environment where instructional practices, policies and norms convey to trainees that learning is important, that all trainees are equally valued, that trying hard is important in order to be successful in learning, which leads to being successful in work as well (Wolters, 2004); trainees that express a greater preference for challenging work, like class more, have more adaptive pattern of attributions for success and higher levels of motivation (Wolters, 2004); a classroom environment that focus on engaging trainees in academic work to develop competence, especially task- and intrapersonal based competence (Murayama & Elliot, 2009); and the trainer-instructor's promotion of learning and support, emphasis understanding, recognising mistakes and failures as a normal part of the learning process, providing positive feedback and encouragement, and trainees' perception of a helping atmosphere in which effort is important for improvement (Skaalvik & Federici, 2016; Van der Westhuizen, 2015).

A 'performance goal structure' can be described by the following key characteristics: when trainees are encouraged to outperform their peers, a climate with a looming threat of punishment for undesirable performance, and if trainees experience their learning environment as entailing differential treatment, may cause a stressful situation for trainees (Newton et al., 2000); trainees' perception of intra-student rivalry, normative praise, unequal recognition, perceiving mistakes are punishable (Halvari et al., 2011); an environment that emphasises standardised test scores, publicly displaying grades, and the prominence of comparison between schools, classes, or students (Skaalvik & Federici, 2016); an environment that signals to trainees that success leads to receiving extrinsic rewards, demonstrating high ability, as well as outperforming others (Midgley et al., 1998; Skaalvik & Federici, 2016; Van der Westhuizen, 2015).

A mastery goal structure is seen as a more appropriate goal orientation than performance goal structure since it is associated with positive outcomes or adaptive cognitive, emotional and behavioural outcomes such as academic performance, academic self-concept, adaptive coping responses after failure, resilience, applying more effort, intrinsic motivation, lower levels of help avoidance, not cheating, positive affect, satisfaction with learning, self-efficacy, and utilising effective learning strategies (Ames & Archer, as cited in Van der Westhuizen, 2015; Halvari et al., 2011; Lau & Nie, 2008; Murayama & Elliot, 2009; Newton et al., 2000; Skaalvik & Federici, 2016; Urdan & Midgley, 2003; Wolters, 2004). Mastery goal structures also encourage or stimulate learning/mastery-orientated goals since trainees are more likely to focus on understanding content rather than focusing on how they are being perceived by others or how well they are doing compared to others (Alkharusi, 2010; Patrick et al., 2007; Skaalvik & Federici, 2016; Wolters, 2004).

In contrast, literature found that performance goal structures have been associated with maladaptive behaviours, for example, self-handicapping, cheating, procrastinating, disruptiveness, help-avoidance, and negative affect regarding school (Anderman, Griesinger, & Westerfield, as cited in Van der Westhuizen, 2015; Lau & Nie, 2008; Skaalvik & Federici, 2016; Van der Westhuizen, 2015; Wolters, 2004). These performance goal structures also stimulate performance-orientated goals (Alkharusi, 2010; Skaalvik & Federici, 2016; Wolters, 2004).

Although the type of classroom climate leads to a specific type of learning goal orientation, it is possible for a classroom or motivational climate to influence trainees differently depending on their initial goal orientation (Gano-Overway & Ewing, 2004). Therefore, students with different learning goal orientations are inclined to view their classroom climate differently (Lyke & Young, 2006). It would appear that classroom goal structure may be in the eye of the beholder (Lyke & Young, 2006; Van der Westhuizen, 2015), where the beholder represents the trainee. Incompatibility between an individual's goal orientation and his/her perception of a climate would result in an individual experiencing a change in their goal orientation. Individuals who had a strong initial goal orientation, are subject to a more pronounced influence by the particular climate (Gano-Overway & Ewing, 2004).

Van der Westhuizen (2015) stated that various achievement goal theorists found that personal achievement goals (learning/mastery goals or performance goals) have the most optimal impact on achievement-relevant outcomes (motivation, efficacy, interest, and value) when they match an individual trainee's higher level goals, achievement dispositions, and/or achievement environment (Harackiewicz & Elliot, as cited in Van der Westhuizen, 2015; Lau & Nie, 2008; Linnenbrink, 2005; Murayama & Elliot, 2009). This match, or matching hypothesis, therefore suggests that the classroom contexts (i.e., mastery goal structure or performance goal structure) that matches or fits the trainee's personal goal orientations (i.e., learning/mastery goals or performance goals) are most beneficial to the trainees' learning in that these (matched) classroom support trainees' individual learning goals, which will lead to adaptive outcomes (Lau & Nie, 2008; Linnenbrink, 2005). In terms of practical implications, it is important for trainer-instructors to understand the idea behind matching since a mismatch can have negative influences on the trainee's learning experience and success. Negative influences of a mismatch occur when the classroom goal structure weakens a desirable relation at the individual level, which produces a diminishing effect and the positive potential of an individual trainee is dampened (or not fully realised) due to goal incongruence (Lau & Nie, 2008). For example, if a trainee with a mastery goal orientation was placed in a classroom characterised by a performance goal structure it would suggest a mismatch. This mismatch may lead to their mastery goal orientation resulting in a weaker positive influence on achievement-related outcomes (Van der Westhuizen, 2015).

For the purpose of this research, *mastery classroom goal structure* was defined as *a classroom goal structure that conveys the trainer-instructor's instructional practices, policies and norms which is formulated to support the successful learning, growth and goal formation of their trainees in order to, ultimately, obtain new skills and a sense of mastery among their trainees*.

The classroom environment, structures and characteristics can influence the individual leaner's goal orientation (Gano-Overway & Ewing, 2004; Skaalvik & Federici, 2016). A mastery-orientated climate promotes learning and providing a supportive atmosphere or environment that enhances learning effort (i.e., positively influencing the formation of mastery-orientated goal) (Halvari et al., 2011). A 'mastery goal structure', which influences a mastery-orientated climate, includes the instructional practices, policies and norms conveyed to trainees about their learning, which leads to being successful in work as well (Wolters, 2004). It can thus be argued that the trainer-instructor's instructional practices, policies and norms, when formulated in such a manner as to support the trainees' learning, growth and goal formation, will influence the trainees' knowledge acquisition and skill development (i.e., their learning goal orientation). Van der Westhuizen (2015) found support for this pathway in her research, in Model A, Model B, Model C and Model D.

Hypothesis 6

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *mastery learning goal orientation*.

Van der Westhuizen (2015) further argued that the influence of goal orientation and goal structure on *learning motivation* is a complex state of affairs. For example, is the relationship between *mastery classroom goal orientation* and *learning motivation* moderated by *mastery classroom goal structure* or is the relationship between *mastery classroom goal structure* and *learning motivation* mediated by *mastery classroom goal orientation*?

Van der Westhuizen (2015) argued against the mediating effect of *mastery learning goal orientation* on the relationship between *mastery classroom goal structure* and *learning motivation*, based on the results of Wolters (2004). Wolters (2004) stated that no inference could be made from or in his research with regards to the causal relationship between classroom goal structure (*mastery classroom goal structure*) and personal goal orientation (*mastery learning goal orientation*). In addition, Wolters (2004) found that on average mastery and performance-approach goal structures (*mastery classroom goal structure*) were not strong or consistent predictors of students' personal goal orientations (*mastery learning goal orientation*) when the individual-level effects were accounted for (Van der Westhuizen, 2015).

The current study, however, argues for the mediating effect of *mastery learning goal orientation* on the relationship between *mastery classroom goal structure* and *learning motivation*. The classroom goal structure, according to achievement goal theory, has an influence on the student's learning motivation (Wolters, 2004). Mastery goal structure was found to be the most influential type of classroom goal structure due to its positive influence on trainee's learning, leads to adaptive outcomes and increase intrinsic motivation (Alkharusi, 2010; Ames & Archer, as cited in Van der Westhuizen, 2015; Halvari et al., 2011; Lau & Nie, 2008; Murayama & Elliot, 2009; Newton et al., 2000; Skaalvik & Federici, 2016; Urdan & Midgley, 2003; Van der Westhuizen, 2015; Wolters, 2004). Stated differently, if the trainer-instructor's instructional practices, policies and norms are formulated or displayed in such a manner as to support and encourage their trainees' learning, growth and goal formation trainees might feel more motivated to learn. However, even when classroom goal structures were accounted for, students' mastery goal orientations increased their motivation (Wolters, 2004). In other words, *learning motivation* is directly influenced by the trainee's *mastery learning goal orientation* (as was previously hypothesised). The trainee's *mastery learning goal orientation*, in turn, is directly influenced by the *mastery classroom goal structure* since literature has found that the classroom climate or structure influences the individual's goal orientation (Alkharusi, 2010; Dragoni, 2005; Dweck & Leggett, 1988; Gano-Overway & Ewing, 2004; Ntoumanis & Biddle, 1998; Skaalvik & Federici, 2016; Van der Westhuizen, 2015). It can be argued that, although the trainer-instructor's instructional practices support their trainees' learning, growth and goal formation (i.e., *mastery classroom goal structure*) influences the *learning motivation* of their trainees, this influence is not direct or cannot be clearly explained. Rather this influence can be better explained by taking into account the trainees' reasons for engaging in and committing to their learning and gaining skills (Bulus, 2011; Du Toit, 2014; Payne et al., 2007; Sideridis, 2005; Van Dam, 2015) (i.e., their *mastery learning goal orientation*). Thus, the trainer-instructor's instructional practices (i.e., *mastery classroom goal structure*) will be able to influence their trainees' *learning motivation* by focusing on and supporting the trainees' mastery learning goal orientation.

Hypothesis 7

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *mastery classroom goal structure* and *learning motivation* is mediated by *mastery learning goal orientation.*

Van der Westhuizen (2015) argued, in favour of the moderating effect, that when trainees with a *mastery learning goal orientation* are placed in a classroom with a mastery goal structure, the desirable relationship between personal mastery goal orientation (*mastery learning goal orientation*) and *learning motivation* should be strengthened. These trainees will probably regard the classroom environment (*mastery classroom goal structure*) as reinforcing and satisfying if the features or characteristics of the classroom resemble their own personal goal preference (*mastery learning goal orientation*). As a result, Van der Westhuizen (2015) hypothesised that *mastery classroom goal structure* moderates the effect of *mastery learning goal orientation* on *learning motivation*. However, Van der Westhuizen (2015) did not find support for this hypothesis (support was only found once, in Model B). The current study did not find sufficient evidence to support this moderating relationship. As a result, based on the lack of evidence and the lack of support found for this hypothesis in Van der Westhuizen's (2015) research, the current study did not include this moderating effect.

In Van der Westhuizen's (2015) research, Model C's modification indices for the beta matrix, **B**, (Table 4.81 in Van der Westhuizen, 2015, p. 390) suggested that an additional path from *mastery classroom goal structure* to *inspiring professional vision* should be included in the structural model to improve the model fit. Van der Westhuizen (2015) argued that a classroom characterised by the trainees' view to learning as learning for the sake of learning, for the sake of understanding and for the sake of growth and improvements will lead to higher levels of the ability to create a professional vision. Stated differently, if trainees learn with the aim of development they will view learning as an important tool for the advancement in their careers and society, which then enhances their belief that they will add value to their organisation as competent and professional employees. An individual trainee that experiences their classroom as having a *mastery classroom goal structure* will, therefore, be more likely to create an *inspiring professional vision* (Van der Westhuizen, 2015). Van der Westhuizen found support for this pathway, in Model D, where it was first introduced and empirically tested.

Hypothesis 8

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *inspiring professional vision*.

According to the modification indices calculated **B** for Model D (Table 4.91 in Van der Westhuizen, 2015, p. 410), the addition of a path in which *mastery classroom goal structure* positively influences *academic self-efficacy* would have statistically significantly ($p < .01$) improved the fit of the revised Van der Westhuizen (2015) model (Model D). This path suggests that a classroom where learning is perceived to be important for personal growth and development would positively influence, or enhance, the belief that an individual can successfully complete the learning actions needed to produce a desired academic outcome (Van der Westhuizen, 2015). Stated differently, that if the trainer-instructor' classroom practises support the trainees' learning growth and skill development it would lead to the trainees having a stronger sense of their learning ability and performance. Although Van der Westhuizen (2015) argued that this path appears to be plausible, it was not included in her research, since there was no need to improve the fit of model D. Urdan and Midgley (2003) found that learners who reported a decline in their *mastery classroom goal* *structure* also reported a decline in adaptive outcomes (e.g., *self-efficacy*). Uçar & Sungur (2017) found that students' perceptions of a *classroom goal structure* were statistically significant predictors of the students' self-efficacy.

Hypothesis 9

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *academic self-efficacy*.

2.7.2 LEARNING CLIMATE

Research on classroom climate began in the early 1930's when Lewin (as cited by Pierce, 1994) acknowledged that human behaviour is not only determined by the individual's personal characteristics, but that the environment in which the individual functions and how this environment interacts with the individual's personal characteristics also influences human behaviour. The classroom, with its unique atmosphere or climate, is thus an important element or influence in the interpersonal and educational development of a student (Pierce, 1994). The correct classroom climate can effectively promote and enhance student attitudes towards learning and subject knowledge, student learning, achievement, cognitive growth as well as develop positive behavioural and academic outcomes (Fraser, 1987; Hannah, 2013; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013; Mucherah, 2008; Pierce, 1994; A. Raviv, A. Raviv, & Reisel, 1990; Walberg & Anderson, 1968).

Goodlad (as cited in Pierce, 1994) defined classroom climate and environment as the physical, emotional and aesthetic characteristics of a classroom that will a tendency to enhance trainees' attitudes toward learning. The classroom climate can be defined as the general class atmosphere which includes attitudes towards learning, norms of social interaction, the learning structures (e.g., caring and supportive learning structures) set by the teacher, and the acceptance of ideas as well as mistakes (Urdan & Schoenfelder, 2006).

The physical aspect of the classroom denotes the room's physical layout, for example, how the desks are arranged (e.g., small groups, u-shaped or one big circle), the attractiveness of the bulletin boards and study material on the walls (i.e., aesthetic characteristics), the room temperature and lighting (e.g., create both well-lit and dimly-lit learning spaces in the classroom since some learners prefer bright lighting where other prefer low light), and the noise-levels (Shalaway, n.d.). If the classroom climate or physical environment is not set up correctly, such as being boring, too quiet, lack of art or resources, it can stifle the learner's creativity or create to lack of interest (Hannah, 2013; Van der Westhuizen, 2015). This, poorly set up environment, will not be able to promote a positive learning environment (Hannah, 2013).

A study conducted by Williams, Childers and Kemp (2013) found that the student's experience of positive emotions (e.g., joy, interest, and excitement) in the classroom was positively related to the student's motivation and learning behaviours, which in turn, to leads to academic success. Thus, positive emotions are positively related to studying, attending class, participating in classroom discussions and performing additional activities outside of class to enhance understanding and negatively related to emotional exhaustion. The trainees' positive emotional experiences in the classroom can be enhanced or influenced by the trainer-instructor's attributes (e.g., display of enthusiasm and communication skills), the physical classroom layout, and the use of technology (e.g., visual learning and multimedia). The student's experience of positive emotions in the classroom is advantageous for both the trainees and the trainer-instructors in stimulating and enhancing learning behaviours (Williams et al., 2013).

Students do not learn in isolation, thus, rather learning is a social process (Ryan & Patrick, 2001; Spears, 2012). The social aspect of the classroom climate or environment includes the trainer-instructor's social and emotional competence, the social relationships between students and teachers, caring, physical closeness, a sense of safety and security, teacher academic support, teacher emotional support, classroom mutual respect, task-related interaction, academic self-efficacy, self-concept, trust, goal structures and values, cooperation and competition, participation and exclusion, hierarchy, group discussions, and democracy (Allodi, 2010; Jennings et al., 2013; Patrick, Kaplan, & Ryan, 2011; Pierce, 1994; Raviv et al., 1990; Spears, 2012; Urdan & Schoenfelder, 2006; Weimer, 2011).

One way in which the classroom climate can enhance learning is to make the classroom environment fun and lively, to allow for innovation, where new ideas are always being tried out and welcomed as well as when teachers can provide students have adequate information (Pierce, 1994; Trickett & Moos, 1973). Another way in which classroom climate can enhance learning is through a more social setting since the classroom climate plays an important role in the social and psychological features of the learning environment during training and development (Fraser, 1987).

The term classroom climate denotes the classroom in which learning occurs and can, thus, also be labelled 'learning environment' (Urdan & Schoenfelder, 2006), 'classroom environment' (Allodi, 2010; Raviv et al., 1990), or 'learning climate' (Van der Westhuizen, 2015). Seeing that learning is a social process and that the classroom can be set in a social setting (Allodi, 2010; Ryan & Patrick, 2001; Spears, 2012), the term classroom climate can, thus, also be called a 'social climate' (Allodi, 2010) or a 'classroom social environment/climate' (Ryan & Patrick, 2001).

Van der Westhuizen (2015) argued, based on research[38], that *learning climate* is comprised of five dimensions, namely, *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *interest and involvement*, and *autonomy*, but mentioned that *mastery goal structure/climate* might also, possibly, be a dimension of *learning climate*. A short description of each will now be provided.

[38] Van der Westhuizen (2015) carefully selected the original five dimensions of learning climate, namely teacher emotional support, teacher academic support, psychological safety and fairness, autonomy, and interest and involvement, by assessing various conceptualisations of the construct of classroom climate or learning climate and extracting the most universal dimensions used in the literature as well as linking the identified dimensions to prominent motivational theories. Van der Westhuizen (2015) decided to not include mastery goal structure as a dimension of learning climate based on popular practice.

Teacher emotional and academic support

As previously mentioned, the social climate can be characterised by the relationships between teachers and students as well as the relationships among students. Therefore, interpersonal relationships such as student-teacher relationship and peer relationships, as well as teachers' beliefs and behaviours, teachers' communication style, classroom management, and group processes all positively influence the learning environment (Allodi, 2010). The classroom climate, in the social setting, emphasises the significance of the development and maintenance of these supportive teacher–student relationships which, in turn, can enhance learning and academic outcomes (Jennings et al., 2013). An important aspect of these social relationships is support. Teacher support denotes that the teacher takes a personal interest in the students, that they care about their students and will help them (Fraser, 1987; Patrick et al., 2007; Trickett & Moos, 1973). Teacher support can be subdivided into teacher emotional support and teacher academic support (Trickett & Moos, 1973).

Teacher emotional support refers to the belief that the teacher is warm, cares about and likes their individual students as a person, or care in a personal capacity, and that the teacher's affective communication with their students include communicating with a smile and positive verbal feedback (Patrick et al., 2007; Shin & Ryan, 2017). Mutual respect and positive relationships among teachers and their students create an emotionally supportive classroom (Shin & Ryan, 2017). Marchand and Gutierrez (2017) found that perceived teacher emotional support predicted the students' behavioural engagement (e.g., perseverance and effort during learning) and emotional engagement in their academic tasks.

Teacher academic support refers to the perception that the teacher cares about how much their students learn and that the teachers will want to help the students master the learning content, or care in an academic capacity (Joe, Hiver, & Al-Hoorie, 2017; Patrick et al., 2007).

The support of the trainer-instructor as well as the quality, quantity, and directions of these social relationships, therefore, influence trainees' engagement, motivation, and performance (Fraser, as cited in Allodi, 2010; Patrick et al., 2007).

Teacher emotional support and *teacher academic support* is considered as the first two dimensions of classroom or *learning climate* (Van der Westhuizen, 2015).

Psychological safety and fairness

A classroom climate can facilitate learning, development, academic achievement and engagement through ensuring structure, fairness, well developed lesson plans, providing security, being caring and providing a non-threatening atmosphere (Blanton, as cited in Van der Westhuizen, 2015; Chory-Assad, 2002; Patrick et al., 2011; Pierce, 1994; Urdan & Schoenfelder, 2006).

Fairness denotes respect and equal treatment for all learners. Therefore, trainer-instructors should not display any form of bias against any individual or group of learners (Blanton, as cited in Van der Westhuizen, 2015). An example of fairness in the classroom and learning environment is the fairness of teachers' grading procedures and allocation (Chory-Assad, 2002). The relationship between perceptions of fairness and learner's motivation in the classroom leads to an increase in student affective learning (Chory-Assad, 2002). The concept of fairness and equity is particularly important in the context of affirmative training and development programmes in South Africa.

Safety is a lower order need for security, including security in the workplace as well as in the learning or training environment (Smit, Cronje, Brevis, & Vrba, 2011). When learners feel safe, they feel like they are being cared for and will then be motivated to work harder (Van der Westhuizen, 2015).

Kahn (1990, p. 708) defined 'psychological safety' as "…feeling able to show and employ one's self without fear of negative consequences to self-image, status, or career". Sanderson (2013, p. 11) defined psychological safety in the following manner "…that one can voice a concern or ask for help and know that the response will always be respectful". Psychological safety pertains to the challenge of human change, which occurs during any learning, training and/or development programme. The right time in a person's development will lead to the cost-effective use of programmes and efforts designed to create human change. The right time being, when the person's assets and abilities align with their social context it produces psychological safety (Rimm-Kaufman, 2016). Psychological safety is, therefore, associated with elements in the social setting that creates more or less nonthreatening, predictable and consistent social situations in learners can engage in (Kahn, 1990). As a result, when an individual learner experiences psychological safety in the learning or classroom environment that learner will have the freedom to focus solely on their learning. This freedom is a result of the learner being without the fear or concern about potential embarrassment, unfair treatment or judgement (Van der Westhuizen, 2015).

Psychological safety is also related to, or includes, fairness, equity and justice (Van der Westhuizen, 2015). If an individual perceives that a trainer or instructor has shown preferential treatment to certain learners, then that individual will feel betrayed. This betrayal, on part of the instructor, will have broken the trust and respect and, in turn, the relationship (Blanton, as cited in Van der Westhuizen, 2015). Therefore, once the trainee-trainer relationship is broken, as a result of unfair practices or breach in the trust relationship, the trainee will probably reduce his/her learning effort and will experience a lack of motivation.

Van der Westhuizen's (2015) research conceptualised *psychological safety and fairness* as a single latent variable. However, as the name implies this latent variable might consists of two separate but related components, namely, safety and fairness. The results of the factor analysis conducted on *psychological safety and fairness* during Van der Westhuizen's (2015) research suggested that it might possibly be meaningful to elaborate on the fairness component as well as to more clearly distinguish between the two components, psychological safety and fairness and whether these two components are differentially influenced by and have a differential influence on other latent variables (Van der Westhuizen, 2015).

Educational equity means that the trainer-instructor not only want their trainees to be warm and loving, but that they should also become knowledgeable and competent. Educational equity is therefore important within the learning process and, in the midst of diversity, also includes active risk-taking, peace-making and reconciliation (Jenkins, 1987). Risk-taking is also an element in psychological safety since one is safe to take risks such as speaking up without consequences (Edmondson & Lei, 2014). It can be argued that there is a link between psychological safety and equity. Classroom equity is also about teaching to all the students in your classroom, not just those who are already engaged, already participating and already know the subject being taught (Tanner, 2013). Equity, in this regard, is about striving to structure the classroom environments in such a manner to maximise fairness so that all students have time to think and so that all students can verbally participate since all students have the right to know that their opinions (i.e., voice) will be heard and valued (Baloche, 2005; Tanner, 2013). Fairness, as related to the learning process, denotes respect and equal treatment for all learners and free from any form of bias (Blanton, as cited in Van der Westhuizen, 2015). Equity can thus act as a measure of the degree of fairness within a classroom (Thomas, 2015). Therefore, it can be argued that since there is a link between psychological safety and equity and between equity and fairness, that there will also be a link between psychological safety and fairness, making this a single construct and not two separate constructs.

Psychological safety and fairness is considered as the third dimension of classroom or *learning climate* (Van der Westhuizen, 2015).

Interest and involvement

Involvement can serve as a tool for assessing classroom climate or environment and it can be defined as the "extent to which students have attentive interest, participate in discussions, do additional work, and enjoy the class" (Pickett & Fraser, 2010, p. 322). Bendapudi (2010) argued that one measure of a learner's engagement in their learning is their participation in the classroom during lectures. Research shows that learners' participation and involvement enhance their learning, it increases motivation, develops higher levels of cognitive skills and it leads to improved academic outcomes. However, effective classroom participation or involvement requires effort from both the lecturer and the learners (Bendapudi, 2010).

Interest, in an educational setting, can incorporate a learner's experiences outside the school into the learning process, encourage the learner to utilise prior knowledge in pursuit of new knowledge as well as motivate the learner to engage in learning tasks at hand (Dewey, as cited in Shroff & Vogel, 2009). Interest denotes a positive psychological state based on person-activity interaction. In learning and training, this psychological state is believed to originate from learner-content interaction (Hidi, as cited in Shroff & Vogel, 2009).

Through social engagement and involvement, in the classroom or learning climate, a learner's curiosity can be stimulated which leads to an increased sense of interest. This increased sense of interest leads to an enhanced state of involvement and interaction with the learning material, increasing motivation and ultimately enhanced learning and better academic outcomes (Reeve, 2009; Shroff & Vogel, 2009; Van der Westhuizen, 2015). Trainer-instructors can, therefore, increase academic achievement, study skills and engagement by stimulating learners' curiosity and interest (Van der Westhuizen, 2015).

Interest and involvement is considered as the fourth dimension of classroom climate (Van der Westhuizen, 2015).

Autonomy

When there is a collaborative relationship between the lecturer and the adult learner it fosters motivation and the development of autonomy in adult learners (Botha & Coetzee, 2016). Larri and Newlands (2017) found that the literature has identified that autonomy, self-directedness, learning through one's own and others' experiences, as and/or when the need for learning or problem-solving arises and being intrinsically motivated are attributes of adult learning.

Autonomy denotes an inner endorsement or validation of one's actions, the sense that these actions emanate from oneself and are one's own (Deci & Ryan, 1987). Autonomy promotes choice and the option of having choices reduces pressure to engage in the behaviour the individual does not want to engage (Deci & Ryan, 1987; Shroff & Vogel, 2009). The freedom of having to make your own choices has psychological benefits such as individuals may feel a sense of control and empowerment (Shroff & Vogel, 2009). In autonomy supported learning environments learners have options, they can choose for themselves, set their own goals and initiate actions by themselves (Shroff & Vogel, 2009; Van der Westhuizen, 2015). Autonomy is therefore important for understanding individual behaviour, development and experience and is associated with intrinsic motivation (Deci & Ryan, 1987). Research has supported the positive effect intrinsic motivation has on learning and academic achievement and intrinsic motivation, in turn, is influenced by autonomy (Shroff & Vogel, 2009).

Autonomy is considered as the fifth dimension of classroom or *learning climate* (Van der Westhuizen, 2015).

Mastery goal structure

Goals and goal structures, the way achievement goals are structured or linked, have been identified as an important concept for the study of social classroom climates or learning environments (Allodi, 2010; Roseth, D. W. Johnson, & R. T. Johnson, 2008). Within this social setting of learning environments, cooperative goal structures (i.e., where the individual's goals are linked together with other individuals' goals that a positive correlation occurs between their collective goal attainments) were found to be associated with a positive relationship between achievement and positive peer relationships (Roseth et al., 2008). Although it appears that goal structure is important to the *learning climate*, no evidence could be obtained for the inclusion of *mastery goal structure/climate* as a dimension of *learning climate*.

By taking all five dimensions of classroom learning climate into consideration, a *learning climate* can be defined as "…*the general atmosphere in the classroom related to teacher emotional support, teacher academic support, psychological safety and fairness, autonomy, and interest and involvement that is conducive to student learning*" (Van der Westhuizen, 2015, p. 121).

If the trainer-instructor, as a thought leader, consistently displays behaviours that exhibit *support*, *psychological safety and fairness*, *autonomy*, and *interest and involvement* they can transmit the importance of such behaviours to their trainees through role modelling, continual guidance and reinforcement (Van der Westhuizen, 2015).

In general, positive emotions in the classroom are positively related to motivation (Williams et al., 2013). *Learning climates* in which the trainer-instructor is supportive, where autonomy is encouraged, where the environment stimulates student interest and involvement, and where the students are comfortable being themselves is likely to be more intrinsically motivating, than say negative classroom climates (Van der Westhuizen, 2015). More specifically, the perceptions of the trainees' understanding and experience of the dimensions of their classroom or learning climate, such as teacher support, promoting interest, promoting mutual respect and fairness, enhancing autonomy, enhancing participation, interest and involvement all have a strong positive effect on the trainees' motivational beliefs (i.e., learning motivation) and engagement (Bendapudi, 2010; Chory-Assad, 2002; Deci & Ryan, 1987; Dewey, as cited in Shroff & Vogel, 2009; Fraser, as cited in Allodi, 2010; Larri & Newlands, 2017; Lombarts, Heineman, Scherpbier, & Arah, 2014; McBer, 2001; Patrick et al., 2007; Ryan & Patrick, 2001). It can, therefore, be argued that *learning climate*[39] positively influences *learning motivation*. Van der Westhuizen (2015) found support for this path in her research, in Model A, Model B, Model C and Model D.

Hypothesis 10

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *learning motivation*.

During Van der Westhuizen's (2015) empirical testing of the structural model, the modification indices for Model A's beta matrix (Table 4.71 in Van der Westhuizen, 2015, p. 378) suggested that an additional path from *learning climate* to *mastery classroom goal structure* should be included, which she did. This path denotes that a classroom, characterised by a stronger learning climate, would consequently also have a stronger mastery goal structure. Van der Westhuizen (2015) argued in support of this new path, in that a

[39] *Learning climate* as a whole training situational latent variable will influence *learning motivation* since each of the separate dimensions influences *learning motivation* and the classroom, as a concept, also influences *learning motivation*.

classroom with a strong learning climate would be one in which trainees would experience emotional and academic support from their teacher, experience mutual respect and trust (i.e., teacher emotional support), have higher levels of autonomy, have higher levels of interest and involvement, and that would allow the trainees to be comfortable with themselves. The presence of these positive states or dimensions are likely to lead to the perception that the classroom is characterised by a helping atmosphere, where effort is important for development and improvement, where all trainees are valued, where trying hard is important and valued, and where all trainees can be successful if they work hard (i.e., a *mastery classroom goal structure*) (Van der Westhuizen, 2015). It can further be argued, that since classroom goal structure (i.e., *mastery classroom goal structure*) denotes those classroom instructional practices or messages that trainees receive from their trainer-instructors about what is important in school (Murayama & Elliot, 2009; Skaalvik & Federici, 2016; Wolters, 2004), these goal structures will be reinforced by the trainer-instructor's messages containing elements of or related to teacher emotional support, teacher academic support, psychological safety and fairness, autonomy and interest and involvement. It can, therefore, be hypothesised, in accordance with Van der Westhuizen's (2015) research, that *learning climate* will positively influence *mastery classroom goal structure*. Van der Westhuizen (2015) first tested this path in Model B and support found in Model B, Model C and Model D.

Hypothesis 11

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *mastery classroom goal structure*.

Furthermore, in Van der Westhuizen's (2015) research, Model D's modification indices for the beta matrix (Table 4.91 in Van der Westhuizen, 2015, p. 410) suggested that an additional path from *mastery classroom goal structure* to *learning climate* should be included in the structural model since it had the highest modification index value. It was hypothesised, based on the literature and theorising, that a classroom or *learning climate* characterised by teacher emotional support, teacher academic support, psychological safety and fairness, autonomy support, and interest and involvement would lead to higher levels of *mastery classroom goal structure*. However, the inclusion of the path from *mastery classroom goal structure* to *learning climate* now suggests that a classroom characterised by the perception that learning is important for personal growth and development (i.e., has intrinsic value), will lead to a stronger *learning climate* characterised by teacher emotional support, teacher academic support, psychological safety and fairness, autonomy, and interest and involvement. Therefore, the current research supports the hypothesis that *mastery classroom goal structure* positively influences *learning climate*[40].

[40] However, this hypothesis was not empirically tested as part of Van der Westhuizen's (2015) partial trainer-instructor performance structural model.

Hypothesis 12

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *learning climate*.

This bi-directional path, between the two latent variables *learning climate* and *mastery classroom goal structure*, suggests a feedback loop in which a classroom with a positive *learning climate* will positively influence *mastery classroom goal structure*, while a *mastery classroom goal structure* will at the same time positively influence *learning climate.*

In Van der Westhuizen's (2015) research, Model B's modification indices for the beta matrix (Table 4.77 in Van der Westhuizen, 2015, p. 386) suggested that an additional path from *inspiring professional vision* to *learning climate* should be included in the structural model to improve the model fit. A vision, or professional vision, can encourage a devotion to certain learning approaches. These learning approaches, in turn, then builds skills and competencies that would facilitate greater learning performance (Van der Westhuizen, 2015; Wofford & Goodwin, 1994). Trainees who experience greater levels of *inspiring professional vision* will be more likely to experience their classroom as one in which they receive more support (both emotional and academic) from their trainer-instructor, they will have higher levels of autonomy, higher levels of interest and involvement, and will experience mutual trust and respect (Van der Westhuizen, 2015). Van der Westhuizen (2015) argued that an individual trainee, who is experiencing *inspiring professional vision*, will be more willing or likely to contribute to the learning process, be more open, and experience the classroom or learning climate as motivating. Van der Westhuizen (2015) found logical theoretical support for this suggested pathway and included it in her structural model (Model C). Van der Westhuizen (2015) found support for this path in Model C and Model D.

Hypothesis 13

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning climate*.

2.7.3 STRUCTURE IN THE LEARNING MATERIAL

The ultimate goal of teaching or any training and development programme is student learning or to promote deep learning (Van der Westhuizen, 2015; Zirbel, 2006) otherwise, there will be no return on investment for both the trainee and the organisation. Deep learning can be enhanced by providing students with basic learning concepts that they themselves should critically think about, understand and connect to previous knowledge. In other words, when learners are able to make sense of learning material they are able to recall previous knowledge and make proper connections between different concepts (Zirbel, 2006). Based on Zirbel's (2006) theory of deep learning, Van der Westhuizen (2015) argued that learning involves the creation of a cognitive structure. Structure denotes the arrangement of and relations between the elements of something complex. Deep learning involves exactly that, that students are required to create their own whole structure of the learning material and its constituent parts or separate concepts (Van der Westhuizen, 2015). Another way in which learning can be enhanced is in how learning concepts and information is ‘chunked’. The human brain can only remember a limited number of facts. However, when those facts are bunched together to form meaningful networks of concepts the number of information or learning material appears to be less and is consequently more easily retained and remembered (Zirbel, 2006).

Learning can, therefore, be enhanced when the learning material or subject knowledge is presented in a format that makes it easy for the students to find meaningful structure, or meaningful connections, as well as when the information is bunched together (Van der Westhuizen, 2015; Zirbel, 2006). Identifying key points and structuring the learning material can help to establish links between the contents in the learning material or learning concepts, leading to, finding meaningful structures within of the learning material or contents (Mayer, as cited in Hübner, Nückles, & Renkl, 2010). Additionally, trainer-instructors can use their expert knowledge in a particular field or subject, since this provides them with a greater overview of the subject, to develop learning material that has meaningful connections between the sections of information and has bundles of relevant information (Zirbel, 2006). Furthermore, Van der Westhuizen (2015) suggested that learning can be enhanced by providing trainees with information from a variety of sources. Trainer-instructors are, however, required to highlight the important differences, similarities and other important elements of the learning material as well as possible alternative interpretations, because trainees not have the necessary overview of the. Consequently, repeating and pointing out relevant aspects of the learning material will assist the trainees in following and building a clear picture of that particular learning theme or subject being discussed. However, it remains the responsibility of the trainees to create their own meaningful perspective of the learning material through actively engaging in the elements being taught and through making relevant connections between previous and current knowledge. It is the responsibility of the trainer-instructor to initiate and facilitate the learning process, but it remains the trainee’s responsibly to deeply understand, deeply think and to, ultimately, learn deeply (Van der Westhuizen, 2015; Zirbel, 2006).

Van der Westhuizen (2015) proposed that the creation of structure in the learning material should be regarded as a subjective, rather an objective, experience on behalf of the trainee. This subjective experience involves the trainer-instructor’s presentation and articulation of the learning material, which can either facilitate or inhibit learning. It is subjective since it is the trainee him-/herself that should experience the feeling that something is making sense, that should be able to put together different parts of information as well as combine new information with current information (Van der Westhuizen, 2015). Van der Westhuizen (2015) stressed the argument that the trainer-instructor cannot be held responsible for what transpires in the mind of their trainees, but that the trainer-instructors are responsible for effectively facilitating the process of learning in the minds of their trainees. *Structure in the learning material* is defined as "*…a meaningful structure within which the constituent parts of the learning material are presented as a meaningfully integrated*" (Van der Westhuizen, 2015, p. 153).

2.8 TRAINER-INSTRUCTOR COMPETENCY LATENT VARIABLES

As part of the discussion on the latent variables comprising the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model and serving as a foundation for the development of the full Wessels-Van der Westhuizen trainer-instructor competency model (specifically for the development of the *trainer-instructor competency potential latent variables*) the following section will focus on the *trainer-instructor competency latent variables*.

During the literature review, it was discovered that the four freestanding dimensions of *learning climate*, which all influence *learning climate* as in Van der Westhuizen's (2015) research, forms an integral part of *transformational trainer-instructor leadership*, a *trainer-instructor competency latent variable*. Consequently, for the purpose of this research study, the four *trainer-instructor competency latent variables* (or four freestanding dimensions) influencing *learning climate*, namely *fostering psychological safety and fairness*, *demonstrating individualised consideration*, *stimulating interest and involvement*, and *providing autonomy support*, were woven into the fabric of *transformational trainer-instructor leadership*. Additionally, *providing inspirational motivation* forms part of one of the four dimensions of transformational leadership. As a result, *providing inspirational motivation* also forms an integral part of *transformational trainer-instructor leadership*. *Providing inspirational motivational* was, therefore, included, for the purpose of this research study, as a dimension of *transformational trainer-instructor leadership*.

2.8.1 TRANSFORMATIONAL TRAINER-INSTRUCTOR LEADERSHIP

2.8.1.1 Leadership within an educational setting

The trainer-instructor fundamentally acts as a thought leader to his/her students. Although there is no single accepted view or understanding of what constitutes the nature of leadership, the theory of transformational leadership is one of the most recognised forms of leadership (Foster & Roche, 2014). Transformational leadership is the most prominent and most popular approach to leadership (Balwant, 2016; Geijsel, Sleegers, Leithwood, & Jantzi, 2003; Riggio, 2015); it is more satisfying (Bass, 1997); it is the most effective form of leadership (Bass, 1997; Den Hartog, House, Hanges, Ruiz-Quintanilla, & Dorfman, 1999; Foster & Roche, 2014; Lam & O'Higgins, 2012); its related to work unit effectiveness (Lowe, Kroeck, & Sivasubramaniam, 1996); and it contributes to outstanding leadership (Den Hartog et al., 1999). Bass (1997) found that transformational leadership is a type of leadership that is universal, in that any individual ranging from individual housewives to world-class leaders can exhibit transformational leadership. Transformational leadership is useful and effective in many different organisational settings (Bass, 1997;

Den Hartog et al., 1999; Leithwood et al., 2004a). It can, therefore, be argued, that transformational leadership might also be useful and effective within an educational setting.

Within the context of a school or educational setting, the potential of leadership (and specifically transformational leadership) is based on the assumption that the classroom can be seen as a small social organisation, with the teacher as the leader or superior and learners as followers or subordinates (Balwant, 2016; Cheng, 1994; Chory & McCroskey, 1999; Leithwood & Riehl, 2003; Pounder, 2008). Chory and McCroskey (1999, p.2) based their argument, that a classroom can be seen as an organisation, on the following definition of an organisation "an organized collection of individuals working interdependently within a relatively structured, organized, open system to achieve common goals". The collection of individuals, referring to the teacher and the students, working together within the structure of the educational or school system with the aim of achieving a common goal, that of learning (Chory & McCroskey, 1999). Successful educational leaders develop and improve their schools into becoming effective organisations (Leithwood et al., 2004a). This effective organisation, in turn, support and sustain the performance of both teachers and learners (Bowman, 2004; Leithwood & Riehl, 2003; Leithwood et al., 2004a). Given this argument or assumption concepts usually related to the organisational setting or organisations in general, that have not yet been tested within an educational or school setting, is now warranted (Chory & McCroskey, 1999). This also provides a justification for empirically testing leadership and transformational leadership, an organisational concept, within the educational or school setting.

2.8.1.2 Teachers as leaders

An argument that has been put forward in literature is that of the teacher leader as a position within an organisation or school (i.e., positional teacher leaders) in contrast to the individual teacher leader as a role or function of the duties of a teacher (i.e., non-positional teacher leaders) (Ackerman & Mackenzie, 2006; Anderson, 2004; Frost, 2012; Silva, Gimbert, & Nolan, 2000; York-Barr & Duke, 2004).

Traditionally, teacher leaders held formally appointed leadership position in schools (i.e., positional teacher leaders), such as department chair, department heads, head teacher, lead teacher and union representatives (Ackerman & Mackenzie, 2006; Anderson, 2004; Silva et al., 2000; York-Barr & Duke, 2004). These, traditional and formally appointed or positional teacher leaders were known as the first wave teacher leaders (Silva et al., 2000; York-Barr & Duke, 2004). However, focusing on teacher leadership based on positions of authority within the hierarchy of the school or organisations leads to deeper concerns (Ackerman & Mackenzie, 2006; Frost, 2012). One such concern is that these appointed positions of authority often demanded the attention of the teacher outside of the classroom, such as developing curriculums, curriculum coordination or consulting teacher roles (Ackerman & Mackenzie, 2006). When using teachers to fill such managerial and leadership roles it takes away the core role of teachers, to teach and interact with their students, or in effect 'neuters' teachers (Silva et al., 2000). Formal leaders at times excluded some groups or individuals from developing leadership skills or becoming leaders, which then led to reduced collective decision-making (Anderson, 2004).

These concerns or limitations lead to the development of the second wave teacher leadership. This type of leadership acknowledges the significance of teachers remaining teachers, but simultaneously becoming instructional leaders. As a result, positions that capitalise on teachers' instructional knowledge were created, such as curriculum developer, team leader and personnel development roles for teachers (Silva et al., 2000). Although these positions started to move away from more formal positions and management roles outside the classroom to more teacher pedagogical or educational expertise these teacher leaders where still more "apart from" rather than "a part of" their daily work roles and duties as teachers (Silva et al., 2000, p. 780; Wiggenton, as cited in Silva et al., 2000). This type of teacher leadership started to show the importance of empowering teachers who work and lead from within their own classrooms, thus moving to the third wave of teacher leadership (Silva et al., 2000).

More recently, teacher leaders are deriving their authority from within their own classroom experience (Ackerman & Mackenzie, 2006). This type of teacher leadership (i.e., non-positional teacher leaders) or third wave teacher leadership is anti-hierarchical since they are developed rather than appointed (Silva et al., 2000). These teacher leaders encourage parent participation, modelling reflective practice, assist their colleagues with professional growth activities, engage in school level problem-solving initiatives, articulate a vision for change and/or improvement and continuous learning (Wasley, as cited in Silva et al., 2000; York-Barr & Duke, 2004). Non-positional teacher leaders or third wave teacher leaders engage in leadership roles and opportunities that form part of their daily work as teachers in a classroom setting (i.e., leading inside the classroom) as well as being leaders outside of their classroom (Ash & Persall, 2000; Silva et al., 2000; York-Barr & Duke, 2004). Formal teacher leaders' roles linked to a formal position of authority still exist, however, more teachers lead informally (Ackerman & Mackenzie, 2006).

According to the Norms and Standards for Educators (Republic of South Africa, 2000), there are seven roles for educators in schooling of which one role is that of *leader*, *manager* and *administrator*. In other words, the concept of the teacher as a leader is embedded in South African education policy documents and therefore an important concept for improving the current education system.

2.8.1.3 Defining teacher leadership and its influences on the individual student

The literature on teacher, educational or academic leadership typically includes describing the various forms of teacher leadership without clearly defining the concept or without a precise description of the term (Anderson, 2004; Balwant, 2016; Childs-Bowen, Moller, & Scrivner, 2000; Marshall, Orrell, Cameron, Bosanquet, & Thomas, 2011; Scott, Coates, & Anderson, 2008; Wenner & Campbell, 2017; Yielder & Codling, 2004; York-Barr & Duke, 2004). Consequently, there is a widespread conceptual confusion over what the term teacher leadership actually entails (Muijs & Harris, 2003; Wenner & Campbell, 2017). York-

Barr and Duke (2004) argued that the lack of a single comprehensive definition might, partly, be due to the expansive field incorporated under the umbrella term "teacher leadership". For example, the evolution of teacher leadership over time (i.e., the three waves) (Silva et al., 2000; York-Barr & Duke, 2004). Another reason for the conceptual confusion is due to the ill-defined boundaries of teacher leadership performance, role ambiguity, the overlap between the various roles involved in teaching, teaching administration and teaching leadership as well as the fact teacher leaders do not always hold the same titles across different schools (Scott et al., 2008; Wenner & Campbell, 2017; Yielder & Codling, 2004). Finally, yet another reason for the lack of a single comprehensive definition, is due to the complex nature of human beings and human activities, with leadership being the most complex of human behaviours and relationship (Leithwood & Riehl, 2003; Riggio, 2015).

On the positive side, this lack of scope or definition of teacher leadership can allow teacher leaders to potentially fit into a variety of roles and positions. Still, this lack of comprehensive definition can become difficult, even dangerous, when evaluating selection processes of potential leaders or leadership development programmes since in the absence of a clear criterion these interventions cannot be fully supported by rigorous empirical research (Wenner & Campbell, 2017). However, the main theme, or point, is that teacher leaders are both teachers and leaders within the educational context (Wenner & Campbell, 2017; York-Barr & Duke, 2004).

Even the term, teacher leader, differs from one article to the next, for example, during the literature review for the purpose of this research the following where found[41],

a) teachers as leaders (Bowman, 2004);
b) instructor-leadership (Balwant, 2016);
c) teacher leader and/or teacher leadership (Ackerman & Mackenzie, 2006; Anderson, 2004; Angelle & DeHart, 2011; Berry et al., 2005; Cheng, 1994; Chew & Andrews, 2010; Childs-Bowen et al., 2000; Clemson-Ingram & Fessler, 1997; Fairman & Mackenzie, 2012; Frost & Durrant, 2003; Frost, 2012; Harris, 2005; Hart, 1995; Leithwood & Riehl, 2003; Louis, Dretzke, & Wahlstrom, 2010; Moller, Childs-Bowen, & Scrivner, 2001; Muijs & Harris, 2003; Wenner & Campbell, 2017);
d) school leaders and/or school leadership (Berry et al., 2005; Chew & Andrews, 2010; Clemson-Ingram & Fessler, 1997; Day et al., 2009; Day, Gu, & Sammons, 2016; De Maeyer, Rymenans, Van Petegem, van den Bergh, & Rijlaarsdam, 2007; Fairman & Mackenzie, 2012; Frost, 2012; Geijsel, Sleegers, & van den Berg, 1999; Geijsel, Sleegers, van den Berg, & Kelchtermans, 2001; Hart, 1995; Leithwood, Louis, Anderson, & Wahlstrom, 2004b; Wenner & Campbell, 2017);
e) classroom leadership (Bolkan & Goodboy, 2009; Pounder, 2006; Pounder 2008);

[41] These articles do not indicate the full extent of the literature review, they only serve the purpose of demonstrating the lack of consistency in using the same term. However, it can be noted that the term 'teacher leader/leadership' was most often used.

f) educational leadership (Fairman & Mackenzie, 2012; Harris, 2005; Hart, 1995; Leithwood et al., 2004b; Wenner & Campbell, 2017; York-Barr & Duke, 2004);
g) and academic leader and/or academic leadership (Marshall et al., 2011).

In their meta-analysis on teacher leadership, Wenner and Campbell (2017) found five general themes that described teacher leadership, namely that teacher leadership goes beyond the walls of the formal classroom, that teacher leaders ought to support professional learning within their schools, that teacher leaders should be involved in policy development and/or decision making, teacher leaders should be working toward the improvement and change of a whole school organisation, and that the ultimate goal of teacher leadership is to enhance student learning and academic success (Wenner & Campbell, 2017). York-Barr and Duke (2004) formed a description of what teacher leadership entails based on a short literature review, namely, teacher leadership is a process that includes the use of the teachers' expertise regarding teaching and learning in order to improve the classroom culture with the main aim of improving teaching and learning practices. It can be argued that the improvement in classroom culture as well as teaching and learning practices can indirectly and positively influence the student's learning success.

Balwant (2016, p. 21) utilised Yukl's definition of leadership and applied it to the educational context, thus defining instructor-leadership as follows "*a process whereby instructors exert intentional influence over students to guide, structure, and facilitate activities and relationships*." Furthermore, instructor-leadership often influence followers towards a specific goal, such as setting detailed course goals or objectives regarding the improvement of students' subject knowledge, critical thinking skills as well as interpersonal skills (Balwant, 2016).

Classroom leadership entails the ability for handling multiple classroom processes simultaneously as well as possessing sound knowledge and understanding of interpersonal relations among students in the classroom (Afdal & Nerland, 2014). It can be argued that once these multiple classroom processes are effectively managed by the classroom leader it will have a positive influence on the students' learning process. This, in turn, can positively influence students' academic success.

Teacher leadership refers to the ability of teachers as leaders to go beyond their classroom, to be researchers within the field of education, and to be supporters of teaching and development of others including their students and other teachers. In other words, teacher leadership includes the ability to move forward or look towards the future (Wasley, as cited in Anderson, 2004). A description of an educational leader explaining the indirect manner in which a teacher as a leader influences their students' learning outcomes comes from Witziers, Bosker and Krüger (2003). They said that an educational leader is an individual whose actions, including both administrative and educational actions and tasks, are intentionally aimed at positively influencing the school's primary processes and, as a result, ultimately improves students' achievement levels (Witziers et al., 2003).

In order to ensure that their review accurately focuses on teacher leaders, Wenner and Campbell (2017) formulated their own working definition of the term teacher leader. According to them, teacher leaders can be defined as "…teachers who maintain K–12 classroom-based teaching responsibilities, while also taking on leadership responsibilities outside of the classroom" (Wenner & Campbell, 2017, p. 140). K-12 is an educational term referring to grades ranging from kinder garden (i.e., K), for children around five or six years of age, through to the 12th grade (i.e., 12) just before attending university or college (Homeland Security, n.d.; Rouse, 2005). Wenner and Campbell (2017) acknowledged that their definition of teacher leadership does not denote a consensus conception of the term teach leadership. However, according to them, it does help differentiate teacher leaders from other leadership forms or roles in schools (e.g., administrators, disciplinary specialists) (Wenner & Campbell, 2017). This definition indicates that all teachers can be empowered to become leaders, but that only a true teacher leader will go above and beyond their typical or traditional duties (Wenner & Campbell, 2017).

Furthermore, the positive relationship or influence of teacher leadership on school improvement (i.e., change and reform[42]), school success or effectiveness and students' academic achievement has been well documented (Angelle & DeHart, 2011; Berry et al., 2005; Childs-Bowen et al., 2000; Day et al., 2009; Day et al., 2016; Frost, 2012; Harris, 2005; Leithwood et al., 2004a; Louis et al., 2010; Moller et al., 2001; Muijs & Harris, 2003; Pounder, 2008; Witziers et al., 2003; York-Barr & Duke, 2004). The focus in the current study is, however, on the individual trainer-instructor in the classroom and his/her effect on the learning performance of individual trainees. The positive outcomes of the teacher as leaders' influence on individual learner academic performance, include positive attitudes towards their classmates, teachers and their school as well as enhanced self-concept, self-efficacy for learning, learners' satisfaction, motivation and development potential (Cheng, 1994).

The positive effect that teacher leadership has on the learner's learning success or academic achievement is, however, most likely not a direct relationship, effect or influence (Barker, 2007; Cheng, 1994; De Maeyer et al., 2007; Leithwood & Riehl, 2003; Leithwood et al., 2004b; Louis et al., 2010; Witziers et al., 2003). It would appear that teachers as leaders influence their learners' academic achievement by affecting their learners' learning attitude (e.g., self-concept) and social behaviour, both individually and in groups (Cheng, 1994). Teacher leadership also motivates teachers and influences the quality of their teaching in the classroom, which then influences the student's academic achievement (Muijs & Harris, 2007). The indirect effect model of educational leadership assumes that the effect or influence of school leadership on student academic achievement is mediated by numerous situational latent variables, for example, the school climate (i.e., instructional processes) and the organisation of the school (De Maeyer et al., 2007), but also

[42] Leithwood et al. (2004b) found no documented instances of where a school was in trouble or a failing school was turned around or improved without the intervention of a powerful leader. Although many other factors may contribute to such improvements or turnarounds the leadership is always the catalyst (Leithwood et al., 2004b).

learner competency potential latent variables like attitudes towards the learning task and learning motivation.

Teacher leadership does not entail only a single role (Angelle & DeHart, 2011). Rather the concept teacher leadership includes, and can be better understood, by a variety of formal and informal roles and positions to be performed by the teachers related to personnel development, management and school improvement (Clemson-Ingram & Fessler, 1997; Fairman & Mackenzie, 2012; Katzenmeyer & Moller, as cited in Muijs & Harris, 2003; York-Barr & Duke, 2004). Some of these roles include leadership of operational tasks through roles such as the head of a department or action researcher. (Katzenmeyer & Moller, as cited in Muijs & Harris, 2003); building different relationships or partnerships with co-workers, the learners' parents, the learners themselves, administrators and community leaders (Bowman, 2004; Katzenmeyer & Moller, as cited in Muijs & Harris, 2003; Muijs & Harris, 2007); the ability to effectively and clearly communicate (Bowman, 2004); working closely alongside legislators and policymakers (Clemson-Ingram & Fessler, 1997; Moller et al., 2001); coaching, providing professional development and mentorships for other teachers (Clemson-Ingram & Fessler, 1997; Moller et al., 2001; Muijs & Harris, 2007); utilising facilitation and presentation skills to communicate and lead (Angelle & DeHart, 2011; Moller et al., 2001); involve others in creating a shared vision and meaning (Angelle & DeHart, 2011); maintain focus on the learner's learning (Angelle & DeHart, 2011) and participate in planning and organising (Moller et al., 2001). However, the types of roles or functions the teacher leader engages in are uniquely dependent on the individual leaders, the specific school and school context in which the teacher is working, and the nature of the goals created (Leithwood & Riehl, 2003; Moller et al., 2001).

2.8.1.4 Models of teacher leadership

Fairman and Mackenzie (2012), viewing teacher leadership as a function rather than a role, developed the Spheres of Teacher Leadership Action for Learning model that provides information on where and how teachers, either individually or co-operatively, formally or informally, perform and influence other teachers with the aim of improving student learning. These nine spheres include, (a) "Individual teacher engagements in learning about his or her practice" (e.g., professional development and continuous learning); (b) "Individual teacher experiments and reflects" (e.g., innovation and bringing about change); (c) "Teacher shares ideas and learning; mentors, coaches other teachers"; (d) "Teachers collaborate and reflect together on collective work" (e.g., developing or creating new curriculums or study material and implementing it together); (e) "Teachers interact in groups and through relationships re culture and the school" (e.g., influencing classroom norms); (f) "Teachers question, advocate, building support and organisational capacity" (e.g., questioning existing school practices and procedures to promote change); (g) "Teachers engage in collective school-wide improvement, focus resources and distribute leadership", (h) "Teachers collaborate with the broader school community, parents"; and (i) "Teacher (or group) shares work outside of school/in professional organisations" (e.g., presenting at conferences) with the main aim of improving student learning. These spheres are non-linear and non-continuous activities or duties of teacher leaders. Additionally, teacher leaders can move into and out of these various activities over the course of their careers (Fairman & Mackenzie, 2012).

The Teacher Leadership Exploratory Consortium, a group of education stakeholders in the USA (Teacher Leadership Exploratory Consortium, 2011) developed the Teacher Leader Model Standards. The purpose of the Teacher Leader Model Standards is to categorise, promote and support teacher leadership as a guide for transforming schools in order to meet the needs and deal with the challenges of 21st-century learners. The standards are organised into seven domains of leadership, or more specifically seven domains of competence for teacher leaders (Frost, 2012; Teacher Leadership Exploratory Consortium, 2011). The seven domains are as follows: Domain I: Fostering a collaborative culture to support educator development and student learning; Domain II: Accessing and using research to improve practice and student learning; Domain III: Promoting professional learning for continuous improvement; Domain IV: Facilitating improvements in instruction and student learning; Domain V: Promoting the use of assessments and data for school and district improvement; Domain VI: Improving outreach and collaboration with families and community; and Domain VII: Advocating for student learning and the profession. Each domain is further supported by a list of functions and skills that a teacher leader might perform (Teacher Leadership Exploratory Consortium, 2011).

Although these model standards, or the Teacher Leader Model Standards, are important and useful activities, Frost (2012) pointed out some limitations or negative sides to this model, namely that teacher leadership is not only about designated roles, that the creation of these specific roles may require additional funding (i.e., increases in budget for increases in salaries), it might place a limit on the development of leadership capacity, and that his model might not be universally applicable.

2.8.1.5 Defining trainer-instructor leadership

The term trainer-instructor leader will be defined as *an individual trainer-instructor performing both teacher and leadership duties inside the classroom and leadership duties outside of the classroom as well as engaged in continuous professional development in order to, ultimately, attain academic goals (such as developing the trainees' academic knowledge; increasing learning skills, trainees' subject knowledge and critical thinking skills; and improve the classroom culture).*

2.8.1.6 Transformational leadership

Similar to the positive effect of teacher leadership on students' academic achievement, transformational leadership or transformational teacher leaders positively influence their learner's behaviours and perceptions (Bolkan & Goodboy, 2009). Transformational leaders encourage growth in their followers, which enables their followers to develop themselves (Dambe & Moorad, 2008). Transformational leadership also ensures higher levels of concern and motivation among teachers (Geijsel et al., 1999). In the current study transformational leadership is viewed from the perspective of the influence that the trainer-instructor is expected to exert on his/her trainees. In the argument presented below, the terms follower and subordinate should therefore first and foremost be understood to refer to the individual trainee.

According to Burns (as cited in Geijsel et al., 2003), transforming leadership motivate and encourage their followers and subordinates to do more than what was originally expected of them to do (Bass, as cited in Bolkan & Goodboy, 2011). A transformational leader is a leader that communicates a vision and inspires their followers through instilling pride, self-respect and faith in their leader. Transformational leaders are able to raise awareness in their followers and those around them about increasing concerns for achievement, self-actualisation. They can lead their followers to go beyond their self-interests to concerns for the good of the community (Foster & Roche, 2014).

Yammarino and Bass (1988) defined transformational leaders as those individuals who can create and articulate a realistic shared vision of the future, that can intellectually stimulate their subordinates, and that can take note of individual differences among their subordinates or followers. Bennis and Nanus (as cited in Beyer, 2006, p. 13) defined transformational leadership as individual leaders "…who can form and elevate the motives and goals of followers, and turn them into agents of change." Transformational leaders are leaders who are concerned about transforming the existing order of things and addressing their followers' needs for personal development and meaning (Conger, 1999).

Transformational leadership consists of four specific dimensions, namely individualised consideration, intellectual stimulation, idealised influence and inspirational motivation[43] (Bass and Avolio, as cited in Geijsel et al., 2003)

Individualised consideration denotes treating subordinates differently according to their individual needs and capabilities (Bolkan & Goodboy, 2009; Bolkan & Goodboy, 2011). These leadership behaviours are related to consideration or thoughtfulness for others by playing close attention to each individual organisational member's needs and interests, such as needs for self-actualisation and growth (Bass and Avolio, as cited in Geijsel et al., 2003; Bass and Avolio, as cited in Beyers, 2006; Bolkan & Goodboy, 2009; Bolkan & Goodboy, 2011). This type of leader coaches and mentors, provides continuous feedback and aligns organisational members' needs to the organisation's overall mission[44] (Bolkan & Goodboy, 2009; Bolkan & Goodboy, 2011). This dimension measures the extent to which the leader cares about their

[43] Early research showed that the original formulation of transformational leadership consisted of three dimensions only, namely individualised consideration, intellectual stimulation and charisma (Bass, as cited in Van der Westhuizen, 2015; Bolkan & Goodboy, 2011; Yukl, 2013). Inspiration or inspirational motivation was at first only seen as a sub-component of charisma (Bolkan & Goodboy, 2009). However, later it was often deemed as a separate dimension of transformational leadership (Gardner & Stough, 2002; Van der Westhuizen, 2015).

[44] In the case of the current study, therefore, the alignment of the needs of trainees in the class with the overall objective of the module or subject.

individual follower's concerns and developmental needs which will, ultimately, lead to followers reaching their full potential (Bass and Avolio, as cited in Beyers, 2006; Pounder, 2006).

It was argued that the support and development elements in individualised consideration (Van der Westhuizen, 2015) are similar to those elements of care, support and development in teacher support, a dimension in the *learning climate*. Teacher support denotes trainees' perceptions that their trainer-instructor cares about them, that their trainer-instructor will take a personal interest in them and that their trainer-instructor will help them (Fraser, 1987; Patrick et al., 2007; Trickett & Moos, 1973). In Feldman's (1998) study the section on 'teacher's concern and respect for students or friendliness of the teacher' includes elements such as the instructor's respect for students as well as respect for their values; the instructor is interested in the student as an individual; being aware of students' individual needs; and whether the instructor makes an effort to get to know students as individuals. Therefore, and terms of the dimensions of the *learning climate,* Van der Westhuizen (2015) argued that individualised consideration appears to be related to teacher support. *Demonstrating individualised consideration*, theorised to influence teacher support, was defined as "*…showing care for student concerns and developmental needs*" (Van der Westhuizen, 2015, p. 165). Due to the strong similarities between *demonstrating individualised consideration* and 'individualised consideration' as defined here these two constructs or dimensions will be combined to form one dimension of transformational leadership for the purposes of this research.

Intellectual stimulation involves stimulating additional effort among subordinates or followers by convincing them to reconsider ideas they have not questioned before and to reassess or rethink their old values and beliefs (Bass, as cited in Bolkan & Goodboy, 2009; Pounder, 2006). These leadership behaviours include developing followers' aptitudes to stimulate innovation and creativity (Bass and Avolio, as cited in Geijsel et al., 2003). This dimension measures the extent to which followers are provided with stimulating, thought-provoking and challenging tasks and how they are encouraged to solve problems in their own manner (Pounder, 2006). *Intellectual stimulation* involves getting followers to critically question the status quo, to critically question conventional ways of seeing and doing things, and to critically examine assumptions that are typically left unexamined.

It appears that the stimulation and engagement (in learning tasks) elements in intellectual stimulation are similar to those elements of engagement and keeping students interested in stimulating interest and involvement, a dimension in the *learning climate*. Involvement denotes the degree to which learners engage in their learning, participate in discussions, do additional work and enjoy the class or the learning environment (Bendapudi, 2010; Pickett & Fraser, 2010). Involvement often leads to or includes interest in learning (Van der Westhuizen, 2015). Interest refers to a positive psychological state based on person-activity and learner-content interaction (Hidi, as cited in Shroff & Vogel, 2009). Student interactions and involvement, such as students suggesting ideas and methods during the teaching or learning session, and explaining their own unique thoughts or reasoning, can cultivate feelings of interest and curiosity which, in turn, leads to stronger interest in the learning material and process (Van der Westhuizen, 2015). Therefore, and terms of the dimensions of the *learning climate,* it can be argued that intellectual stimulation appears to be related to stimulating interest and involvement. *Stimulating interest and involvement* can, theorised to influence stimulating interest and involvement, be defined as "…*instructional behaviour inspiring excitement or interest in the learning material and getting students involved in class and learning activities*" (Van der Westhuizen, 2015, p 179). Due to the similarities between *stimulating interest and involvement* and 'intellectual stimulation' these two constructs or dimensions will be combined to form one dimension of transformational leadership for the purposes of this research.

Idealised influence or charisma is the product of subordinates' belief in their leader as well as their mission, admiration for, trust in, and devotion to said leader. The leader, in turn, provides a vision and a sense of mission, instils pride, gains respect and trust, has insights into the needs and values of their followers, and increases optimism among his/her followers (Bass, as cited in Van der Westhuizen, 2015; Bolkan & Goodboy, 2011; Pounder, 2006). This include those behaviours of the leaders that involve putting followers' needs first, being role models, doing the (morally and ethically) right thing and avoiding the use of power either unnecessarily or for personal gain which leads to followers wanting to emulate their leader (Bass and Avolio, as cited in Geijsel et al., 2003). *Idealised influence* in the classroom context refers to the teacher demonstrating their subject matter expertise by being acting as examples of that which they aspire their students to become that students would wish to emulate. Charisma was consistently, across studies, found to be the dimension of transformational leadership that has the strongest relation to leader effectiveness (Lowe et al., 1996).

It can be argued that the respect, trust and ethical elements in idealised influence or charisma are similar to those elements of respect, fairness and equity in psychical safety and fairness, a dimension in the *learning climate*. According to Shao, Feng and Wang (2017), a team leader should utilise idealised influence and personal charisma (leadership style) rather than using authoritative power, so as to gain the trust and respect from their team members and to facilitate a climate of psychological safety. Having psychological safety implies that one is feeling able to be one's self, voice concerns and ask for help without fear of negative consequences to self-image, status, or career and knowing that the response or assistance will be respectful (Kahn, 1990; Sanderson, 2013). A psychological safe environment is characterised by mutual respect, fairness and equity (Van der Westhuizen, 2015). Learners want to feel acknowledged, respected, cared for, treated with equal value or equity and fairness, challenged but not intimidated, and also want to feel comfortable (Schrader, 2004). In order to create this warm, challenging, supportive, psychological and intellectually safe *learning climate*, trainer-instructors should create a classroom climate that is characterised by mutual respect, caring, fairness, support, communication and flexibility (Schrader, 2004). Furthermore, according to Blanton (as cited in Van der Westhuizen, 2015), fairness denotes respect and equal treatment for all learners. Fairness also plays an important role in creating this psychological safe climate of mutual respect (Van der Westhuizen, 2015). Therefore, and terms of the dimensions of the *learning climate,* it can be argued that idealised influence or charisma appears to be related to psychological safety and fairness. *Fostering psychological safety and fairness* can, theorised to influence psychological safety and fairness, was defined as "… *behaviours promoting mutual respect, fostering feelings of safety and security, and demonstrating a sense of fairness and justice*" (Van der Westhuizen, 2015, p. 171). Due to the strong similarities between *fostering psychological safety and fairness* and 'idealised influence or charisma' these two constructs or dimensions will be combined to form one dimension of transformational leadership for the purposes of this research.

Inspirational motivation requires leaders to act as a model for their subordinates, communicating an inspirational vision and using symbols to focus the efforts of their subordinates (Pounder, 2006). These leadership behaviours include motivating and inspiring first and foremost their followers, but then also everybody around them, creating desired visions of future states, promoting follower goals, and inspiring optimism and enthusiasm (Bass and Avolio, as cited in Geijsel et al., 2003). This dimension is a measure of the ability of the leader to create confidence, among their subordinates, in the leader's vision and values (Pounder, 2006). Inspirational leaders are emotionally arousing, animating and invigorating (Bass, as cited in Bolkan & Goodboy, 2009). This latter statement was corroborated in literature in that transformational leadership is often argued to be rooted in the emotional aspects of leadership (Foster & Roche, 2014; Yukl, 2013) or that transformational leadership involves heightened emotional levels (Gardner & Stough, 2002). Therefore, there should be a strong connection between emotional intelligence and transformational leadership (Gardner & Stough, 2002).

Although inspirational motivation does not appear to be directly linked to any of the current specific dimensions in the *learning climate*, it does, however, link to *providing inspirational motivation*. It can be argued that the communication, motivational and vision creation elements in inspirational motivation are similar to those elements of future-orientated messages, idealised picture creating and statements building motivation as part of *providing inspirational motivation*. According to Rafferty and Griffin (2004), 'vision', seen as a sub-dimension of transformational leadership, was recognised as an important leadership dimension encompassed by a more general construct of charisma. The importance of articulating a vision is frequently mentioned or seen as a common theme when discussing charisma. Rafferty and Griffin (2004, p. 332) defined vision as "The expression of an idealized picture of the future based around organizational values." Additional, 'inspirational communication' was identified by Rafferty and Griffin (2004) as another sub-dimension of transformational leadership. Bass (as cited in Rafferty & Griffin, 2004) first stated that charismatic leaders utilise inspirational appeals and emotional talks to awaken their followers' motivations to transcend self-interest for the good of the whole team. Later Bass (as cited in Rafferty & Griffin, 2004) stated that both charisma and inspirational motivation, rather than only charm, are displayed when a leader envisions a desirable future, articulates how this future can be reached, sets an example to be followed, sets high standards of performance, and shows determination and confidence. This latter description suggests that vision and inspirational motivation might be combined into a single construct when defining transformational leaders (Rafferty & Griffin, 2004). They, also, stated that when considering the various definitions of inspirational leadership, a recurring element is the use that of oral communication, utilised to motivate and arouse followers' emotions. As a result, Rafferty and Griffin (2004) focused on inspirational communication, or the use of appeals and emotion-laden statements by leaders to arouse followers' emotions and motivation, as opposed to the broader construct of inspirational motivation proposed by Bass. Inspirational communication, as a distinct construct, can be defined as "The expression of positive and encouraging messages about the organization, and statements that build motivation and confidence" (Rafferty & Griffin, 2004, p. 332). Van der Westhuizen (2015) utilised certain elements of Rafferty and Griffin's (2004) conceptualisation of charisma and inspirational motivation, as these sub-dimensions focus on the expression of the vision, in the definition of providing inspirational motivation. Therefore, *providing inspirational motivation* was constitutively defined as "*the expression of an idealised picture of students' future as professionals, of positive and encouraging messages about their future, and statements that build motivation and confidence*" (Van der Westhuizen, 2015, p. 161).

The remaining dimension in learning climate, namely autonomy, does not appear to be specifically linked to any one of the dimensions of transformational leadership. Rather it would appear that autonomy can be influenced by all the dimensions of transformational leadership. Autonomy denotes an inner endorsement or validation of one's actions, the sense that these actions emanate from oneself and are one's own, that one has a choice in what do to, and is therefore also responsible for one's actions (Deci & Ryan, 1987). Autonomy, in the academic environment, refers to students' perceived choices and options related to education and feelings of ownership in the learning process (Young-Jones, Cara, & Levesque-Bristol, 2014). Trainer-instructors can create autonomy-supportive learning environments by encouraging individual choice (i.e., individualised consideration); offering recommendations and encouragements (i.e., idealised influence or charisma and intellectual stimulation); providing honest and supportive feedback and praise in an understanding and non-judgmental manner (i.e., idealised influence or charisma); supporting a trainee's psychological needs, interests and preferences (i.e., idealised influence or charisma); identifying, nurturing and building trainees' inner motivational resources (i.e., individualised consideration); allowing their trainees to realise their personal goals and interests (i.e., individualised consideration); allow the trainees to work in their own way (i.e., individualised consideration); and not just giving the solutions (i.e., intellectual stimulation) (Assor, Kaplan, & Roth, 2002; Deci & Ryan, as cited in Young-Jones et al., 2014; Grolnick & Ryan 1989; Reeve, Bolt & Cai, 1999; Reeve & Jang 2006). Therefore, *providing autonomy support*, theorised to influence autonomy, was defined as "…*instructional behaviour that nurtures students' inner motivational resources by providing students with organisational, procedural and cognitive latitude*" (Van der Westhuizen, 2015, p. 175). It can be argued then that these autonomy behaviours have an influence on all four of the transformational leadership dimensions.

2.8.1.7 Transformational leadership within an educational setting

According to a literature review conducted by Silins and Mulford (2004), there is a growing number of studies that indicate that transformational leadership, as perceived by teachers, generates the greatest level of helpful management practices within the educational context. Transformational teacher leaders emphasise vision, inspiration and setting directions (Day et al., 2016); enhance extra effort from their learners (Geijsel el at., 2003; Pounder, 2008), and increase learners' perception of their teacher as a leader's effectiveness and credibility (Bolkan & Goodboy, 2009; Pounder, 2008), increase learners' satisfaction with their teacher (Bolkan & Goodboy, 2009; Pounder, 2008), lead to higher levels of learner involvement and participation (Bolkan & Goodboy, 2009; Bolkan & Goodboy, 2011), and positively influenced student learning outcomes (i.e., cognitive learning, affective learning, state motivation, communication satisfaction) (Bolkan & Goodboy, 2009).

Balwant (2016) found that transformational instructor-leadership had a statistically significant positive influence on students' motivation (e.g., higher enthusiasm, energy and effort among students); on perceived instructor credibility (e.g., students perceive their instructor-leader to be dependable, competent or knowledgeable, trustworthy and believable); and on satisfaction with leader (e.g., students exhibiting feelings of gratification or contentment towards their instructor-leader). Transformational instructor-leadership also has a statistically significant positive influence on learning outcomes, such as students' affective learning and cognitive learning (Balwant, 2016). Affective learning denotes those feelings or emotions directed toward a school or university subject (Krathwohl, Bloom, & Masia, as cited in Balwant, 2016). Transformational instructor-leaders increase their students' affective learning by utilising leadership behaviours that enhance students' self-efficacy. Self-efficacy allows the students to feel connected to the subject and the subject matter. This connection, then, enhances the students' beliefs in their abilities to engage in the subject and once successfully engaged and understood increases the students' positive feelings toward the subject (Balwant, 2016). Cognitive learning denotes the ability of the student to recall or recognition knowledge as well as the development of the student's intellectual aptitudes (Bloom, as cited in Balwant, 2016).

2.8.1.8 Moving beyond the trainer-instructor leadership and transformational leadership towards transformational trainer-instructor leadership

During the in the late 1980s and early 1990s Leithwood and colleagues from the Ontario Institute for Studies in Education in Toronto, Canada initiated and conducted research on transformational leadership within the educational setting (Geijsel et al., 2001; Geijsel et al., 2003). These studies indicated the departure of transformational leadership within an organisational setting to that of an educational setting (Geijsel et al., 2003). The results of these earlier studies on the nature of school or teacher leadership, based on earlier studies on transformational leadership, revealed three dimensions of transformational school leadership that were identified as the most relevant as well as specific behaviours associated with each of these dimensions (Geijsel et al., 2001; Leithwood, Tomlinson, & Genge, as cited in Geijsel et al., 1999), namely charisma/inspiration/vision [45], individual consideration/individualised consideration, and intellectual stimulation. However, these three categories are focused on the school as a whole and how transformational school leaders influence their co-workers, which is not the main focus of the current research. It can, however, not be denied the manner in which the school is managed by the school principal and senior teaching staff will also affect the teaching performance of trainer-instructors in the classroom and, in the end, also the learning performance of learners. This line of reasoning would suggest that a principal competency model should be grafted onto the trainer-instructor competency model.

More recently a specific model of transformational school leadership includes three broad categories of core leadership practices for effective leadership in all educational settings and contexts, namely setting directions, developing people and developing organisations[46] (Geijsel et al., 2003; Leithwood & Riehl, 2003; Leithwood et al., 2004a; Leithwood et al., 2004b; Yu, Leithwood, & Jantzi, 2002). Each of these three categories has its own specific competencies, considerations and orientations (Leithwood & Riehl, 2003), which will be discussed in the following section. Although mastering these competencies and categories will not guarantee the educational leader's success, a lack of mastering them will likely guarantee failure (Leithwood & Riehl, 2003). In other words, an educational leader might need to do more since these practices can be seen as the basics of successful leadership, but an educational leader cannot do less since not much will happen or change without them (Leithwood & Riehl, 2003; Leithwood et al., 2004b).

The three categories include:(a) 'Setting direction', which focuses on the educational leader developing educational and school goals (Leithwood & Riehl, 2003), it assists groups of followers to develop a shared understanding of the organisation, its activities, process and goals (Leithwood et al., 2004a), it includes creating a shared vision, creating and promoting co-operation among others to work together towards the common goals, and clearly and convincingly communicating the school's vision to everyone (Leithwood & Riehl, 2003). (b) 'Developing people', focuses on the educational leader influencing the development of the school's human resources (Leithwood & Riehl, 2003), it includes encouraging co-workers to reflect on their work performance and to ultimately gain mastery over their tasks and duties, respect co-workers' feelings and needs, leading by setting examples for others to follow (Leithwood & Riehl, 2003). (c)

[45] Geijsel et al (1999) argued that these three transformational school leadership dimensions strongly resemble that of the four dimensions of transformational leadership as developed by Bass and Avolio (as cited by Geijsel et al., 1999). The transformational school leadership dimension of charisma/ inspiration/ vision includes two of the four transformational leadership dimensions, namely idealised influence and inspirational motivation.

[46] It can be argued that the first category, namely setting direction, in the transformational school leadership model is based on, and similar to, 'charisma/inspiration/vision' the earlier transformational school leadership dimension. That the second category, namely developing people, in the transformational school leadership model might be based on 'individual consideration/individualised consideration' in the earlier transformational school leadership dimension. That the third category, namely developing the organisation, in the transformational school leadership model is based on, and similar to, 'intellectual stimulation' in the earlier transformational school leadership dimension. However, no support for this argument could be found. Geijsel et al. (2003), on the other hand, stated that this model of transformational school leadership had both similarities and differences to the original Bass model of transformational leadership. For example, that the single dimension of vision building (i.e., setting direction in the model of transformational school leadership) compasses two of Bass' (as cited in Geijsel et al., 2003) dimensions, namely, idealised influence and inspiration motivation.

'Developing the organisation', focuses on the educational leader influencing and focusing on the internal and external processes and relationships of the school as an organisation to enhance the function of the school as a professional learning community for both teachers and students (Leithwood & Riehl, 2003), such as developing a school culture that supports and promotes shared norms, beliefs, values, attitudes and mutual trust and caring among all members, ensuring positive and optimal conditions for both teaching and learning, enhancing the school's performance through providing opportunities for co-workers to practice decision making and identifying individual concerns (Leithwood & Riehl, 2003). It can be argued that these categories will have an indirect influence on the individual student's learning and academic successes. However, once again, these three categories are focused on the school as a whole and how transformational school leaders influence their co-workers, which is not the main focus of the current research.

Due to lack of models of transformational teacher leadership or a particularly clear definition of what transformational teacher leadership entails the following definition, based on the current literature study and with the specific focus of the influence of trainer-instructors on their individual students, will be utilised for the purpose of this research:

A trainer-instructor competency that allows the trainer-instructor to combine teacher practises inside the classroom with transformational leadership inside and outside the classroom (e.g., individualised consideration, which includes demonstrating individualised consideration and autonomy support; intellectual stimulation, which includes stimulating interest and involvement and autonomy support; idealised influence or charisma, which includes autonomy support and fostering psychological safety and fairness, as well as inspirational motivation, which includes providing inspirational motivation) in order to, ultimately, attain academic goals.

2.8.1.9 The influences of transformational trainer-instructor leadership

Cheng (1994) found that, at the group level, transformational teacher leadership has a positive outcome of a classroom social climate. The classroom environment or climate has an important role in the learning process since it influences learners' motivation, engagement and academic achievement (Patrick et al., 2011). The classroom social climate, therefore, performs a significant role in determining what really transpires during the learning process (Joe et al., 2017). According to Patrick and colleagues (2011), classroom social climate has four dimensions, namely, teacher academic support, teacher emotional support, classroom mutual respect and task-related interaction. According to Van der Westhuizen (2015), a *learning climate* has the following five dimensions teacher emotional support, teacher academic support, psychological safety and fairness, interest and involvement, and autonomy. A classroom social climate denotes a psychological environment created through social interactions or interpersonal relationships and methods of communication between the learners as well as between learners and the teacher within the classroom (Cheng, 1994; Dörnyei & Murphey, as cited in Joe et al., 2017). Cheng (1994) argued that a successful teacher leader can shape a suitable social (classroom) environment as well as a suitable physical environment perceived by their learners.

Teacher leadership refers to the ability of teachers as leaders to go beyond their classroom to become supporters of teaching and development of others including their students and other teachers (i.e., teacher academic support) (Wasley, as cited in Anderson, 2004). Trainer-instructor leaders building close relationships with their followers (Foster & Roche, 2014) (i.e., teacher emotional support) and encourages their followers to grow and learn and reach their full potential Bass and Avolio, as cited in Beyers, 2006; Pounder, 2006) (i.e., teacher academic support). Furthermore, teacher emotional support and teacher academic support, dimensions in the learning climate was theorised[47] to be influenced by *demonstrating individualised consideration*. *Demonstrating individualised consideration*, in turn, is argued to be related to 'individualised consideration' a dimension of transformational leadership.

According to the Teacher Leadership Exploratory Consortium (2011), Domain I, Fostering a Collaborative Culture to Support Educator Development and Student Learning, the teacher leader can utilise their understands of the principles of adult learning to promote an environment of trust and respect (i.e., psychological safety and fairness) that focuses on continuous improvement in teacher instruction and student learning (Teacher Leadership Exploratory Consortium, 2011). Furthermore, in Domain IV, Facilitating Improvements in Instruction and Student Learning, the teacher leader should promote instructional strategies and methods that address issues of diversity and equity within the classroom and should ensure that the individual student's learning needs remain the central focus of instruction, instead of any form of bias (i.e., psychological safety and fairness) (Teacher Leadership Exploratory Consortium, 2011). Teaching can be based on social justice (i.e., psychological safety and fairness) (Strong-Rhoads, 2011). Social justice focuses on human rights in various social and personal aspects (Goldfarb & Grinberg, as cited in Ali, 2015). According to this definition, social justice acknowledges and alter oppressive or unfair processes through active repossession and preservation of equality, equity and fairness in personal, educational, economic, and social contexts (Ali, 2015). Ryan (2012) found a statistically significant positive relationship between transformational leadership and mutual trust. Transformational trainer-instructor leaders that should always strive to do the (morally and ethically) right thing and avoid the misuse of power (Bass and Avolio, as cited in Geijsel et al., 2003). It can be argued that by doing what is moral and ethical, transformational trainer-instructor leadership will always be fair and strive to create an environment of trust, unbiased and safety (i.e., psychological safety and fairness). Furthermore, psychological safety and fairness, a dimension in the learning climate, was theorised[48] to be influenced by *fostering psychological*

[47] Van der Westhuizen (2015) found empirical support for the hypothesis that *demonstrating individualised consideration* positively influences *learning climate*.
[48] Van der Westhuizen (2015) found empirical support for the hypothesis that *fostering psychological safety and fairness* positively influences *learning climate*.

safety and fairness. *Fostering psychological safety and fairness*, in turn, is argued to be related to 'idealised influence or charisma' a dimension of transformational leadership.

Transformational leadership is positively related to student participation (i.e., interest and involvement) (Bolkan & Goodboy, 2009). Transformational trainer-instructor leaders encourage individuals to engage in and be involved with one another and with team and organisational goals (i.e., interest and involvement). Furthermore, interest and involvement, a dimension in the learning climate, was theorised[49] to be influenced by *stimulating interest and involvement*. *Stimulating interest and involvement*, in turn, is argued to be related to 'intellectual stimulation' a dimension of transformational leadership.

Transformational leaders increase their follower's level of empowerment and autonomy which is expected to promote follower satisfaction (i.e., autonomy) (Balwant, 2016; Beauchamp, Barling, & Morton, 2011). Strong-Rhoads (2011) found that some teacher leaders felt very strongly about creating autonomy within their classroom, which could be done through ongoing conversations with their learners about the importance of independence and through creating a shared vision. Intellectual stimulation, a dimension of transformational leadership, involves providing followers with stimulating, thought-provoking and challenging tasks and how they are encouraged to solve problems in their own manner (Pounder, 2006). It can be argued that this stimulation and encouragement can lead to enhanced autonomy since students now need to solve their own problems in their own terms. It was argued that autonomy, a dimension of the *learning climate*, is influenced by many of the dimension of transformational leadership.

Based on the aforementioned discussion of the influence of transformational teacher leadership on the dimensions of a *learning climate* and the multiple processes or duties related to transformational teacher leadership, it is hypothesised that *transformational trainer-instructor leadership* will influence the *learning climate*.

Hypothesis 14

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *learning climate*.

Inspirational motivation, one of the dimensions of transformational leadership, focuses on the creation of an inspiring vision with the aim of motivating, inspiring and creating confidence in followers to reach the exciting educational vision put forward by the trainer-instructional leader (Bass and Avolio, as cited in Geijsel et al., 2003; Pounder, 2006; Van der Westhuizen, 2015). In order to be motivated to act, followers require a strong sense of purpose or ideal future goals. In the creation of a positive professional vision, a trainee's mind attempts to instil a strong sense of purpose that inspires them to exert effort which leads to a desire to learn (Van der Westhuizen, 2015). As previously discussed, an important vision within the

[49] Van der Westhuizen (2015) found empirical support for the hypothesis that *stimulating interest and involvement* positively influences *learning climate*.

context of affirmative development programmes is the creation of a professional vision for the trainees to accomplish which entails the trainees seeing themselves as professionals and becoming successful employees (Van der Westhuizen, 2015; Yokotani et al., 2014). The trainee can become inspired by the idealised picture, of becoming a professional, that the trainer-instructor creates or can become encouraged by the trainer-instructor's view of his/her future. It can be argued that transformational trainer-instructor leaders can guide their trainees, based on the trainer-instructor's past experiences and knowledge about developing visions, in creating a professional vision for themselves. Moreover, it can be argued that this relationship might possibly be further strengthened (i.e., moderated) or explained in more detail or more clearly (i.e., mediated) by other variables such as the trainees' *buy-in* into their trainer-instructor's vision or the *trust* in their trainer-instructor's ability as a transformational leader. These variables will, however, was not considered for the current research, but future research might find it valuable to investigate this relationship further. Additionally, intellectual stimulation includes those leadership behaviours that are involved in developing followers' aptitudes to stimulate innovation and creativity (Bass and Avolio, as cited in Geijsel et al., 2003). It can be argued that by stimulating and involving the trainees' innovation and creativity they will be able to better imagine their future as professionals and will also be better equipped to formulate unique professional visions for themselves.

Hypothesis 15

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *inspiring professional vision*.

2.8.2 CLARIFYING LEARNING CONCEPTIONS AND REQUIREMENTS

Students approach learning situations with different preconceived beliefs of what learning means or what it entails (Ashong & Commander, 2017; Marshall, Summer, & Woolnough, 1999). These beliefs about learning provide information or insights into the ways students choose to approach their learning (Marshall et al., 1999). Conceptions of learning, thus, refer to students' basic understanding or interpretation of learning and includes systems or networks of knowledge, beliefs regarding learning, and other experiences related to learning (Ashong & Commander, 2017; Marshall et al., 1999; Marton, as cited in Ashong & Commander, 2017). These individually created learning conceptions develop from knowledge and experience, which then directs the different methods in which learning occurs and the ways in which learning is understood (Ashong & Commander, 2017). It can then be argued that students' ideas of learning (i.e., their conceptualisation of learning) will affect their approaches to learning (Biggs, as cited in Van der Westhuizen, 2015), which will then affect their learning outcomes (Ashong & Commander, 2017; Purdie, Hattie, & Douglas, 1996; Trigwell & Prosser, 1996) as well as influence students' interaction with their courses or study material, the classroom environment, their teachers and their peers (Marshall et al., 1999).

Devlin (2002) investigated students' conceptions of learning and the results indicated that many of the participants viewed learning as a quantitative exercise, denoting the accumulation of facts and knowledge to be remembered and used in practice. Devlin (2002) argued that these students were taking personal responsibility for a particular, limited, form of surface learning. The perceived personal responsibility for contributing to the accumulation and memorisation of quantitative knowledge, facts and procedures was primarily related to the practice of a particular industry or vocational area. The results of this study indicated that students, and even when they accept personal responsibility for learning, expect to be 'spoon fed' the facts and procedures (Devlin, 2002). Even when students perceived to take personal responsibility for their learning, without the ability to envision learning as a qualitative process, it would be very difficult for students to adopt study and learning practices that lead to high quality deep learning (Devlin, 2002; Trigwell & Prosser, 1996).

Learning takes place in a complex environment with many factors influencing students' conceptions of learning, the way they confront or approach a learning task, and what they finally learn (Eklund-Myrskog, 1997; McLean, 2001; Purdie et al., 1996). Factors, within the learning environment, that influence the development of learning conceptions include culture and cultural differences, past learning experiences and the curriculum (e.g., volume of work and assessments), as well as teaching and departmental characteristics of the learning environment (McLean, 2001; Purdie et al., 1996). Van Rossum, Deijkers & Hamer (as cited in Eklund-Myrskog, 1997) suggested that students' conceptions of learning from part of the individual's philosophy (i.e., their 'learning image') and that an individual's learning image changes with his/her development. In turn, the development of a 'higher' conception of learning can be stimulated or inhibited by contextual factors such as through educational institutions. An individual's concept of learning can, therefore, change (Eklund-Myrskog, 1997). In other words, a 'cognitive jump' occurs from viewing the concept of learning as quantitative (surface) to a qualitative (deep) view (Eklund-Myrskog, 1997). Surface learning occurs when students are only paying attention to specific details, passively listening or taking part in the learning process, which then results in an inability to repeat such details or information at a later stage (Eklund-Myrskog, 1997; Purdie et al., 1996). The deep approach to learning, or deep learning, involve students who are actively partaking in their learning process and who find meaning in their learning (Marton & Säljö, as cited in Eklund-Myrskog, 1997; Purdie et al., 1996). At its core learning is an active process of constructing meaningful structure in learning material and automating that insight (De Goede & Theron, 2010). Trainer-instructors should try to encourage trainees to discover principles and ideas for themselves through active dialogue, negotiation and other similar methods (Devlin, 2002). This cognitive jump indicates that learning conceptions can change over time and should, through trainer-instructors, encourage deep learning (Devlin, 2002; Eklund-Myrskog, 1997; McLean, 2001; Van der Westhuizen, 2015).

Further, learning conceptions also include preconceived ideas about the trainees' roles, the role of the trainer-instructor, the roles of other academic professionals, the trainees' ideas or beliefs about the different roles, as well as the relationships between all the different role players within the educational setting which can have an impact on how trainees approach learning (Ashong & Commander, 2017; Mclean, 2001). Trainees should, therefore, ideally possess an accurate definition of what qualitative learning entails. A definition of learning that describes to them how they should actively engage with their learning material in order to promote deep learning. Similar to how learning conceptions affect the manner in which learning is approached, trainees' interpretation or understanding of their role in the learning process will also affect the manner in which they approach their learning material. The trainer-instructor can endorse an accurate conception of learning by communicating to trainees that learning is a process of actively constructing cognitive or intellectual meaning, as well as a process of constructing mental models/images. Trainees should understand that learning involves creating meaningful *structure in the learning material* and committing the obtained insights into knowledge stations or memory. Trainer-instructors should further communicate to trainees that this understanding of learning implies that a specific type of interaction with the learning material, such as asking questions about, spending time on, reflecting on, and reading more about the learning content. Trainees should thus accept the responsibility to create and/or find meaningful structure by themselves, with the guidance of the trainer-instructor (Van der Westhuizen, 2015).

There exists an upward spiralling cyclical relationship between learning and the application thereof (Van der Westhuizen, 2015). Stated differently, during classroom learning (or training programmes) the trainee will encounter learning problems and learn new knowledge and skills which the trainee (or employee) will have to utilise in order to solve work-related problems (after the training programme). Van der Westhuizen (2015) argued that there can, thus, be no division between classroom learning and action learning (in the workplace) if a trainee or an employee wishes to be successful. Unless trainees have an appropriate understanding of the conception of learning and unless they become competent at learning, they will fail as trainees or learners in the classroom as well as job incumbents in the practical world of work (Van der Westhuizen, 2015). That is why an accurate conceptualisation of learning is so critically important. An accurate conceptualisation of learning is a necessary condition to ensure that development programmes truly equip trainees and learners to creatively and innovatively solve novel problems in the world of work.

Trainees would hold a clear understanding of their role (i.e., role clarity), in the learning process, if they know (a) what the expectations of their role are; (b) what activities are needed to be performed to fulfil the role responsibilities; and (c) what the consequences of role performance are to the individual trainee self and to others (Van der Westhuizen, 2015). Zirbel (2006) stated that a manner in which the trainer-instructor can deal directly with trainee misconceptions (i.e., role ambiguity) is to tell the trainees directly what the role of each party is in the learning process, for example, the trainer-instructor will not simply give away the answers but will encourage the trainees to try and figure it out by themselves first. However, merely telling trainees is not enough. Trainees will have to experience this for themselves (Zirbel, 2006). The trainer-instructor should thus model the appropriate behaviour and maintain the learning responsibilities of each party (Van der Westhuizen, 2015). While trainees try to figure out the answers on their own, the trainees may experience 'confusion'. This confusion is an important learning curve and the first step in understanding the problem and ultimately results in deep understanding (Van der Westhuizen, 2015; Zirbel, 2006).

A concept related to role clarity is Feldman' (1988) 'Clarity of Course Objectives and Requirements' that have the following elements: students know what is expected of them during the course; clarity of course structure; courses are well organised with clearly specified objectives, assignments, requirements and related aids; and instructors clearly explains assignments. Another concept related to role clarity is the International Board of Standards for Training, Performance, and Instruction's (IBSTPI) competency 'establishes daily and academic term goals' in their model of trainer effectiveness. They defined this competency as the trainer-instructor preparing and/or following the syllabus and having goals for each class (Foxon, Richey, & Roberts, as cited in Van der Westhuizen, 2015).

Van der Westhuizen (2015, p. 192) defined *clarifying learning conceptions and requirements* as "…*behaviours promoting accurate conceptions of learning, accurate role perceptions, and clarity with regard to objectives, assignments, and requirements*."

It can be argued that once a trainee has clarity regarding their learning concepts and what is required of them during the learning programme they will be able to accurately perceive their role in the learning process. It can, therefore, be hypothesised, in accordance with Van der Westhuizen's (2015) research, that *clarifying learning conceptions and requirements* will positively influence *accuracy of role perceptions*[50].

Hypothesis 16

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *clarifying learning conceptions and requirements* will positively influence *accuracy of role perceptions*.

2.8.3 ENHANCING STUDENT SELF-EFFICACY

Academic self-efficacy, based on Bandura's (1986; 1997) concept of self-efficacy, refers to a learner's belief about their capability and capacity to learn and perform academic tasks effectively and that he/she can successfully execute the actions needed to produce a desired academic outcome (Burger, 2012). According to Bandura (1977; 1986; 1997), self-knowledge or expectations about one's efficacy is based on four principal sources of information, namely, (a) Performance accomplishments (Bandura 1977)/ Enactive attainment (Bandura, 1986)/ Enactive mastery experience (Bandura, 1997); (b) Vicarious experience; (c) Verbal persuasion; and (d) Physiological state (Bandura, 1986)/ Physiological and affective states (Bandura, 1997).

[50] However, this hypothesis was not empirically tested as part of Van der Westhuizen's (2015) partial trainer-instructor performance structural model.

(a) "*Mastery experience* refers to students' recognition of the degree to which they succeeded on tasks" (Margolis & McCabe, 2006, p. 219). Enactive mastery experience is the most influential source of efficacy information since it is based on personal mastery experiences or authentic evidence of whether or not one can muster the energy or effort to succeed or be a success (Bandura, 1977; Bandura, 1986; Bandura, 1997). It produces stronger efficacy beliefs than the other three sources (Bandura, 1997). Successes in one's life raise efficacy where repeated failures lower efficacy. Therefore, a strong sense of self-efficacy will be developed after continuous successes and the occasional failure will not have much effect on one's efficacy (Bandura, 1986). The proverb "nothing breeds success like success" is particularly true when it comes to developing self-efficacy (Siegle & McCoach, 2007, p. 281). The effects failures have on personal efficacy will partly depend on the timing as well as the total pattern of experiences in which the failures occur (Bandura, 1977). Past performance is thus an important contributor to a student's confidence and their ability to achieve academic success (i.e., efficacy). For example, if the student was successful in a particular skill or task in the past, they believe they will be successful at that skill or task in the future as well (Bandura, 1993). Enactive mastery experience is a subjective evaluation made by the individual trainees themselves (Van der Westhuizen, 2015).

(b) 'Vicarious experiences' includes observing friends model a task which then provides the observer, or struggling learner, with direct guidance about how to do something (Margolis & McCabe, 2006). Vicarious experience does not rely solely on enacted or past experiences but suggests that self-efficacy appraisals are party influenced by vicarious experiences (Bandura, 1977; Bandura, 1986; Bandura, 1997). When individuals see other people perform threatening activities without adverse consequences or failures it can generate expectations in the individual observer that they too will not fail or improve if they persist in their efforts (Bandura, 1977). They feel that if others can do it, and succeed, they can also do it or that they should also be able to achieve some improvement in their performance (Bandura, 1986). According to Bandura (1986, p. 399), "…observing that others perceived to be similarly competent fail despite high effort lowers observers' judgments of their own capabilities and undermines their efforts." By observing others perform similar tasks the individual can make judgements, based on what was observed, about their own capabilities (Schunk, as cited in Siegle & McCoach, 2007). Modelling others serve as an effective tool for promoting a sense of personal efficacy (Bandura, 1997). Self-efficacy gained through observation is less stable and can, therefore, more readily be changed than the self-efficacy gained through mastery experience (Bandura, 1986; Siegle & McCoach, 2007). In a classroom, where one can freely observe others, performance is often evaluated in terms of social criteria. This can allow trainees to experience relief, comradery and higher self-efficacy when they know they are not the only ones who are experiencing difficulty with a specific skill, task or concept (Van der Westhuizen, 2015).

(c) 'Verbal persuasion' involves influencing others or talking people into believing, or strengthening their belief, that they have the capabilities to master certain tasks and that they will be successful (Bandura, 1977; Bandura, 1986; Bandura, 1997). Verbal persuasion is widely used because of its ease and ready availability (Bandura, 1977; Bandura, 1986). According to Bandura (1986, p. 400), verbal persuasion "…can contribute to successful performance if the heightened appraisal is within realistic bounds". People who are verbally persuaded are more likely to assemble greater sustained effort when faced with difficulties than if they were to harbour self-doubts and dwell on personal shortages or faults (Bandura, 1986). Consequently, people are led, through verbal suggestion, into believing they can now successfully cope with what has overwhelmed them in the past (Bandura, 1977). Efficacy expectations induced through verbal persuasion are likely to be weaker than the efficacy gained from one's own past accomplishments because they do not provide an authentic experiential base for them (Bandura, 1977). Trainer-instructors that, when providing feedback, emphasises trainees' weaknesses in order to justify deducted marks can often result in trainees feeling negative about their ability to perform a given task. Trainer-instructors should rather point out possible developmental areas and give trainees clear, concise and corrective feedback. Corrective feedback should focus on what the trainees need to do to continue improving and ultimately master the skill they are attempting to learn (Van der Westhuizen, 2015).

(d) "*Physiological reaction or state* refers to how students feel before, during, and after engaging in a task" (Margolis & McCabe, 2006, p. 220). The physiological state is when a student's emotions and physiological states influence their judgements about their capabilities (Bandura, 1986). This includes somatic indicators of personal efficacy obtained from domains such as physical accomplishments, health functions and ability to cope with stressors (Bandura, 1997). Physical inefficacy, during physical activities, would include being fatigued and having aches and pains (Bandura, 1997). Similarly, stressful and taxing situations can also elicit emotional arousal that, depending on the circumstances, might provide information concerning personal competency. For example, by conjuring up fear-provoking thoughts about their incompetence, individuals can rouse themselves to elevated levels of anxiety that greatly exceeds the initial fear experienced during the actual threatening situation (Bandura, 1977; Bandura, 1986). Therefore, when stressed, emotionally through anxiety and physically through pain, individual's self-efficacy about their performance will lower. P. A. Schulze & J. M. Schulze (2003) beliefs that this lowered self-efficacy will have a negative effect on learning performance and that trainer-instructors should try to reduce stress and anxiety in the classroom or *learning climate*.

In order to enhance a student's self-efficacy and, in turn, enhance their *academic self-efficacy* as well, trainer-instructors can make use of various strategies and techniques that capitalise on the influences of the aforementioned sources of information (Margolis & McCabe, 2006; Siegle & McCoach, 2007). There are several strategies can influence a student's *academic self-efficacy*, such as (a) modelling (which involves students observing other students who are completing similar tasks successfully), (b) goal-setting (activities designed to draw students' attention towards successful performances), (c) constructive feedback (which compliments the student's abilities and skills and (d) rewards (Alderman, as cited in P. A. Schulze & J. M. Schulze, 2003; Alderman, as cited in Van der Westhuizen, 2015; Siegle & McCoach, 2007).

Modelling

Modelling, or vicarious experience, is exhibited in the classroom as a process involving demonstrating and describing a process of mastering a new skill by a trainer-instructor to a novice trainee (P. A. Schulze & J. M. Schulze, 2003; Van der Westhuizen, 2015). In the context of a classroom or learning environment, the model can either be a mastery model or a coping model (P. A. Schulze & J. M. Schulze, 2003). A mastery model denotes a specialist as a person that is an expert at the task. A coping model refers to a person who may still be experiencing some difficulty with the task, but is nonetheless able to teach and demonstrate the task successfully to someone else who is acquiring the skill. Both types of models are observable and both should be used in the classroom at opportune times. Both co-trainees and trainer-instructors can serve both models (P. A. Schulze & J. M. Schulze, 2003). According to Siegle and McCoach (2007), trainer-instructors can improve student or trainee self-efficacy, through modelling, in the following manners: (i) choose models who can successfully perform the skills that will be taught and (ii) consider a variety of ways to use models, such as videotaping.

Goal-setting

It was hypothesised earlier that *mastery learning goal orientation* is influenced by *academic self-efficacy*, goal setting, on the other hand, influences *academic self-efficacy*. It is goal setting, and not goal orientation, that is central to Bandura's (1986) concept of self-efficacy (Seijts et al., 2004). Therefore, setting (learning) goals enhances *academic self-efficacy* (Bandura, 1986; Latham et al., 2016). Goals serve the function of setting a standard or benchmark against which students can estimate and measure their progress. This will allow students to become aware of the progress or lack thereof. The fact that students can now track their progress, their perception of possible improvement increases their self-efficacy (Siegle & McCoach, 2007; Van der Westhuizen, 2015). Proximal goals, those goals that can easily be reached but are still challenging, and goals that include specific performance standards ensure higher goal attainment (Siegle & McCoach, 2007; P. A. Schulze & J. M. Schulze, 2003). According to Siegle and McCoach (2007), trainer-instructors can improve student or trainee self-efficacy in the following manners: (i) let trainees themselves decide how to break up larger goals into smaller, attainable ones; (ii) seek advice from trainees regarding how challenging the trainer-instructor goals should be for them, and (iii) set goals, and have trainees also set goals, in terms that are sufficiently clear to avoid any ambiguity.

Constructive feedback

Trainer-instructor feedback also plays a role in increasing student or trainee self-efficacy and ultimately *academic self-efficacy* (Hattie & Timperley, 2007; Van der Westhuizen, 2015). However, there are many types and forms of feedback that each have a different effect on learning and, as a result, not all types of feedback will affect self-efficacy (Amitay, Moore, Molloy, & Halliday, 2015; Deci, Koestner, & Ryan, 1999; Deci, Vallerand, Pelleiter, & Ryan 1991; Hattie & Timperley, 2007). According to Van der

Westhuizen (2015, p. 196), "…students, who received positive feedback on their ability rather than their effort, developed higher self-efficacy and learning". According to Siegle and McCoach (2007), trainer-instructors can improve student or trainee self-efficacy, through providing feedback, in the following manners: (i) when trainees performed poorly: help trainees to practice explanation for their lack-of-effort, (ii) call attention to trainees' ability and (iii) be careful not to offer unsolicited help or advice. The constructive feedback should be clear, for example, the trainer-instructor can make the feedback or instructions clear by either demonstrating the task or skill themselves or by allowing another competent individual to demonstrate the task of skill (P. A. Schulze & J. M. Schulze, 2003).

Rewards

Rewards is another method or strategy that can be utilised to increase student or trainee self-efficacy, however, it is considered to be the least effective method (Alderman, as cited in Van der Westhuizen, 2015). The most effective way to implement rewards is to provide rewards to students as a group, rather than on an individual basis. Group rewards will assist in creating a more cooperative atmosphere which is important if peers are to serve as effective models (P. A. Schulze & J. M. Schulze, 2003; Van der Westhuizen, 2015). Other forms of rewards include showing appreciation by allowing the students to take home something that they have created so that they can share it with their friends and family (P. A. Schulze & J. M. Schulze, 2003)

For the purpose of this study, *enhancing student self-efficacy* is defined as "…*instructional behaviours that increase students' belief that they can successfully execute the actions needed to produce a desired academic outcome*" (Van der Westhuizen, 2015, p. 198).

The trainer-instructor has an important influence on the learning experience of their trainees and, as a result, also an influence on the trainee's *academic self-efficacy*. For example, trainer-instructors control the flow of information, they can provide or withdraw their support, and they can provide extra resources and learning opportunities (Van der Westhuizen, 2015). It was therefore, hypothesised by Van der Westhuizen (2015) that *enhancing student self-efficacy* will positively influence *academic self-efficacy*. Van der Westhuizen (2015) found support for this path, in Model A, Model B, Model C and Model D.

Hypothesis 17

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *enhancing student self-efficacy* will positively influence *academic self-efficacy*.

2.8.4 PROMOTING A MASTERY CLIMATE

A trainer-instructor can encourage a particular goal orientation, in trainees, by emphasising certain cues, rewards, and expectations. When a trainer-instructor shapes or structures an entire instructional process (i.e., classroom) in order to communicate certain goals, based on the context of the learning environment, they create a motivational climate (Ames, 1992a). Classroom climate, or classroom structure, plays an important role in eliciting the orientation of an individual trainee toward mastery performance goals (Ames, 1992a; Ames, 1992b). In an attempt to implement a mastery orientation in a classroom setting, in terms of achievement goal theory, a group of strategies or mastery principles, making up six areas of the learning environment, can be utilised. These six areas form the acronym TARGET, which stands for, or includes, task, authority, recognition, grouping, evaluation, and time dimensions (Ames, 1992a; Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011). Recently, a seventh dimension of trainer-instructors' practices that leads to a mastery classroom goal structure has been identified, namely social. As a result, the acronym now reads TARGETS (Vedder-Weiss & Fortus, 2018). Trainer-instructors can implement these seven dimensions or principles into the daily classroom routines to influence trainees' mastery motivation over the long term (Ames, 1992a; Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011; Vedder-Weiss & Fortus, 2018). A short description of each of these seven mastery principles will be discussed in the following section.

The 'task dimension' includes the content and sequence of the curriculum or programme, the design of the classroom work or homework, the difficulty of tasks, the material required to finish assignments, and class activities (Ames, 1992a; Epstein, as cited in Van der Westhuizen, 2015). When the strategies related to the task dimension include/are: variety, novelty, diversity, meaningful, discovery, problem-solving, active involvement, interesting, challenges that fit individual needs, and if it helps individuals set short-term and realistic goals a mastery orientation will occur (Ames, 1992a; Patrick et al., 2011; Van der Westhuizen, 2015; Vedder-Weiss & Fortus, 2018). Furthermore, trainees are more likely to consistently engage in the act of learning when the learning tasks are perceived as meaningful. When a valuable or meaningful learning activity is presented, trainees will focus on the activity in order to develop and understand its contents, which then leads to the improvement of current skills and the development of new skills. These task features or strategies should facilitate the acceptance of a desirable mastery goal orientation which, in turn, enhances motivation (Ames, 1992b; Van der Westhuizen, 2015). Assigning challenging assignments or tasks to trainees can act as an incentive to encourage trainees to invest more, more of their time, energy and thought into the assignments (Vedder-Weiss & Fortus, 2018). Trainer-instructors can encourage trainees to ask more questions and seek assistance from different learning sources, such as experts allocating different assignments to different trainees (Vedder-Weiss & Fortus, 2018).

The 'authority/autonomy dimension' refers to the authority structure that influences the nature of decision making between trainer-instructors and trainees, trainee participation during the instructional process or where the trainer-instructor shares responsibility and authority for rules and decisions with their trainees (Ames, 1992a; Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011; Vedder-Weiss & Fortus, 2018). The strategies related to authority involve engaging trainees in decision making and leadership roles, assisting trainees in developing self-management and self-monitoring skills, supporting autonomy results in adaptive motivational patterns, intrinsic motivation toward learning, provide students with more choice in their learning (e.g., methods of evaluation, seating arrangements and content of assignments), and the use of effective learning strategies. This dimension also includes classrooms that are characterised by the sharing of the responsibility for making choices, giving directions, monitoring work, setting and reinforcing rules, providing rewards, and evaluating success (Ames, 1992a; Lepper & Hodell, as cited in Van der Westhuizen, 2015). Furthermore, encouraging trainees to initiate activities and make task choices as well as allowing them to choose their own method of learning or pace of learning is an important strategy that can foster commitment, positive attitudes, intellectual and moral growth, and a mastery orientation (Ames, 1992b; Van der Westhuizen, 2015). Vedder-Weiss & Fortus (2018) found that it might be possible to prevent, or at the least reduce, the decline in motivation for learning is through supporting trainees' autonomy in the learning process.

'Recognition' refers to the distributions and opportunities for rewards, the informal and formal use of rewards, incentives, and praise in the classroom that recognises students' efforts and accomplishments, and provides reasons for recognition (Ames, 1992a; Ames, 1992b; Epstein, as cited in Van der Westhuizen, 2015). Trainer-instructors should avoid social comparison and rather provide trainees with private recognition (Ames, 1992b; Patrick et al., 2011). Trainer-instructors can maintain or boost trainees' motivation to learn by recognising and rewarding individual progress, effort and improvement; creating fair opportunity for recognition; privately giving recognition and rewards so that their value is not derived at the expense of others; and focusing on the self-worth of trainees (Ames, 1992a; Patrick et al., 2011).

'Grouping' involves how and why, students who are similar or different in certain characteristics, are brought together or kept apart for instruction and other learning activities. In other words, the manner and frequency in which trainees working together in groups (Ames, 1992a; Ames 1992b; Epstein, as cited in Van der Westhuizen, 2015). Trainer-instructors can enhance trainees' mastery motivation by using flexible and heterogeneous grouping arrangements and opportunities for all trainees as well as provide for multiple grouping arrangements to ensure that trainees are not grouped according to their ability (Ames, 1992a; Ames 1992b; Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011). Trainees working together can create a climate that encourages them to share effective practice strategies with each other or to develop new strategies as they help one another solve problems (Van der Westhuizen, 2015).

'Evaluation' is concerned with standards of performance, monitoring of performance and evaluative feedback (Ames, 1992a). The strategies utilised during evaluation include criterion-referenced, improvements and mastery of skills, self-evaluations and keeping evaluations private rather than public, and all test scores are evaluated and interpreted in terms of effort and improvement (Ames, 1992a; Patrick et al., 2011). However, the focus should be on the trainees' perceptions of the meaning or value of the evaluative information since it will assist or guide the trainee in different goals or patterns of motivation, based on the meaning of the evaluation (Ames, 1992b). According to Ames (1992b), the manner in which individual trainees are evaluated is one of the most salient classroom factors or principles that affect motivation.

The ‘time dimension’ refers to the workload, pace of instruction or learning, and the management of homework (Ames, 1992a). Trainer-instructors should provide flexible learning schedules for trainees which provides them with sufficient instructional- and assignment time (Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011). Strategies for the time principle includes providing opportunities and time, in trainee’s own pace, for improvement and assisting trainees to establish work and practice schedules which will promote the adoption of a mastery goal orientation (Ames, 1992a; Patrick et al., 2011).

The ‘social dimension’ or ‘social relationship dimension’ involves the trainer-instructors interaction with their trainees (Vedder-Weiss & Fortus, 2018). For example, “How supportive, warm, and caring are the interactions between the teacher and students?” and “Is peer interaction encouraged by the teacher?” (Vedder-Weiss & Fortus, 2018, p. 184). This dimension states that the social relationships within the classroom should be respectful, supportive (both socioemotionally and academically) and should covey positive affect about trainees and the learning content or material they are learning (Anderman & Patrick, 2012).

The ‘Checklist for an Ethical and Achieving Classroom’ has eight categories of which a mastery atmosphere is one (Narvaez, 2008). Mastery atmosphere denotes “…instructional practices that motivate students to learn rather than focus only on comparing their performance to the performance of others” (Narvaez, 2008, p. 3). This dimension, in the ‘Checklist for an Ethical and Achieving Classroom’ (CEAC) questionnaire includes elements such as emphasising strategic effort rather than right answers; emphasising mastery and learning rather than getting good grades or competing to outperform others; building hopefulness in struggling learners by helping them see how they are making progress; adjusting learning activities to match learner’s skills, is ideas discussed that encourage deep thinking (e.g., pursuing a line of questioning to the end, logically and/or creatively sorting out the elements in a problem and coming up with a solution); are the materials in the classroom fostering curiosity; and are there learning activities at different levels of difficulty, etc. (Narvaez, 2008).

Van der Westhuizen (2015, p. 188) defined *promoting a mastery climate* as “*instructional behaviours that emphasise learning, understanding, and personal improvement rather than focussing only on normative comparison*.”

Numerous studies supported the idea that a focus on personal improvement and mastery of tasks, rather than on outperforming others, provides an environment that promotes learning for all trainees (Biddle, as cited in Solmon, 2006). All trainees can be successful or achieve learning success when trainer-instructors encourages trainees to work on improving their skills and defining success on either meeting criterions standard or achieving personal goals (Solmon, 2006). Classrooms with a combination of TARGET[51] principles are consistently found to be associated with adaptive academic behaviours and outcomes that include "persistence at a task, effort attributions for success and failure, task interest, deep processing and self-regulation strategies, and adaptive help-seeking behaviours" (Koskey, Karabenick, Woolley, Bonney, & Dever, 2010, p. 254). Morgan, Sproule, Weigand and Carpenter (2005) found that by manipulating certain teaching behaviours and TARGET principles trainer-instructors can influence trainees' subjective perception of the motivational climate as well as their cognitive and affective motivational responses. However, trainer-instructors should be aware that implementing strategies that contribute to a mastery climate do not necessarily actually translate into trainees perceiving a mastery climate. Trainer-instructors should thus consider their trainees' perceptions of the instructional environment since different trainees may perceive the same trainer-instructor behaviours differently (Morgan et al., 2005; Van der Westhuizen, 2015). It can, therefore, be hypothesised, in accordance with Van der Westhuizen's (2015) research, that *promoting a mastery climate* will positively influence *mastery classroom goal structure* since TARGET and TARGETS are instructional behaviours that influence or lead to mastery orientation in a classroom setting or mastery classroom goal structure (Ames, 1992a; Epstein, as cited in Van der Westhuizen, 2015; Patrick et al., 2011; Vedder-Weiss & Fortus, 2018). Van der Westhuizen (2015) found support for a positive relationship between *promoting a mastery climate* and *mastery classroom goal structure* in Model A only. Although the path remained statistically significant in Model B, Model C and Model D, the path became negative.

Hypothesis 18

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *promoting a mastery climate* will positively influence *mastery classroom goal structure.*

Van der Westhuizen (2015), however, found consistent negative relationships (in Models B, C and D) during her research. She argued that one plausible explanation for this negative partial regression coefficient describing the slope of the relationship between *promoting a mastery climate* and *mastery goal structure* (i.e., *mastery classroom goal structure*) is that in the structural equation also contain *learning climate* as an trainer-instructor behaviour that (over)emphasises the need or importance of behaviour that has already been accepted and embraced by the class under the influence of the *learning climate* in that the class evokes resistance and rebellion against the ideal. Van der Westhuizen (2015) further states that this argument seems sufficiently plausible not to reverse the addition of the added path and that future studies should have to cross-validate this finding.

[51] Research was conducted on the older version of TARGET, excluding social relationships.

2.8.5 FACILITATING CLARITY AND UNDERSTANDING

Van der Westhuizen (2015) argued that in order to facilitate learning, the trainer-instructor has to create a meaningful structure within which the learning material can be understood. Where *structure in the learning material* represents the meaningful structure within which the essential parts of the learning material are presented as a meaningfully integrated and connected network of concepts (Van der Westhuizen, 2015, Zirbel, 2006). Learning can, therefore, be enhanced when the learning material or subject knowledge is presented in a format that makes it easy for the students to find meaningful structure, or meaningful connections, as well as when the information is bunched together (Van der Westhuizen, 2015; Zirbel, 2006).

The ability of the trainer-instructor to teach clearly, so that trainees can understand the course material, is fundamental to teaching (Chesebro, 2003). Instructional or instructor clarity, such as clear explanations and the effective use of examples, has been found to be an important variable in enhancing student achievement and satisfaction (Cruickshank & Kennedy, 1986; Loes & Pascarella, 2015; Rosenshine & Furst, as cited in Van der Westhuizen, 2015). Teacher clarity can be defined as "…a variable which represents the process by which an instructor is able to effectively stimulate the desired meaning of course content and processes in the minds of students through the use of appropriately-structured verbal and nonverbal messages" (Chesebro & McCroskey, 1998, p. 448).

Based on the literature on teacher clarity, a "Profile of the Clear Teacher" denotes that teachers should structure their lessons, messages and presentations clearly and they should also be verbally clear (Chesebro, 2003). Verbal elements in teacher clarity include aspects such as vagueness, fluency, mazes, explaining effectiveness, the pace of instruction as well as the use of effective examples to enhance clarity. Research on structuring and organising instructional presentations focused on aspects such as advance organisers, organisations, transitions, internal summaries, reviews, previews, explicit teaching, and basic outlines provided to students (Chesebro, 2003). Non-verbal clarity such as instructor enthusiasm and expressiveness, although not widely discussed in relation to teacher clarity, may facilitate learning by gaining students' attention during lectures. However, unless teachers are able to gain and retain students' attention, the extent to which they teach clearly may be relatively unimportant (Chesebro, 2003). Non-verbal elements of teacher clarity include the use of time spent by trainer-instructors covering a learning topic as well as their speaking pace (Van der Westhuizen, 2015).

Teacher clarity includes clear communication processes on top of focusing only on course content (Civikly, as cited in Van der Westhuizen, 2015; Simonds, 1997). Simonds (1997) developed the Teacher Clarity Report which focused on clear communication in terms of clear communication of the course or learning content and the extent to which trainer-instructors are clear in communicating classroom processes. Feldman (1988) included dimensions related to clarity in his study, namely, 'Clarity and Understandableness', which involves the clarity with which the instructor explains concepts that allow students to follow and understand class lectures and presentations as well as the way instructor responds to students' questions with clarity, and 'Teacher's Elocutionary Skills', which involves the ability of instructors to speak clearly so that students can easily hear them as well as the ability of instructors to vary the speed and tone of their voices (Feldman, 1988).

It can be argued that in order to create a meaningful structure, within which the learning material can be understood by the trainee, the trainer-instructor needs to be able to clearly and efficiently communicate (i.e., an effective communicator). Ideas, concepts, arguments and theories need to be communicated in a clear, organised and well-defined manner (Van der Westhuizen, 2015). Therefore, the trainer-instructor's communication method, quality and speed as an aspect of instruction and the facilitation of learning should be a focus of research on learning performance. Catano and Harvey (2011, p.706) defined communication as "To display verbal and written eloquence and flexibility based on the type of audience, to communicate with clarity, precision and purpose, and to take the time to listen to others and decipher relevant points". An 'Effective Communicator' involves speaking clearly and/or loudly, using precise English lexis as well as providing clear and compelling examples (Keeley, Smith, & Buskist, 2006).

How the trainer-instructor presents the learning material is an important aspect of instructor effectiveness and trainee learning (Van der Westhuizen, 2015). *Facilitating clarity and understanding* includes the instructional behaviour that facilitates the creation of a learning structure and can be defined as "…*instructional behaviour that makes lectures easy to outline, cases being well organised, and learning material being explained clearly*" (Van der Westhuizen, 2015, p. 184).

Students with instructors that were both clear and direct reported lower receiver apprehension or anxiety scores, increased positive affect for course material and instructors as well as greater perceptions of control (Chesebro & McCroskey, 1998). Trainer-instructors can facilitate learning, and thereby understanding of learning material, by reducing trainee uncertainty, confusion and anxiety and communicating clarity (Van der Westhuizen, 2015). It can, therefore, be hypothesised, and the current research supports this hypothesis, that *facilitating clarity and understanding* will positively influence *structure in the learning material*[52].

Hypothesis 19

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *facilitating clarity and understanding* will positively influence *structure in the learning material.*

2.8.6 PROVIDING FORMATIVE FEEDBACK

Behaviourism, a school of thought within psychology, was perhaps the origin of examining the role of feedback in learning (Buckley, as cited in Chai, 2003). Behaviourists were particularly interested in the

[52] However, this hypothesis was not empirically tested as part of Van der Westhuizen's (2015) partial trainer-instructor performance structural model.

impact of feedback on learning as a reinforcer (i.e., feedback in terms of rewards and punishments) (Chai, 2003). Cognitivist theories and theorists later suggested that most frequent effect of knowledge of performance is to boost motivation and thus including a strong affective component, both internally and externally, in feedback within the learning process is important (Chai, 2003). Following cognitivist theories, the cognitive model, assuming that mental or cognitive processes mediate the relationship between feedback and the learner’s response, claimed that feedback is essential for both learning and satisfaction. In terms of learning, feedback acts both to inform the learner of expected behaviours and through providing information about rewards from such behaviour provides satisfaction to the learner (Chai, 2003).

Feedback plays an important role in learning and is generally regarded as vital for improving knowledge building and skill acquisition (Blanco-Blanco, 2013; Shute, 2008). Trainer-instructors can, for example, provide supportive and formative feedback in order to enhance trainee’s learning motivation (Van der Westhuizen, 2015). Providing supportive feedback can enhance trainees’ self-confidence (Evans, as cited in Van der Westhuizen, 2015). The quality of feedback has an influence on the trainees’ role clarity and ambiguity (Van der Westhuizen, 2015). Providing positive feedback influences the mastery goal structure (Skaalvik & Federici, 2016). Positive verbal feedback is where teachers emotionally support their learners (Shin & Ryan, 2017). Providing feedback on trainees’ learning activities’ outcomes is a form of stimulating interactions in the classroom (Haraldseid, Friberg, & Aase, 2016). Effective and clear feedback leads to promoting psychological safety and fairness in the classroom (Boex, 2000; Catano & Harvey, 2011; Chory-Assad, 2002); and providing honest and supportive feedback creates an autonomy-supportive learning environment (Assor et al., 2002; Grolnick & Ryan 1989; Reeve & Jang 2006).

Feedback is information that can be provided by various external sources of information or various agents (e.g., a teacher, peer, book, computer-based systems, parent) and by internal sources (e.g., information perceivable by the student while the learning tasks are processed, self or through experience) regarding aspects of one's performance or understanding (Hattie & Timperley, 2007; Narciss, 2017). Agents provide information to the learner in the following manner: a teacher or parent can provide corrective information, peers can provide alternative strategies, a book can provide information to clarify ideas or concepts, a teacher or parent can provide encouragement and the learner self can look up answers to evaluate the correctness of a response. Feedback can more narrowly be defined is a ‘consequence’ of performance (Hattie & Timperley, 2007). Winne and Butler (as cited in Hattie & Timperley, 2007) define feedback as information with which a learner can confirm, add to, overwrite, adjust or restructure information stored in the memory, whether that information is knowledge, meta-cognitive knowledge, beliefs about self and tasks or cognitive strategies.

Studies have shown that feedback is more effective when students receive information feedback about a specific task, when students receive information feedback on how to do a task more effectively, when it provides information on correct rather than incorrect responses and behaviours, when it builds on changes from previous trails and experience as well as when the task or goals are more difficult. Feedback was less effective when the feedback was related to praise, rewards, and punishment (Hattie & Timperley, 2007). When considering different types or forms of feedback, the most effective feedback was when feedback was provided through cues or reinforcement to learners, in the form of video-, audio-, or computer-assisted instructional feedback and when feedback was related to goals. Programmed instruction, praise, punishment and extrinsic rewards were the least effective for enhancing achievement. (Hattie & Timperley, 2007).

Hattie and Timperley (2007) questioned the effectiveness of rewards when giving feedback or whether it should be thought of as feedback at all. This poor effectiveness of rewards and feedback on achievement could be due to the fact that tangible rewards, such as stickers, contain too little task information (Deci et al., 1991; Hattie & Timperley, 2007). Feedback needs to provide information specifically relating to the learning task or process of learning in order to fill the gap between what is understood and what was aimed to be understood (Sadler, as cited in Hattie & Timperley, 2007). Additionally, the effect of feedback on motivation was found to have a negative correlation between extrinsic rewards and task performance as well as between extrinsic rewards and intrinsic motivation (Deci et al., 1999). This latter statement only strengthens Hattie and Timperley's (2007) previous argument regarding the poor effectiveness of rewards when providing feedback. Furthermore, this primary negative effect of rewards is that they tend to prevent self-regulation in that they undermine people's ability to take responsibility for motivating or regulating themselves (Deci et al., 1999).

Feedback is not always essential for learning since learning can occur with or without feedback (Petrov, Dosher, & Lu, 2006). Feedback can influence learning positively, for example, feedback can facilitate the speed or rate of learning (Liu, Lu, & Dosher, 2010; Vallabha & McClelland, 2007), and feedback during learning and training can enhance retention of knowledge obtained during training and development programme (Dobres & Watanabe, 2012). However, according to Amitay et al. (2015), literature provides little consensus regarding how much feedback should be given to improve learning. As well as if the feedback that is given should be in response to correct performance (positive feedback) or incorrect performance (negative feedback) (Amitay et al., 2015). Although continuous feedback is important, future studies and research on feedback should thus focus more on the exact amount of feedback or the threshold between providing enough and providing too much feedback during a training programme.

Feedback has a powerful influence on learning and it is a motivator of learning and achievement (Amitay et al., 2015; Hattie & Timperley, 2007). The timing of the feedback, however, needs to be taken into account. Immediate error correction feedback during task acquisition can result in faster rates of acquisition or learning, but delayed feedback is more effective when the task is difficult (Hattie & Timperley, 2007). Van Rooyen (2011) suggested that the learning session or programme should first allow a trainer-instructor to provide information, then trainees should have the opportunity to respond to this information. After the trainees had time to internalise the information the trainee should receive feedback from the trainer-instructor on his/her response to the information. Ideally, the trainee should get the opportunity to actively engage with the feedback (Van Rooyen, 2011).

There are many different types or forms of feedback (Shute, 2008; Wong, 2013), such as elaborated feedback components (e.g., hints, explanations, work examples) (Narciss, 2017; Shute, 2008), task-level feedback (Shute, 2008), task feedback (Kluger & DeNisi, 1996; Wong, 2013); summary information (Shute, 2008); constructive feedback (Blanco-Blanco, 2013); destructive feedback (Blanco-Blanco, 2013); response feedback (Dobres & Watanabe, 2012); self-regulation feedback; process feedback; self-feedback (Wong, 2013); positive and negative feedback (Amitay et al., 2015; Blanco-Blanco, 2013; Deci et al., 1999; Gist & Michell, 1992; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Mubuuke, 2012; Zanolie et al., 2008); formative feedback (Blanco-Blanco, 2013; Mubuuke, 2012; Shute, 2008).

Task-level feedback provides more specific and timely, and often in real-time, information to the learner about a particular response to a problem or task and may additionally make allowance for the learner's current understanding and ability (Shute, 2008). Task feedback encourages the learner to learn task rules and recognise errors which leads to learning through trial and error (Kluger & DeNisi, 1996). According to Wong (2013, p. 93), task feedback is feedback that is directed at the accuracy of the task, for example, “You need to re-organize your essay structure so it is more coherent”. Summary information is utilised by the teachers to provide information and modify instructions to the whole class (Shute, 2008). Constructive feedback, as discussed earlier as one of the methods of enhancing student academic self-efficacy, is focused on the student’s ability (Siegle & McCoach, 2007). Constructive feedback, as perceived by the learner, is seen as a useful message which can be either positive or negative (Blanco-Blanco, 2013). Destructive feedback refers to feedback given with no intention of assisting the learner’s learning process (Blanco-Blanco, 2013). Response feedback refers to the information about the accuracy of observers’ responses and it is provided to observers as they perform their learning tasks (Dobres & Watanabe, 2012). Self-regulation feedback focuses on self-evaluating or one’s work in order to improve, for example, “Look back at your essay and see if you followed the structure that we went over in class” (Wong, 2013, p. 93). Process feedback is feedback that is directed at the individual learner’s strategies, for example, “Make sure that your introduction has all the main points of your essay” (Wong, 2013, p. 93). Self-feedback focuses on evaluative comments on the individual learner or their work “Your introductory paragraph is well done” (Wong, 2013, p. 93).

Positive or negative feedback (i.e., the valence of feedback) affects processing and learning differently (Amitay et al., 2015; Hattie & Timperley, 2007; Zanolie et al., 2008). Amitay and colleagues (2015) found little consensus in the literature regarding how much or the weight of feedback is needed as well as whether positive feedback (for correct behaviour or performance) or negative feedback (for incorrect behaviour or performance) should be given. In some cases, negative feedback has a stronger effect or influence on the motivation of learning, for example, when the learning task is difficult, when a learner undertakes a task that he/she is not committed to and thus have to do, and when the feedback was at the self-level (Hattie & Timperley, 2007; Meyer & Offenbach, 1962). On the other hand, studies conducted on children in an education setting showed that positive feedback, independent of reward effects, has a stronger influence on *learning motivation* (Amitay et al., 2015; Harackiewicz, 1979). Feedback that informs learners they were doing badly, corrective feedback and independent of valance, resulted in better post-training performance than feedback that informed them they were doing well, specifically when learning new skills or tasks (Amitay et al., 2015; Hattie & Timperley, 2007). Positive corrective feedback during training resulted in higher post-performance than negative feedback. Positive feedback was also more effective in driving learning than negative feedback was (Amitay et al., 2015).

Formative feedback is an important factor in the facilitation of student learning since it helps students identify learning gaps early on in their learning session and they can plan means of covering those gaps (Blanco-Blanco, 2013; Mubuuke, 2012). Students' *learning motivation* can be greatly enhanced through formative qualitative feedback. In addition to assisting and motiving students to learn, feedback information can also help trainer-instructors to realign their teaching in response to their trainees' needs. When feedback serves this purpose, it is called formative feedback (Mubuuke, 2012). Black (as cited in Shute, 2008) stated that a beneficial effect of providing formative feedback is that it has a balance of both negative and positive components. The negative component provides guidance on issues and elements that needs correction. The positive component provides motivational support or motivation for the learner to engage in tasks in order to improve his/her learning (Black, as cited in Shute, 2008). Based on research by Rust, Price and O'Donovan (2003), Shute (2008) identified features required for formative feedback to be effective in enhancing students' learning: (a) feedback should be given shortly after the assessment or task is completed to allow learning to be connected to the assessment or task, (b) feedback should be critical yet supportive to enhance learning and encourage confidence, (c) feedback should be directly related to learning outcomes and assessment or task criteria, (d) feedback should show respect for diversity and individuality (in terms of the student's work rather than the student self), and (e) the students should be made aware of the purpose for and the use of the information when receiving it (Shute, 2008). As a result, formative feedback should form an important part in all teaching and learning programmes (Mubuuke, 2012).

According to Oxford Dictionaries (n.d.), feedback denotes "Information about reactions to a product, a person's performance of a task, etc. which is used as a basis for improvement." Oxford Advanced Learner's Dictionary (n.d.) more specifically defines feedback as "advice, criticism or information about how good or useful something or somebody's work is." Feedback, in the instructional context, refers to all post-response information which informs the student on his/her real state of learning or learning performance with the intention of regulating the future learning process in the direction of the learning standards or outcomes strived for (Narciss, 2017). Formative feedback can be defined as information communicated to the learner, by the teacher, with the intention to modify his/her thinking and/or behaviour for the purpose of improving the learner's learning (Shute, 2008).

For the purposes of this research study *providing formative feedback* was defined as *providing trainees with verbal praise and recognition directly or immediately after correct responses, ideal learning performance or behaviours as well as providing trainees with corrective information on responses or behaviours not yet done correctly or perfectly according to and directly related to learning outcomes in an attempt to allow trainees to adjust or change their learning strategies and behaviours to ensure correct future learning performance*. *Providing formative feedback* also denotes providing feedback on a continuous basis (i.e., during the entire learning experience or programmes).

In a classroom setting, the effectiveness of formative feedback will depend upon several detailed features of the quality of feedback and not its existence or absence (Black & Wiliam, 1998). The quality of feedback also depends on various factors or components which determine how the feedback is perceived by the students (Blanco-Blanco, 2013; Hattie & Timperley, 2007). These factors include, timing; focus; clarity, quality or nature; specificity, content or function; complexity; and language used (Blanco-Blanco, 2013; Hattie & Timperley, 2007). Blanco-Blanco (2013) found that students perceive good or effective feedback to include the following characteristics: clarity and meaning; communicated in a friendly way; timely and frequently; it should address specific learning issues; includes guidance for improvements; standardised for the expected outcomes measured; it should be comprehensive (learning, knowledge, communication, integration, participation, cooperation); individually tailored; truthful, interactive and participative; and encouraging. Feedback that is not clearly understood by the students will have no positive value or effect on learning, in fact, it is more likely to create stress and confusion (Blanco-Blanco, 2013). Additionally, the tone of the communication used when providing feedback also has an effect on the learning process. For example, if the tone of feedback is perceived, by students, as one of asserting domination or intimidation, if there is a lack of verbal communication or if the feedback is filled with anger or done in an intolerant style of expression then the feedback might have a negative effect on the learning process (Blanco-Blanco, 2013). It can be argued that these factors and characteristics will also have an influence on how well the trainer-instructor *provides formative feedback* to their trainees.

As discussed earlier, instructor or teacher clarity, denotes being able to clearly explain the study material and concepts to the students in order to stimulate meaning of the work and can be done through non-verbal messages and verbal messages (Chesebro & McCroskey, 1998; Cruickshank & Kennedy, 1986; Loes & Pascarella, 2015; Rosenshine & Furst, as cited in Van der Westhuizen, 2015). One such verbal message is to provide feedback (Cruickshank & Kennedy, 1986; Simonds, 1997). It can, therefore, be argued that if feedback is delivered effectively (e.g., timely, with clarity, quality, address specific learning issues, guidance for improvements) it will influence teacher clarity, which in turn, influences the trainees' ability to find clarity the learning material, learning process and/or learning tasks. According to literature, feedback has an influence on the learners' ability to learn deeply and enhances their understanding (Mubuuke, 2012). More specifically, Shute (2008) found that formative feedback increases student knowledge, skills and understanding of the learning material and content. Formative feedback enables learners to reorganise their understanding of the learning material, which then leads to the ability to build more compelling ideas and constructs of knowledge (Stronge, as cited in Mubuuke, 2012). It can, therefore, be argued that if formative feedback (i.e., *providing formative feedback*) is delivered effectively it will indirectly influence trainee's understanding of the learning material (i.e., *structure in the learning material*) through the trainer-instructor instructional behaviours and the learning material being explained clearly (i.e., *facilitating clarity and understanding*).

Hypothesis 20

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding*.

Some trainees may be naturally enthusiastic about learning and can thus sustain motivation for learning by themselves. Other trainees may need their *learning motivation* to be stimulated by the environment, such as by the trainer-instructor and especially through feedback. (Van der Westhuizen, 2015). Trainer-instructors can enhance a trainee's *learning motivation*, and ultimately enhance performance, if the feedback provided is focused on a specific task and conducted continuously (Kluger & DeNisi, 1996). Shute (2008) found that, in addition to feedback influencing learning achievement, it also influences motivational learning among students. When students perceive the role of feedback to be of value, feedback can be seen as a tool for improving learning skills and also to enhance *learning motivation* (Blanco-Blanco, 2013). More specifically, Mubuuke's (2012) research found that learners` *motivation to learn* was greatly enhanced through qualitative formative feedback. It can, therefore, be argued that when the trainer-instructor provides trainees with recognition immediately after correct responses, ideal learning performance or behaviours as well as providing trainees with corrective information on responses or behaviours not yet done correctly it will encourage or motivate trainees to adjust or change their learning strategies and behaviours to ensure correct future learning performance.

Hypothesis 21

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* will positively influence *learning motivation*.

Van der Westhuizen (2015) hypothesised that *enhancing student self-efficacy* (containing an element of feedback) can enhance or influence a trainee's *academic self-efficacy*. The current author acknowledges that the feedback component in *enhancing student self-efficacy* and *providing formative feedback* might overlap slightly. However, the current author more strongly believes that the feedback component in *enhancing student self-efficacy* differs from *providing formative feedback* and that these differences can be explained in the following ways: (a) the feedback component, in *enhancing student self-efficacy*, relates more to helping students explain their lack-of-effort during poor performance, where *providing formative feedback* focuses more on providing specific task feedback immediately after learning as well as providing the feedback through cues or reinforcement to learners while they learn; (b) the feedback component calls attention to students' ability, where *providing formative feedback* calls more attention to correct responses, performance and behaviour as well as placing attention on responses or behaviours not yet done correctly or perfectly in order to adjust these incorrect responses or behaviours.

2.9 TRAINER-INSTRUCTOR COMPETENCY POTENTIAL LATENT VARIABLES

2.9.1 LIFELONG LEARNING TRAINER-INSTRUCTOR CAPACITY

2.9.1.1 Reflection in the teaching profession

The South African workforce, trainees, students and learners are diverse in terms of age, gender, race, experience and language (Makoni, 2000). This, the matter of diversity, is among the many challenges that South African higher education institutions have to face (Msila, 2006). Abbate-Vaughn (2006) suggested that teachers should make use of 'process writing' which assists these teachers in gaining awareness and understanding of diverse communities. Process writing is a procedure that enables teachers to construct and reconstruct the knowledge they acquired through experience in the field. This knowledge can be acquired through journal writing, drafting, peer reviews as well as by revising accounts of their own observations and responses. These sources of knowledge, or written work, allow teachers to analyse their own underlying assumptions. Process writing allows individuals to gain incremental comprehension of the role their own identities play in identifying and understanding cultural and linguistic diversity and how it sometimes overlaps with poverty (Abbate-Vaughn, 2006). It can be argued that process writing might also assist trainer-instructors gain awareness and understanding of other aspects of teaching, such as their teaching practices and knowledge of teaching.

During process writing teachers become reflective (Alfaro & Quezada, 2010). Reflection denotes a process of critical thinking; thinking about and interpreting situations, events, experiences and emotions; problem-solving; and critically analysing own knowledge, experience, decisions, actions, reasoning and effects. The aim of reflection is to achieve deeper understanding and meaning, of complex situations and knowledge, in order to learn from them and to ultimately act optimally in future situations or continue learning (Dekker-Groen, van der Schaaf, & Stokking, 2013; Hatton & Smith, 1995; Mamede & Schmidt, 2005; Mann, K. Gordon, & J. Gordon, 2009). According to Pinsky and Irby (1997, p.973), "…reflection provides the mechanism for converting raw experiences into new knowledge for improving teaching." Teachers' reflective practice is an important element or learning activity in teacher professional development (Mann et al., 2009; Pinsky & Irby, 1997; Pinsky, Monson, & Irby, 1998; Runhaar, Sanders, & Yang, 2010).

Reflective practice is aligned with the three phases of the teaching process, namely planning, teaching and reflection. Therefore, each of these three teaching process phases is associated with one of the three types of reflection, namely anticipatory reflection, reflection-in-action and reflection-on-action, respectively (Mann et al., 2009; Pinsky et al., 1998; Pinsky & Irby, 1997). However, reflection is not a process defined by an exact beginning and an end, rather it is a continuous process (Rogers, 2001).

Anticipatory reflection

Anticipatory reflection utilises past experience for planning and preparing teaching activities prior to actual teaching. For example, preparing the content and materials needed for learning and selecting teaching modes and strategies to be used (Mann et al., 2009; Pinsky et al., 1998; Pinsky & Irby, 1997). Anticipatory reflection for planning is particularly successful when the teacher involved the learners in the planning process and when the teacher is continuously being innovative and creative. Another aspect that increased the success of anticipatory reflection includes creating a positive class atmosphere for learning. This occurs when the teacher considers the learners' current level of understanding, engaging the learners in the teaching activity and preparing adequately for the class (Pinsky et al., 1998).

Reflection-in-action

Reflection-in-action is the process of thinking or solving problems while engaging in the act of teaching. For example, continuously monitoring one's actions and making adjustments as one goes along (Pinsky et al., 1998; Pinsky & Irby, 1997). The success of reflection-in-action lays in maintaining flexibility during teaching (Mann et al., 2009; Pinsky et al., 1998).

Reflection-on-action

Reflection-on-action, or reflecting, occurs after the act of teaching has passed and involved careful analysis and evaluation of the experience for (or leads to) future planning and new actions (Mann et al., 2009; Pinsky et al., 1998; Pinsky & Irby, 1997). Through the process of analysing the teaching experience comes the transformation of new or improved knowledge and skills and the understanding of what worked well and why (Pinsky et al., 1998).

2.9.1.2 Reflection and learning

Reflection and reflective or critical thinking, such as recognising what you know, what you think they know and what do not yet know, leads to deep learning or effective learning (Lockyear, 2002; Mann et al., 2009; Millican & Bourner, 2014; Rogers, 2001). Reflective learning or reflection is, thus, a valuable academic skill required for learning success and academic progress (Lockyear, 2002; Poulou, 2005). Involving learners in taking responsibility for their own learning, occurring through reflection, can lead to the development of skills that support lifelong learning. These skills will allow the learner to adjust more effectively to the continuous changing world of work (Lorente-Catalán & Kirk, 2014). Therefore, students' lifelong learning occurs through reflective practice, reflective thinking, and reflective learning (Duyff, 1999; Millican & Bourner, 2014).

2.9.1.3 Reflection and continuous learning in the teaching profession

It can be argued that the same aforementioned principles apply to trainer-instructors. Through reflection and reflective thinking, trainer-instructors can analyse which skills or knowledge needs to be developed in order to enhance current competencies. As well as which teaching strategies worked and which did not work. Then, they can take the responsibility to develop these, lacking, competencies through training and development programmes which develops deep learning and, ultimately, lifelong learning. Therefore, through developing experience, reflective educators or teachers become lifelong learners themselves (Alfaro & Quezada, 2010; Körkkö, Kyrö-Ämmälä, & Turunen, 2016). In short, reflective teachers become engage conscious thinking and continuous learning which then turn these teachers into critical thinkers and lifelong learners (Alfaro & Quezada, 2010; York-Barr, Sommers, Ghere, & Montie, as cited in Alfaro & Quezada, 2010). Although, reflection also be applied to the learner's learning process, for the purposes of this research the term reflection will only relate to the trainer-instructor's learning process. Future research on the learning potential competency models could include reflection or reflective thinking as a learning competency potential latent variable.

Teachers continue to develop and grow as their efforts to improve their students are rewarded or if it affects their students' learning positively (Dinham & Scott, 1998; Haiyan, Walker, & Xiaowei, 2016). Professional development, a form of formal learning, is an approach to improve the quality of a teacher's learning and teaching ability through developing teachers' teaching competence and competencies. It also develops a culture that stimulates and supports lifelong learning (Nicholls, 2000). Fullan (as cited in Nicholls, 2000) said that professional development is a key component in the success of lifelong learning. Continuous learning is particularly important in the teaching industry since the educational curriculum, teaching methods and society develop and change all the time and knowledge is continuously being pursued by individual learners and higher educational institutions (Körkkö et al., 2016; Msila, 2006). Furthermore, teachers' continuous learning is important since "…only when teachers learn will their students learn" (York-Barr & Duke, 2004, p. 259).

According to the Norms and Standards for Educators (Republic of South Africa, 2000), there are seven roles for educators in schooling, one of which includes *scholar, researcher* and *lifelong learner*. In other words, the concept of continuous learning is embedded in South African education policy documents and is, therefore, an important competency potential latent variable for South African affirmative development trainer-instructors.

2.9.1.4 Defining lifelong learning

Continuous learning is also known as continuous improvement, continuous personal development, continuous learning (Clemson-Ingram & Fessler, 1997), continuous professional development (CPD) (Cross & Ndofirepi, 2015; Frost, 2012), lifelong learning process (Körkkö et al., 2016) or lifelong learning (Duyff, 1999; Nicholls, 2000); self-directed learning (Bolhuis, 2003; Iwasiw, 1987; O'Shea, 2003); and professional development as ongoing (Desimone, 2009).

Nicholls (2000) stated that lifelong learning is highly complex and multifaceted in nature. The attainment of graduate degrees (or acquisition further professional training and professional development) is but one aspect or form of lifelong learning (Carlson, 2016; Nicholls, 2000). If 'learning from learning' is not taking place, then the individual is not engaged in lifelong learning and development (Nicholls, 2000).

Lifelong learning can be defined as a continuously supportive process that stimulates and empowers individual learners to acquire all the knowledge, values, skills and understanding that they will need throughout their lifetimes and to also provide them with confidence, creativity and satisfaction in all roles, circumstances and environments (A National Learning: Vision for the 21st Century, as cited in Duyff, 1999). Based on this definition the following key elements was identified: (a) *continuous*, in that learning never ceases; (b) *supportive,* individual learning does not occur in a vacuum or done alone; (c) *stimulating and empowering*, learning is not passive, rather it is self-directed and active; (d) *incorporating knowledge, values, skills and understanding* thus focusing on more than what we know; (e) *spanning a lifetime*, learning starts from our first breath and ends with our last breath; (f) *applied*, learning occurs not just for knowledge's sake or merely for the accumulation of knowledge; (g) *incorporating confidence, creativity and enjoyment*, it is a positive and fulfilling experience; and (h) *inclusive of all roles, circumstances and environments*, learning not only applies to our chosen vocation but to our entire life as well (Carlson, 2016; Collins, 2009; Duyff, 1999).

Lifelong learning is the individual's motivation to learn and the development of related learning skills in order to meet and sustain their own learning needs throughout their personal and professional life. This then allows the individual to cope with their rapidly changing professional and personal domains (Wielkiewicz & Meuwissen, 2014). Continuous learning, according to Frost (2012), can range from merely brushing up on subject matter knowledge and content, to regularly updating and renewing teachers' training, to developing teachers themselves rather than developing the profession or practice of teaching.

The continuous learning model assumes that teachers are effective only if they can adapt to and cope with different types of changes and challenges, meet diverse expectations, and if they can develop themselves through continuous learning (Kyriakides, Demetriou, & Charalambous, 2006). This model is linked to school improvement and can be valuable when evaluating teachers' pedagogical and content knowledge. The criteria for this model include: the teacher seeks and strive for continuing training, the teacher evaluates the innovations she/he implemented in the classroom, the teacher implements innovative teaching approaches, the teacher has awareness of current educational research findings, the teacher participates in action research, and the teacher attendants graduate studies (Kyriakides et al., 2006).

The traits that a lifelong learner, or individual, needs in order to be successful are: curiosity or being constantly curious; motivation to learn; expressed a personal responsibility for own learning; confidence in one's learning ability and ability to learn from others; reflective and self-aware; sharing one's knowledge with others; accept feedback; willingness to make mistakes and learn from them; methodical, disciplined, logical and analytical; persistence; flexible thinking; and being venturesome, creative and resourceful (Carlson, 2016; Collins, 2009; Duyff, 1999). The skills that a lifelong learner, or individual, needs in order to be successful are: communication skills for acquiring and transferring knowledge and information; self-directed learning skills that assist determining learning needs and planning; information literacy which is the ability to search for and locate appropriate and accurate information, evaluating the quality of acquired information, organising and utilising newly acquired information effectively; higher-order thinking skills such as creative thinking, problem-solving and decision making skills; able to work as a change agent; and self-awareness, self-monitoring skills and reflection or reflective thinking (Carlson, 2016; Collins, 2009; Duyff, 1999).

The learning component in lifelong learning, arises from a variety of activities, for instance, watching how other people do things (i.e., observing), debating or talking with others and asking someone for help or information (i.e., discussions), looking up information (i.e., research), trying something for oneself and learning from mistakes and failures (i.e., trial and error), and reflecting on all the previous learning and other activities (i.e., reflection/reflective thinking) (Bolhuis, 2003). It can, therefore, be said that the mental or cognitive activities involved in learning can be divided into four categories, namely social interactions, processing verbal and other symbolic information, direct experiences and reflection (Bolhuis, 2003).

Postholm's (2012) research question "How do experienced teachers learn" produced the following learning activities or themes in which teachers can learn (either formally or informally): participating in various courses and workshops; practice-oriented exploratory work (e.g., where teachers test their own teaching); teachers' reflections of their own teaching practice and reflection on others' teaching through observation; learning that occur in school and in co-operation with other teachers and if school administration supports social learning; when teachers work with themes they are interested in or fascinated by, based on their practical experiences; when they want to specify their own learning goals (i.e., being autonomous); and teachers should have a will or motivation to learn on top of merely adequate time and resources. Moreover, learning can occur in planned and structured reflection meetings between teachers or during unplanned or informal conversations with other colleagues (Postholm, 2012).

Based on the aforementioned discussion and information a *lifelong learning trainer-instructor* can be described as *an individual trainer-instructor that continuously engages in reflection (e.g., critical thinking about his/her past and current knowledge, past and current experiences, past and current teaching, during active teaching and utilising past experiences and knowledge for teaching), that is continuously involved in research within the educational field of study, sharing newly learned knowledge and information with others and through teaching, that engages in continuous professional development or other informal learning, training and development programmes over the course of his/her professional teaching career and that experiences this continuous learning or lifelong learning as fulfilling.*

For the purpose of this research study, *lifelong learning trainer-instructor capacity* was defined as, *the ability of an individual trainer-instructor to continuously engage in reflection, research and development or learning and to continuously shares his/her knowledge and information with others over the course of his/her professional teaching career*.

2.9.1.5 The influences of lifelong learning trainer-instructor capacity

Should a trainer-instructor consciously learn he/she might develop into more than just an effective teacher or achieve more than merely perfecting their teaching skills and craft. Should a trainer-instructor continue to learn and grow he/she might develop into more than just a teacher, trainer or instructor.

Professional development (Fairman & Mackenzie, 2012), continuous learning (Fairman & Mackenzie, 2012; Teacher Leadership Exploratory Consortium, 2011; York-Barr & Duke, 2004) and modelling reflective practices (York-Barr & Duke, 2004) are but some of the many functions or roles of a teacher leader. It can be said that teacher leadership development occurs through continuous learning, which then in turn, enhance teacher effectiveness (Angelle & DeHart, 2011; Childs-Bowen et al., 2000; Muijs, Chapman, & Armstrong, 2013; Smylie, 1995; Wenner & Campbell, 2017).

Where teacher leadership is more focused on continuously learning themselves, transformational leadership is more focused on their follower's continuously learning. Transformational leaders pay close attention to their followers learning and development needs and encourages their followers to grow, develop and learn continuously (Bass and Avolio, as cited in Geijsel et al., 2003; Bass and Avolio, as cited in Beyers, 2006; Bolkan & Goodboy, 2009; Bolkan & Goodboy, 2011; Dambe & Moorad, 2008; Day et al., 2016; Hallinger, 2003; Scott et al., 2008; Yammarino & Bass, 1988). It can be argued that if transformational leaders value lifelong learning among their followers, they themselves will also value it. Squires, Ball and Ackerm (n.d.) corroborate this argument. They stated that lifelong learning is an important component in transformational leadership. Transformational leaders need to be open-minded to and ready for change and should thus also be lifelong learners themselves (Hogg, 2015).

It can thus be argued that once a trainer-instructor engages in continuous lifelong learning and development he/she will influence and develop both elements of transformational trainer-instructor leadership, (i.e., teacher leadership and transformational leadership). Stated differently, if a trainer-instructor has the ability to engage in continuous reflection on his/her past and current transformational trainer-instructor leadership duties (i.e., the elements and dimensions of transformational leadership and their classroom teacher practices) he/she will be able to identify which of his/her duties are functioning effectively and which are not. This trainer-instructor will then be able to do more specific research on the duties or practises that are lacking. This research will lead to this trainer-instructor searching for and engaging in professional development or self-learning in order to become a more effective transformational trainer-instructor leader (i.e., better at developing his/her trainees' academic needs and reaching trainees' academic goals). Therefore, it can be hypothesised that *lifelong learning trainer-instructor capacity* will influence *transformational trainer-instructor leadership*.

Hypothesis 22

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *transformational trainer-instructor leadership.*

2.9.2 TRAINER-INSTRUCTOR EXPERT

2.9.2.1 Changes placing demands on teachers

Professionals today face demanding requirements such as increasing globalisation and internationalising, growing proportion of knowledge-intensive work, rapid increases in technology, as well as consistently working with different people, different communities and other experts (Tynjälä, 1999). Similar demands apply to the educational system and education professionals (Darling-Hammond, 1998; Tynjälä, 1999). Changes in technology can have implications for educational institutions, teachers and teaching methods (Clarke, 2010; Moodley, 2015). For example, teaching and learning can now occur online as well as in person (Clarke, 2010). Changes also occur in the curriculum (Clarke, 2010). Clarke (2010) argued that globalisation and changes in technology have a created new global economy, one powered by information and knowledge. These changes, thus, lead to increases in research into effective teachers and their development (Clarke, 2010) and results lead to schools now requiring immensely skilful teachers that can assist their students in achieving high levels of understanding (Darling-Hammond, 1998). Furthermore, quality teachers influence student performance and students' learning experience (Bold et al., 2017; Han, 2012) and an educated workforce is critical for developing a high national standard of living (e.g., reducing poverty), particularly in South Africa (Bold et al., 2017; Steyn, 2011). It can, therefore, be argued that skilful, quality, and effective teachers (i.e., expert teachers) are an important asset within ever-changing school environments.

According to the Norms and Standards for Educators (Republic of South Africa, 2000), there are seven roles for educators in schooling, one of which includes *learning area/subject/discipline/phase specialist*. In other words, the concept of expert teacher is embedded in South African education policy documents and is, therefore, an important competency potential latent variable for South African affirmative development trainer-instructors.

2.9.2.2 The expert teacher

The terms good, quality or effective teachers are often used interchangeably with each other or with the term expert (Krátká, 2015). An expert teacher can better utilise subject matter or content knowledge, have extensive educational content knowledge (including deep understanding of subject matter knowledge), have more effective problem solving strategies, are more effective at adapting and modifying learning goals, have more effective decision making abilities, can set more challenging objectives or learning outcomes, create a more effective classroom climate, have a better perception and understanding of classroom events and reading cues from learners, have a greater sensitivity to learning material or content, are more effective at monitoring learning and the ability to provide feedback, tests hypotheses frequently, have greater respect for learners, and displays passion for teaching (Berliner, 2001). Expert teachers can improvise their planned lessons naturally when encountering problems during teaching. Expert teachers are able to be innovative since they possess, in their memory, a fast amount of content knowledge and past teaching experiences or routines and since they have the ability to quickly assess cues in the environment and adapt to it or solve the problem (Borko & Livingston, as cited in Sparks-Langer & Colton, 1991).

Darling-Hammond (1998) argued that in order for teachers to become skilful they will need to deeply understand the subject matter they teach. This statement on skilful, or effective, excellent, and quality, teachers has been corroborated by other researchers such as Bold et al (2017), Bolkan and Goodboy (2009), Han (2012), Krauss et al., (2008), Moodley (2015) and Shulman (1986).

Krauss and colleagues (2008) argued that in order for mathematics teachers to better explain mathematics to their students they need to know more about the concepts and content of mathematics (i.e., domain-specific knowledge, subject knowledge, deep understanding of mathematics concepts and content, teacher's mathematics-related knowledge) (Ball, Hill, & Bass, 2005; Krauss et al., 2008). In order to become effective teachers, teachers must become experts in their discipline, they must be able to present their material (i.e., study material or subject), they must be able to effectively manage their classrooms, facilitate and encourage maximum student involvement (Bolkan & Goodboy, 2009). Historically, Chinese teachers were considered excellent teachers if they were experts in subject matter knowledge (Han, 2012). A student's learning performance in science (i.e., a specific school subject) is dependent on the quality of the science teacher's science instruction (i.e., teaching) which, in turn, is dependent on the teacher's expertise in science content knowledge (i.e., subject matter content knowledge) and pedagogical knowledge

(Moodley, 2015). Teacher quality is assessed and measured by their knowledge and their practices in their classroom (Bold et al., 2017). The key to teachers' effectiveness is their pedagogical content knowledge or the knowledge about how to teach a particular subject or particular subject matter content (Leithwood et al., 2004b).

Quality teaching pertains to what is being taught (i.e., the content) and how it is being taught (i.e., the method) (Fenstermacher & Richardson, 2005). Good teaching includes teaching according to high standards for subject matter content (e.g., adequate and complete subject content) and utilising appropriate methods (e.g., age-appropriate and morally defensible). Good teaching is grounded in a task sense of teaching. Successful teaching includes teaching that leads to intended learning[53] (e.g., the learner acquiring an acceptable level of proficiency). Successful teaching is grounded in an achievement sense of teaching (Fenstermacher & Richardson, 2005). Hogan, Rabinowitz and Craven III (2003) argued that expert teachers tend to focus on achievement or their students' learning success. Quality, or expert, teaching should, therefore, include both good and successful teaching (Berliner, 2001; Fenstermacher & Richardson, 2005). In terms of good teaching, the teacher will need to have a strong foundational knowledge in the specific subject or domain being taught. This foundational knowledge of the subject matter (i.e., teachers' mastery of subject matter) forms part of the notion of what is an expert teacher (Fenstermacher & Richardson, 2005).

2.9.2.3 Knowledge and subject matter experts

A central theme of the aforementioned discussion on quality, skilful and expert teachers is that of knowledge. Expert teachers require knowledge on the subject being taught. The fact that teachers should be knowledge experts have been known for quite some time. Shulman (1986) argued that the subject matter is a central aspect on the road to teaching effectiveness. Stated differently, a prerequisite for an individual who wants to teach a subject to students is the ability for that individual to demonstrate knowledge of the subject matter (Shulman, 1986). Teachers need to understand their subject matter in order to help their learners and students create cognitive maps during learning, be able to relate ideas to each other, and to be able to address misconceptions of learning or subject matter material (Darling-Hammond, 1998). It is, therefore, important to understand the cognitive process (e.g., deep knowledge of content and elaborate schema) that are inherent in the teaching profession in order to improve current teaching practices and teachers themselves (Hogan et al., 2003).

Preparation for knowledge creation, application and distribution, within an education setting, is dependent on a conceptual framework of the subject being taught or studied, a deep knowledge of the subject, and understand the subject's methods. The education professional, or expert, thus requires being able to

[53] Fenstermacher and Richardson (2005) argued that teaching and learning are two distinct activities. Teaching is performed by the teacher (and might not lead to effective learning on the part of the learners) and learning is performance by the learner (thus a person other than the teacher learns).

integrate theoretical and practical knowledge, interpersonal and communication skills as well as the ability to reflect on one's own teaching, practice or experiences (Tynjälä, 1999).

2.9.2.4 Different types of knowledge

The knowledge base of expert teachers is extensive and integrated (Krauss et al., 2008; Sparks-Langer & Colton, 1991). As a result, expert teachers are often seen as knowledge experts (Howard, 1998; Lentell, as cited in Briggs, 2005) or subject experts (Briggs, 2005; Clifford, 1999). In order to understand the concept of expertise or being an expert, one needs to be aware that there are many different forms of expert knowledge (Kettula & Clarkeburn, 2013).

2.9.2.4.1 Different forms or types of expert knowledge

The three different forms or types of expert knowledge are formal knowledge, practical knowledge and self-regulative knowledge (Kettula & Clarkeburn, 2013; Tynjälä, 1999; Tynjälä, Nuutinen, Eteläpelto, Kirjonen, & Remes, 1997).

Formal knowledge

Formal knowledge, according to cognitive psychologists, is also known as declarative knowledge (Tynjälä et al., 1997; Tynjälä, 1999). This type of knowledge is related to explicit and factual knowledge and it plays an important role in educational and professional competence (Tynjälä, 1999). Formal or declarative knowledge is, for example, the knowledge found in textbooks (Kettula & Clarkeburn, 2013). Formal knowledge can be described as universal and explicit (Tynjälä, 1999).

Practical knowledge

Practical knowledge is often labelled as procedural knowledge (Tynjälä et al., 1997; Tynjälä, 1999). This type of knowledge is learned and developed in practical or realistic situations (i.e., from experience) (Kettula & Clarkeburn, 2013) and is related to the development of skills and the 'knowing-how' to do things (Tynjälä, 1999). Practical knowledge, thus, takes formal knowledge from the textbooks and applies it practically to real-life settings (Kettula & Clarkeburn, 2013) or assesses how formal knowledge will be applicable in a specific classroom situation (Krátká, 2015). Practical knowledge (or tacit knowledge) is more personal (i.e., closely linked to a specific personal and context), inferred, 'intuition-like', and difficult to express explicitly (Krátká, 2015; Tynjälä et al., 1997; Tynjälä, 1999). It can be argued that task knowledge can be a type of practical knowledge since task knowledge develops as a result of experience or observations (and not textbooks) and since it provides information related to when and why to use a certain task (which helps the individual establish a relationship between the environment and the task) (Brandt, 2001).

Self-regulative knowledge

Self-regulative knowledge consists of conscious, meta-cognitive and reflective skills that are utilised to monitor and evaluate one's own performance and actions (Kettula & Clarkeburn, 2013; Tynjälä et al., 1997; Tynjälä, 1999).

In the past, these three forms of expert knowledge were researched in isolation. For example, formal knowledge was studied in educational settings, practical knowledge in work-life settings and self-regulative knowledge was studied in both educational and work-life settings (Tynjälä, 1999). However, recent studies focusing on experts have included both formal and practical knowledge, or studied together, based on the argument that knowing what to do and doing it are two inseparable aspects of being an expert (Tynjälä, 1999). This is also the position taken by the current study.

2.9.2.4.2 Different categories of teacher content knowledge

Based on research conducted on teachers' knowledge, the following three types of teacher's content knowledge was identified as being critical for teacher effectiveness, namely subject matter content knowledge or content knowledge, pedagogical content knowledge, and curricular or pedagogical knowledge (Hogan et al., 2003; Shulman, 1986).

Subject matter content knowledge

Subject matter content knowledge is also known as content knowledge, subject matter, or subject content knowledge (Bold et al., 2017; Hogan et al., 2003; Shulman, 1986). The amount, understanding the concepts embedded with the subject (both understanding what it is and why it is) and organisation of knowledge, related to a specific subject or domain, in the mind of the teacher (Hogan et al., 2003; Krauss et al., 2008; Shulman, 1986) and is related to the teacher's deep understanding of that specific subject information or content (Krauss et al., 2008). It is important for teachers to have a strong knowledge base in the subject they teach (i.e., subject matter domain) (Tynjälä, 1999) and knowledge about what their learners should learn (Dekker-Groen et al, 2013). Subject matter instruction refers to teaching the knowledge that is related to a specific discipline or field (i.e., specific subject) (Moje, 2007).

Pedagogical content knowledge

Pedagogical content knowledge goes beyond understanding subject matter content knowledge it also includes knowledge for teaching or teaching a specific subject (Krauss et al., 2008; Shulman, 1986). For example, this includes presenting the subject or content knowledge, utilising illustrations and examples, effectively explaining and demonstrating the subject or content in a manner that is understandable to others or enhances others' understanding of the subject or content (Shulman, 1986). Pedagogical content knowledge also includes the teacher's understanding of what constitutes learning, which students understand what concepts and eliminating misconception among students (Shulman, 1986). Basically, pedagogical content knowledge is the ability of the teacher to convey their understanding of the subject, through the use of multiple models or methods of teaching, in order to enhance students' understanding of the subject (Hogan et al., 2003) or where actual teaching occurs (Moodley, 2015). Teachers should have knowledge about the different teaching activities needed to teach and support student learning (e.g., how to give feedback) (Dekker-Groen et al., 2013) and the knowledge about what constitutes learning (e.g., the processes or stages of learning) (Tynjälä, 1999).

Curricular knowledge

Curricular knowledge is also known as pedagogical knowledge (Bold et al., 2017; Hogan et al., 2003). Curricular knowledge refers to the programmes designed for teaching a specific subject and the variety of instructional or teaching materials related to that subject (Shulman, 1986). Curricular knowledge is, thus, the set of tools a teacher can utilise in order to teach a specific subject (Shulman, 1986). For example, alternative textbooks, software programmes and visual material (Shulman, 1986). It also includes classroom management techniques, utilising effective communication strategies and assessing students' learning progress (Bold et al., 2017; Hogan et al., 2003).

Krauss and colleagues (2008) found that there is a strong correlation between (subject) content knowledge and pedagogical content knowledge, indicating that teachers high on content knowledge are also high on pedagogical content knowledge.

2.9.2.4.3 Different forms of teacher knowledge

Based on research conducted on teachers' knowledge, the following three types of teacher knowledge was identified propositional knowledge, case knowledge and strategic knowledge (Shulman, 1986).

Propositional knowledge

There are three types of propositional knowledge in teaching, namely principles, maxims and norms with the aim of guiding the work of a teacher (Shulman, 1986). Principles correspond with disciplined empirical or philosophical inquiry (as a source of knowledge) and develop the principles for teaching (Shulman, 1986). Maxims correspond with practical experience (as a source of knowledge) and is thus practical in nature (rather than theoretical). Maxims represent accumulated wisdom in the practice of teaching and provide guidance to teachers (Shulman, 1986). Norms correspond with moral and ethical reasoning (as a source of knowledge) and include values, ideological or philosophical commitments to justice, equity and fairness. They are normative rather than practical or theoretical (Shulman, 1986).

Case knowledge

Case knowledge is knowledge of specific, well-documented and thoroughly described events or sequences of events (Shulman, 1986). These cases can be either examples of specific instances of practical events or examples of principles which are more abstract or theoretical (Shulman, 1986). There are three types of case knowledge in teaching, namely prototypes, precedents and parables. Prototypes focus on theoretical principles. Precedents focus on encapsulating and communicating principles of practice or maxims. Parables focus on conveying the norms and values of teaching (Shulman, 1986).

Strategic knowledge

Strategic knowledge or judgements is utilised when a teacher is confronted with a particular problem or situation, whether it is theoretical, practical or moral, in which principles collide or contradict each other, there are no straightforward solutions possible or when the precedents of specific cases are incompatible (Shulman, 1986). Strategic knowledge goes beyond understanding principles to utilising wisdom or practice (i.e., experience) (Shulman, 1986).

2.9.2.5 Defining trainer-instructor expert

Based on the aforementioned discussion, a *trainer-instructor expert* can be described as a trainer-instructor that has an extensive knowledge base and deep understanding of the specific subject he/she teaches (including formal or declarative knowledge and subject matter content knowledge), and that has a vast knowledge and understanding of the learning and the teaching processes and which teaching methods are appropriate and ethically justifiable (including practical or procedural knowledge, self-regulative knowledge, pedagogical content knowledge, curricular or pedagogical knowledge, propositional knowledge, case knowledge and strategic knowledge). Trainer-instructor expert also encompasses the ability to effectively solve educational or classroom related problems.

For the purpose of this research, *trainer-instructor expert* can be defined as *the ability of a trainer-instructor to acquire and retain extensive knowledge and deep understanding of the specific subject being taught and of the all learning and the teaching processes as well as appropriate teaching methods.*

2.9.2.6 The influences of trainer-instructor expert

Adaptive or fluid experts learn throughout their careers and from experience. This continuous learning then updates their current expertise in order to solve new problems (Berliner, 2001). Knowledge is acquired from a process of active inquiry and reflection since reflection drives learning (Li, D'Souza, & Du, 2011), and provides the means to convert raw experiences into new knowledge for the purpose of improving teaching (Pinsky & Irby, 1997). Through the process of analysing, the teaching experience (i.e., reflection) becomes the transformation of new or improved knowledge (Pinsky et al., 1998). Expert knowledge is generated through the continuous reinvestment of cognitive resources (Tynjälä et al., 1997). It would appear that lifelong learning (e.g., throughout a career, reflection and continuous reinvestment) has an influence on the creation of knowledge. In a definition of lifelong learning, it states that lifelong learning is a continuously supportive process that stimulates and empowers individual learners to acquire all the knowledge that they will need throughout their lifetimes (A National Learning: Vision for the 21st Century, as cited in Duyff, 1999).

It can then be argued that if a trainer-instructor continuously reflects on his/her past and current knowledge and experiences, then that trainer-instructor will continuously be aware of areas in his/her teaching practice that needs to be updated. This active awareness then leads to the trainer-instructor participating in professional development programmes or self-learning. These programmes or learning activities will provide the trainer-instructor with additional and/or new knowledge. Furthermore, if a trainer-instructor actively engages in lifelong learning, that is to say that the trainer-instructor is continuously engaging in research in his/her specific subject and continuously updating his/her teaching methods, then that trainer-instructor will continuously gather new information and knowledge on their specific subject (i.e., subject matter content knowledge) and teaching methods (i.e., pedagogical content knowledge).

Hypothesis 23

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *trainer-instructor expert.*

Zirbel (2006) argued that students' deep learning can be enhanced by providing them with basic learning concepts that they should critically think about, understand and connect to previous knowledge, and by 'chunking' learning concepts and information (Zirbel, 2006). Therefore, when the learning material or subject knowledge is presented in a format or manner that makes it easy for the students to find meaningful structure or connections and when the information is bunched together the learners' learning will be enhanced (i.e., *structure in the learning material*) (Van der Westhuizen, 2015; Zirbel, 2006). In order for the teacher to present their subject knowledge to their students in the correct format or manner, they need to use their expert knowledge in a particular field or subject (Zirbel, 2006). This latter statement is in alignment with previous arguments in literature in that skilful, effective, excellent, quality and expert teachers will need to have a deep understanding of their specific subject matter, content and concepts to be able to teach effectively (Bold et al., 2017; Bolkan & Goodboy, 2009; Darling-Hammond, 1998; Han, 2012; Krauss et al., 2008; Moodley, 2015; Shulman, 1986).

Hypothesis 24

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *structure in the learning material.*

Furthermore, in order to create *structure in the learning material*, the trainer-instructor has to possess the ability to teach clearly. Meaning, the trainer-instructor has to communicate and present the learning material clearly. Therefore, the trainer-instructor has to be able to *facilitate clarity and understanding* in order for the trainees to obtain *structure in the learning material*. It can be argued that if a trainer-instructor has the ability to *facilitate clarity and understanding*, but does not have the appropriate knowledge about the subject or teaching methods, then that trainer-instructor will not be able to create *structure in the learning material* for his/her trainees[54].

Hypothesis 25

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that the effect of *trainer-instructor expert* on *structure in the learning material* will be moderated by *facilitating clarity and understanding*.

Formative feedback should be directly related to the learning outcomes and should provide information to the students regarding the purpose for and the use of the information when receiving it (Rust et al., 2003; Shute, 2008). It can be argued that for the formative feedback to be succesful, the trainer-instructor has to have knowledge of the specific learning outcomes of the learning material and information being provided. Some of the greatest ways to discriminate between expert and novice teachers are the teacher's representation of the subject matter as well as the ability to monitor the student's learning and to provide feedback (Berliner, 2001). Expert teachers have the ability to use subject matter or content knowledge more effectively which influences their ability to, for example, provide feedback (Berliner, 2001). Knowing how to provide feedback is also dependent on the teacher's pedagogical content knowledge (Dekker-Groen et al., 2013). It can be argued that the ability of a trainer-instructor to *provide formative feedback* will be influenced by the trainer-instructor's expertise.

Hypothesis 26

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *providing formative feedback.*

2.9.3 TRAINER-INSTRUCTOR EMOTIONAL INTELLIGENCE

2.9.3.1 Emotions within an educational setting

Learners come to the classroom with different feelings and emotions, such as being hopeful, fearful, anxious, nervous, and vulnerable. The teacher needs to acknowledge and influence these kinds of feelings (Ergur, 2009). Hargreaves' (1998, p. 835) statement "Emotions are at the heart of teaching" has been corroborated by literature. For example, that the affective domain plays a crucial part in teaching (Broli,

[54] The reverse is not necessarily true. A *trainer-instructor expert* possesses the subject matter knowledge as well as knowledge about other teaching methods. Even when the *trainer-instructor expert* does not have the ability to *facilitate clarity and understanding*, he/she will utilise other teaching methods or procedures to carry across and share their knowledge with their trainees.

Berrone, Renati, Zanetti, Palazzeschi & Di Fabio, 2011; Sutton & Wheatley, 2003). Another example is that the ability to work with or manage emotions (i.e., emotional competencies) is an important skill for teachers since it has an enormous influence on the teaching-learning process (Corcoran & Tormey, 2013; Ergur, 2009). Effective teachers are emotional and passionate (e.g., passionate about their relationships with their learners), they connect with their learners, and they fill their work and their classrooms with enjoyment, creativity, challenges and joy (Hargreaves, 1998).

The emotional climate of a school and of a classroom creates a favourable atmosphere for the learning. This will only occur if the teacher pays attention to the emotional aspect of the school or classroom, by recognising and managing the feelings of oneself and of the students, by using listening skills, and by dealing with students' learning expectations. This then influences student learning, such as improvements in motivation to learn, willingness to engage in learning activities, more effective problem-solving, willing to take risks, becoming more creative as well as increases in academic performance (Corcoran & Tormey, 2013; Ergur, 2009).

Apart from subject knowledge, knowledge of appropriate teaching methods, or cognitive skills, successful teaching also requires affective skills (Ergur, 2009; Perry & Ball, 2008; Pugh, 2008). Hargreaves (1998) demonstrated how emotions are a central part of teaching and in the teachers' relationships with their learners by discussion four interrelated points, namely, teaching is an emotional practice, teaching and learning both involves emotional understanding (of relationships), teaching is a type of emotional labour (e.g., acting out feelings and emotions), and teachers' emotions are inseparable from their moral and ethical purposes as well as their ability to achieve these purposes.

2.9.3.2 Defining emotional intelligence

Various intellectual problems or challenges contain emotional information that must be processed, along with other information, in order to respond appropriately or to solve the problem or challenge (Mayer & Salovey, 1993). Emotional intelligence (EI or EQ) thus combines emotions and intelligence together in one single concept (Brackett, Rivers, & Salovey, 2011; Mayer, Salovey, & Caruso, 2004). For example, emotions such as anger, happiness and fear, as well as mood states, preferences and bodily states, influence how people reason, make decisions and how they perform their different tasks (Brackett et al., 2011).

The term emotional intelligence (EI) was coined by Peter Salovey and John Mayer (1990) (Corcoran & Tormey, 2012; Corcoran & Tormey, 2013; Friedman, 2014) and made famous by Daniel Goleman in 1995 when he wrote his book titled *Emotional Intelligence: Why it can Matter More than IQ* (Benson, Fearon, McLaughlin, & Garratt, 2013; Brackett et al., 2011; Corcoran & Tormey, 2012; Friedman, 2014; Goleman, 2004). Mayer and Salovey (1993) correctly mentioned that they should have labelled emotional intelligence as Goleman (1995) defined it as "emotional competence". Mayer and Salovey (1993) chose the term "intelligence" in order to link their framework or perception to the historical literature on intelligence.

Although emotional intelligence (EI) as they defined it is related to general intelligence in some degree, in that it is an ability, it actually differs from general intelligence in terms of mechanisms (e.g., emotionality, emotional management and neurological substrates) and manifestations (e.g., verbal fluency within the emotional domain and information transmission or thinking during an emotional threat) (Mayer & Salovey, 1993).

Emotional intelligence can be defined as "*the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions*" (Salovey & Mayer, 1990, p. 189). Goleman (1998, 317) defined emotional intelligence as "*the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships.*"

EI involves a set of emotional skills and competencies that is focused on or facilitate the identification of emotions, processing emotion-relevant information and regulating emotions (Mayer, Salovey, Caruso, & Sitarenios, 2003; Vesely, Saklofske, & Leschied, 2013). EI further involve the ability to accurately reason about emotions to enhance thinking and reasoning, the ability to accurately perceive or identify emotions, to retrieve and generate emotions and emotional information or knowledge in such a manner as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions in such a manner as to promote both emotional and intellectual growth (Mayer et al., 2004; Mayer, Roberts, & Barsade, 2008).

Individuals will differ in their level of EI. For example, some people might be more emotionally intelligent than others (Mayer & Salovey, 1993). Those who are more emotionally intelligent or have high levels of EI will be more aware of their own and others' feelings and emotions, they are more perceptive of emotions, they will be more receptive to positive and negative aspects of internal experiences, they are able to label and communicate labelled emotions and feelings, they will be able to utilise these acknowledged and labelled emotions in thought, they will be able to understand the meanings of these emotions, and will be able to manage emotions better than others (Mayer et al., 2004; Mayer & Salovey, 1993). Self-awareness will lead to the effective regulation and management of affect within themselves and others, which in turn, will also contribute to well-being (Mayer & Salovey, 1993).

Research on EI found that it is separated into two subfields, namely ability EI and trait EI (Austin, 2010; Brackett et al., 2011; Mavroveli & Sánchez-Ruiz, 2011; Petrides, Pita, & Kokkinaki, 2007; Pugh, 2008). Ability EI (cognitive-emotional ability) is concerned with emotion-related cognitive abilities and theorised as an actual ability, such as reasoning and problem-solving within an emotional domain (Austin, 2010; Mavroveli & Sánchez-Ruiz, 2011; Petrides et al., 2007). Ability approach to EI or ability EI scales measures a set of abilities or an actual intelligence (Mayer, Caruso, & Salovey, 2000) and, as a result, ability EI tests and questionnaires resemble standard intelligence tests (Austin, 2010). Trait EI (trait emotional self-efficacy) is emotion-related dispositions and self-perceptions and it is theorised as a distinct and lower order personality construct (i.e., a personality trait on the lower levels of personality hierarchies such as the Giant Three and the Big Five personality taxonomies). It is measured through self-report questionnaires (Austin, 2010; Mavroveli & Sánchez-Ruiz, 2011; Petrides et al., 2007).

Although trait EI and ability EI appears to be separate, it has been argued that this separation or distinction is mainly concerned with operationalisation and since these two constructs are entirely different, they can in actual fact co-exist (Benson et al., 2013). Mixed-method models (those including both ability and trait EI) measuring EI has found to be relevant for understanding school and teacher leadership (Allen, as cited in Benson, 2013). Based on Goleman's (as cited in Birol, Atamtürk, Silman, & Şensoy, 2009) statement that human thoughts (i.e., intelligence) and emotions are inseparable processes, EI can be seen as a unit (or interconnected) leading to an individual that can possess both types of intelligences (both ability EI and trait EI). For example, one's thoughts affect one's emotional state (cognition influences emotions) and one's emotions can, in turn, affect one's perceptions and memories (emotions influence cognition) (Birol et al., 2009). It is unfeasible to separate these two spheres or concepts from each other (Birol et al., 2009). Therefore, for the purpose of this research, EI was conceptualised as one concept, instead of two separate concepts, namely ability EI and trait EI.

Pugh (2008) placed the theoretical framework of EI into four sections, namely, (a) recognising or identifying our own feelings or emotions (which is personal/intrapersonal and awareness of emotions); (b) managing our own feelings or emotions effectively (which is personal/intrapersonal and behavioural responses to emotions); (c) recognising or identifying the feelings or emotions of others (which is social/interpersonal and awareness of emotions); and (d) the actions that takes account of the feelings or emotions of others (which is social/interpersonal and behavioural responses to emotions). Salovey and Mayer (1990) stated that EI involves a set of related mental processes or components, namely (a) apprising and expressing emotions in oneself and in others, (b) regulating emotions in oneself and in others, and (c) utilising emotions in an adaptive manner. The four-branch ability model divides EI abilities and skills into four areas, namely, (a) the ability to perceive emotions, (b) the ability to utilise emotions to facilitate thought, (c) the ability to understand emotions, and (d) the ability to manage emotions (Mayer et al., 2004). Additional components of EI include motivation (Goleman, 1998; Goleman, 2004); empathy (Goleman, 1998; Goleman, 2004; Mayer et al., 2008), and social skills (Goleman, 1998; Goleman, 2004). These EI components will be discussed, in an interlinked fashion, in the following section.

Appraising and expressing emotions: Identifying emotions

Identifying, assessing and explaining emotions in oneself can occur verbally (i.e., through spoken language) and non-verbally (Salovey & Mayer, 1990). Identifying, assessing and explaining emotions in others can occur through non-verbal perception (e.g., through facial expressions) and empathy (the ability to understand another individual's feelings and to re-experience them for oneself) (Salovey & Mayer, 1990). Branch 1, in the four-branch ability model of EI, the perception of emotions involves the ability to recognise and identify emotion in others' facial and postural expressions through non-verbal perception as well as through expressions of emotion in the face and voice (Mayer et al., 2004). In terms of Pugh's (2008) theoretical framework of EI, this component is related to the section of recognising or identifying our own feelings or emotions and the section of recognising or identifying the feelings or emotions of others. Identifying one's emotions was one of the five EI variables or dimensions used in Mathew and Gupta's (2015) study on the relationship between transformational leaders and emotional intelligence. The ability to accurately identify emotions forms part of the description of EI (Mayer et al., 2003; Mayer et al., 2004; Mayer et al., 2008) and features in the definition of EI as the ability to discriminated among emotions (Salovey & Mayer, 1990), as discussed earlier.

Self-awareness: Understanding emotions

Self-awareness is a self-management skill of EI (Goleman, 2004). Self-awareness denotes having a profound understanding of one's emotions, strengths, weaknesses, needs, and motivations which leads to an individual being honest and not overly critical or unrealistically hopeful (Goleman, 2004). Individuals with a high degree of self-awareness can recognise how their feelings and emotions affect them, others and how it influences their job performance (Goleman, 2004). Goleman (1998, 318) defines self-awareness as "Knowing what we are feeling in the moment, and using those preferences to guide our decision making, having a realistic assessment of our own abilities and a well-grounded sense of self-confidence". Branch 3, in the four-branch ability model of EI, the understanding of emotion, involves the ability to analyse emotions, describe and plan for their possible trends over time and to understand their outcomes all of which includes language and thought development (Mayer et al., 2004). Understanding other's emotions was one of the five EI variables or dimensions used in Mathew and Gupta's (2015) study. The ability to understand emotions and emotional meanings and to prove information forms part of the description of EI (Mayer et al., 2003; Mayer et al., 2008), as previously discussed.

Self-regulation: Managing emotions

Self-regulation is a self-management skill of EI (Goleman, 2004). Self-regulation is based on the notion that biological impulses and messages drive emotions. This means that we cannot avoid them, rather we can only control and manage them through ongoing inner conversations (i.e., self-regulation) (Goleman, 2004). Goleman (1998, 318) defines self-regulation as "Handling our emotions so that they facilitate rather than interfere with the task at hand; being conscientious and delaying gratification to pursue goals; recovering well from emotional distress". Regulating mood or emotions in oneself is, thus, often autonomic, for example, one does not make a conscious decision to be sad during a tragedy or tragic event (Salovey & Mayer, 1990). Regulating emotions in others are based on the argument that individuals often behave (e.g., actors) or dress (e.g., interviewees) in a certain manner to elicit certain favourable impressions or emotions in others (Salovey & Mayer, 1990). Goleman (2004) argued that individuals engaging in internal conversations (i.e., controlling and managing emotions) still feel negative moods and emotional impulses, just like everybody else. However, they find ways to control these moods and impulses, they make choices about reactions to such emotions while in the middle of a crisis and even find effective ways to channel these emotions into useful emotions (e.g., different approaches to show anger) (Goleman, 2004; Orme, as cited in Ergur, 2009). Branch 4, in the four-branch ability model of EI, the management of emotions, involves personality or individual goals and self-knowledge (Mayer et al., 2004). In terms of Pugh (2008) this component is related to the section of managing our own feelings or emotions effectively. Managing emotions was one of the five EI variables or dimensions used in Mathew and Gupta’s (2015) study. Regulating emotions forms part of the description of EI (Mayer et al., 2003; Mayer et al., 2004; Mayer et al., 2008; Vesely et al., 2013) and features in the definition of EI as the ability to monitor one's own and others' emotions (Salovey & Mayer, 1990), as discussed earlier.

Utilising emotions in an adaptive manner: The facilitation of emotions

Utilising emotions in an adaptive manner include flexible planning (e.g., mood swings or people experiencing mood swings will generate more future plans or possibilities), creative thinking (e.g., emotions can assist in problem-solving), redirected attention (e.g., redirecting attention when a powerful emotion occur), and motivation (e.g., anxiety about a test can motivate an individual to study harder) (Salovey & Mayer, 1990). Branch 2, in the four-branch ability model of EI, facilitation, involves capacity of emotions to assist cognition, problem-solving and planning (Mayer et al., 2004). In terms of Pugh (2008) this component is related to the section those actions that are taken to account for the feelings or emotions of others. The ability to acutely to retrieve emotions and emotional information and to reason about emotions in order to enhance thought forms part of the description of EI (Mayer et al., 2004; Mayer et al., 2008) and features in the definition of EI as the ability to use emotional information to guide one's thinking and actions (Salovey & Mayer, 1990).

Motivation

Motivation is a self-management skill of EI (Goleman, 2004). According Goleman (1998) motivation involves utilising ones’ deepest preferences to move and guide one towards certain goals as well as to assist one in improving and persevering in the face of frustrations or setbacks. Motivation, further, denotes a passion to work for purposes that go beyond a big salary (i.e., money) or status (i.e., impressive title), such as motivated by the desire to achieve for the sake of achievement (Goleman, 2004; Mathew & Gupta, 2015). People who are highly motivated will pursue all goals with energy and persistence (Goleman, 2004). Internal motivation was one of the five EI variables or dimensions used in Mathew and Gupta’s (2015) study.

Empathy

Empathy, in terms of EI, relates to an individual's ability to manage relationships with others (Goleman, 2004). Goleman (2004) argued that empathy is the most recognised component or dimension of EQ. Empathy involves sensing, recognising and identifying others' feelings and emotions, thoughtfully considering everybody's feelings (e.g., during decision making processes), the ability to understand the emotional character or makeup of other people, treating others according to their emotional reactions, and building rapport with a diversity of people (Goleman, 1998; Goleman, 2004; Mayer et al., 2008). Empathy was one of the five EI variables or dimensions used in Mathew and Gupta's (2015) study.

Social skills

Social skills, in terms of EI, relates to an individual's ability to manage emotions in relationships with others, to accurately read social cues and situations, to interact with others smoothly. Social skills can be utilised to persuade, lead, negotiate and settle disputes (Goleman, 1998; Goleman, 2004). Goleman (2004) argued that social skill is the one component or dimension that is a result of the other dimensions of EI.

EI is crucial for both work and life success (Alon & Higgins, 2005; Dabke, 2016; Mayer et al., 2004). EI is linked to strong and outstanding on the job performance (Goleman, 2004). When calculating the ratio of technical skills, intelligence or cognitive abilities (i.e., IQ) and EI as the three most important components of excellent job performance, EI was found to be twice as important as the other two components for jobs at all levels (Goleman, 2004). EI also plays a role in terms of teaching since individuals with high levels of EI will be drawn to occupations that involve a high degree of social interactions, such as teaching and counselling (Mayer et al., 2004).

2.8.3.3 Emotionally intelligent teachers

Socially and emotionally competent teachers are important for the following reasons:

- they can manage their behaviour (even when they are emotionally aroused),
- they develop supportive and encouraging relationships with their learners, they identify and understand the emotions of others,
- they have a realistic grasp of their abilities, they can recognise their own emotional strengths and weaknesses,
- they design learning lessons that build on the learners' strengths and abilities,
- they can regulate their own emotions in such a way that they can facilitate positive classroom outcomes without compromising their own health (e.g., avoiding burnout), they are aware of how their emotional expressions and behaviours affect their interactions and relationships with others,
- they establish and implement behavioural guidelines that promote intrinsic motivation,

- they coach and teach their learners how to behave during conflict situations,
- they themselves know how to navigate a conflict situation,
- they encourage cooperation among learners,
- they act as a role model displaying respectful and appropriate communication and prosocial behaviour,
- they respect others, and
- they take full responsibility for their decisions and actions (Jennings & Greenberg, 2009).

Teachers with a high level of EI will be more successful in dealing with or managing two learners who are fighting, they will be more aware of a learner who is feeling alienated and will be able to assist this learner regain entry into a group, they will be able to assist learners adapt to social dynamics within the classroom, they are more effective in fostering stronger teacher-student communication, they cope better with stress and conflict; they building a more positive school environments, and they attain academic success (Birol et al., 2009).

The qualities that an EI teacher should have include, spending energy to create a positive emotional classroom climate, paying attention to (i.e., planning) the learning content and teaching methods, recognising and working with the feelings and emotions of oneself and of one's learners, employing listening skills (e.g., reflecting feelings, asking questions to ensure they understand what the learners said, listing to facts and feelings, reading body language) with individuals and groups, dealing with and managing learners' expectations, possessing a well-developed self-awareness, taking time to understand their learners feelings and emotions, and empathising with learners (Ergur, 2009). Perry and Ball (2008) found four dimensions or factors that describe EI teachers, namely the willingness or readiness to receive positive feedback; identify and managing negative emotions; reflecting on these negative emotions or situations and adopting coping or avoiding strategies for future use; and the ability to management oneself in any teaching situation.

In terms of the components of EI, socially and emotionally competent teachers can identify and recognise their own emotions and emotional patterns (i.e., identifying emotions) as well as how to use their emotions to motivate learning in themselves and in their learners (i.e., the facilitation of emotions and motivation) (Jennings & Greenberg, 2009). There are three levels of self-awareness (i.e., understanding emotions) that a teacher needs to develop, they are, awareness of one's feelings and emotions with regard to teaching, awareness of one's values and attitudes as a teacher, and awareness of one's teacher behaviours as well as how others see these behaviours (Mortiboys, as cited in Ergur, 2009). Self-awareness is a very important dimension or component of EI for teachers in order for teachers to become effective and it assists the teacher to cope with the emotional demands of teaching (Friedman, 2014; Jennings & Greenberg, 2009). In terms of non-verbal communication, the teacher's body language can affect the learners' feelings, responses and behaviours towards learning and the teacher self (i.e., identifying emotions) and, as a result, teachers should be attentive of their non-verbal communication while teaching (i.e., understanding emotions) (Ergur, 2009). Teachers need to read their learners' body language (non-verbal communication), such as facial expressions; the movements and placements of their learners' arms, hands and legs; the sound and pitch of the learners' voice; and the body posture, in order to identify their learners' emotions (i.e., identifying emotions) (Ergur, 2009).

During a particular teaching moment or situation (e.g., getting angry) firstly teachers need to recognise their feelings (i.e., identify emotions). They then have to handle or manage their feelings by considering the interests of both himself /herself and their learners and by choosing the best way to behave (i.e., manage emotions). Lastly, they should take their time to reflect on and hopefully learn from that particular experience or situation (i.e., understanding emotion) (Ergur, 2009). Teachers regulating negative emotions include, for example, controlling anger or frustration during teaching. Teachers regulating positive emotions are, for example, waiting for a private moment after class to tell a learner that they did good work (i.e., managing emotions) (Sutton & Wheatley, 2003). Self-management, just like self-awareness, is a very important dimension or component of EI for teachers to have since it assists the teacher to cope with the emotional demands of teaching (Jennings & Greenberg, 2009). The ability of the teacher to effectively regulate their emotions (i.e., manage emotions) will positively influence their relationships with their learners as well as the classroom climate (Friedman, 2014). The ability of the teacher to effectively regulate their emotions (i.e., managing emotions) is also important in terms of their learners' perception and awareness of their teachers' emotions. According to literature, learners will pick up on the teacher's emotions through, for example, non-verbal communication such as blushing, high voice pitch, yelling and angry facial expressions, which then influences their own emotions, for example, making them feel small, embarrassed or ashamed (Sutton & Wheatley, 2003).

2.9.3.4 Defining trainer-instructor emotional intelligence

Trainer-instructor emotional intelligence, for the purpose of this research study, is defined as *the ability of the trainer-instructor to recognise, monitor and manage their own feelings and emotions (i.e., identifying emotions and managing emotions), to recognise and monitor their trainees' feelings and emotions (i.e., identifying emotions and empathy) and to use this information to guide their own thinking, actions, behaviours and plans, as well as to guide and manage their relationships with others (i.e., understanding emotions, the facilitation of emotions, empathy, motivation, and social skills) within the classroom in order to create an emotionally stable classroom climate that promotes trainee learning and academic success.*

It would appear that *trainer-instructor emotional intelligence* can be placed in either the *trainer-instructor competency potential latent variable domain* or the *trainer-instructor competency latent variable* since emotional intelligence focuses on the individual attainments and dispositions as well as behaviours.

Trainer-instructor emotional intelligence is a *trainer-instructor competency latent variable*, based on the following information:

- Goleman (1995) defined it as "emotional competence"
- Ability EI that is concerned with emotion-related cognitive abilities, such as reasoning and problem-solving within an emotional domain (Austin, 2010; Mavroveli & Sánchez-Ruiz, 2011; Petrides et al., 2007)
- As well as some elements in self-awareness (i.e., understanding emotions), self-regulation (i.e., managing emotions), utilising emotions in an adaptive manner (i.e., the facilitation of emotions), and motivation.

The current study, however, argued that *trainer-instructor emotional intelligence* is a *trainer-instructor competency potential latent variable*. The argument was based on the idea that before mechanisms and manifestations can be utilised to monitor one's own feelings and emotions, before emotions can be used to guide ones' thinking, behaviours and actions, and before emotional information can be processed for reasoning and problem-solving, one has to (a) understand what emotion is and (b) one has to recognise, assess and discriminate between the different emotions. Therefore, the trainer-instructor first have to possess the knowledge of emotions and feelings (i.e., attainments) and the emotional, social and empathetic skills (i.e., dispositions) before the trainer-instructor can engage in emotional behaviours. Without these person-centred individual attainments and dispositions the individual will not be able to display the relevant emotional intelligent behaviours.

2.9.3.5 The influences of trainer-instructor emotional intelligence

In terms of interpersonal relationships, emotions play a central role (Crawford, 2007; Dabke, 2016). Thus, making emotions an important concept to understand and manage for teachers, leaders and teacher leaders (Broli et al., 2011; Celik & Karakus, 2012; Corcoran & Tormey, 2013; Crawford, 2007; Glasø & Einarsen, 2006; Hargreaves, 1998). The head teacher or educational leader needs to understand the inter-connectedness between his/her own feelings, emotions and the affective relationships within the school (Crawford, 2007). As a result, there is an argument in literature that states that school leaders, or leaders within the educational environment, need to be emotionally intelligent in order to acknowledge and understand the emotions of their learners and co-workers (Benson et al., 2013; Mavroveli & Sánchez-Ruiz, 2011). Emotions (EI) and leadership have become important concepts in the educational leadership field (Benson et al., 2003; Crawford, 2007). EI plays a crucial role in educational or academic leaders' effectiveness in enhancing their teaching and their learners' learning (Scott et al., 2008). Not only do emotions play a part in relationships, but unmonitored emotional stress, ineffective and poor interpersonal relationships and personal stagnation can have a negative influence on the quality of teaching that the school leader provides to its learners (Singh, Manser, & Mestry, 2007). School leaders must be able to manage their emotions under stress and use emotional information to create successful academic work environments (Benson et al., 2003; Singh et al., 2007).

Transformational leadership (or transformational behaviours) is linked to the most effective type of leadership (Cavazotte, Moreno, & Hickmann, 2012; Dabke, 2016; Foster & Roche, 2014; Friedman, 2014). Charisma, a dimension of transformational leadership, is argued to be viewed as the leaders' ability to regulate his/her followers' emotions, which is a component of EI (Salovey & Mayer, 1990). Walter and Bruch (2009) argued that EI is an antecedent for charismatic leaders and studies have found that charismatic leadership overlap significantly with transformational leadership. It can thus be argued that EI will also be seen as an antecedent for transformational leaders. Studies have found that leaders high on EI is positively associated with transformational leadership behaviour (Walter & Bruch, 2009) or that EI[55,56] is positively associated with transformational leaders (Foster & Roche, 2014; Mathew & Gupta, 2015; Rosete & Ciarrochi, 2005; Walter, Cole, & Humphrey, 2011). EI is, thus, an antecedent for transformational leaders and leadership (Walter & Bruch, 2009; Walter et al., 2011). This statement is corroborated by literature, in that transformational leadership is emotionally laden, for example, transformational leaders exhibit empathy and self-awareness (Foster & Roche, 2014; Mathew & Gupta, 2015; Yukl, 2013). Empathy is seen as the most dependable antecedent of transformational leadership (Mathew & Gupta, 2015).

In terms of the components of EI, in order to be an effective transformational leader the leader needs to read their own and their group's or followers' mood and emotions or be sensitive to his/her followers' emotional needs and how they feel (i.e., identifying emotions), the leader should be able to identify with his/her followers' emotions (i.e., empathy), the leader should be able to manage the emotions and feelings of his/her followers (i.e., manage emotions), the leader should have the ability to control and his/her mood and emotions as required by the sitution (i.e., manage emotions and utilise emotions effectively), the leader should have the ability to self-motive and influence events in his/her life (i.e., motivation), the leader should have clear emotional awareness, be able to predict how his/her followers will react emotionally to certain situations and should be able to understand how others feel (i.e., understand emotions), and the leader should be able to choose the apporpriate stragties to motivate, inspire and emotionally stimulate his/her followers to achieve a vision (i.e., manage emotions, the facilitation of emotions and motivation) (Dasborough & Ashkanasy, 2002; Foster & Roche, 2014; Glasø & Einarsen, 2006; Mathew & Gupta, 2015).

[55] Foster and Roche (2014) found that ability EI was strongly correlated with transformational leadership behaviours. They also found that self-reported (trait) EI moderated the relationship between ability EI and transformational leadership, but that future research will need to test the interaction effect between self-reported (trait) EI and ability EI on transformational leadership.
[56] Mathew and Gupta (2015) found that each dimension of EI (identifying emotions, understanding emotions, managing emotions, intrinsic motivation and empathy) correlated statistically significantly and positively with each dimension of transformational leadership (inspiring to go beyond, integrity demonstration, creating a shared vision and building relationships) as well as the overall concept of EI correlated statistically significantly and positively with the overall concept of transformational leadership.

It can, thus, be argued that a trainer-instructor's EI will positively influence both elements of *transformational trainer-instructor leadership*, (i.e., teacher leadership and transformational leadership). For example, if a trainer-instructor has the ability to identify and monitor the emotions of their trainees or students (i.e., identifying emotions and empathy) during their lessons they will be able to control the emotional level in their classroom. Having a stable emotional classroom allows the trainer-instructor to stimulate their trainee and students' learning interests and needs only (i.e., intellectual stimulation and *stimulating interest and involvement*). Stated differently, stimulating the interest of and encouraging trainees or students who are anxious or nervous to participate in class discussions (i.e., intellectual stimulation and *stimulating interest and involvement*) will not be successful. Trainees or students will not respect or trust their trainer-instructor, experience feelings of psychological safety or feel that the trainer-instructor is fair (i.e., idealised influence or charisma and *fostering psychological safety and fairness*) when the trainer-instructor cannot control his/her own emotions (e.g., emotional outbursts of anger).

Hypothesis 27

In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor emotional intelligence* will positively influence *transformational trainer-instructor leadership*.

2.10 SUBSTANTIVE HYPOTHESES OF THE FULL WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR COMPETENCY MODEL

The following hypotheses, developed during the theoretical discussion in the aforementioned literature review, form the nomological network of latent variables that comprise the full Wessels-Van der Westhuizen affirmative development trainer-instructor competency model.

Hypothesis 2[57]: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model[58] it is hypothesised that *mastery learning goal orientation* will positively influence *learning motivation*.

Hypothesis 3: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *learning motivation*.

Hypothesis 4: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *mastery learning goal orientation*.

[57] Where hypothesis 1 indicates the overarching substantive research hypothesis.

[58] The phrase *in the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that* is used on purpose to acknowledge that all hypotheses postulate that a specific effect explains variance in a specific endogenous latent variable when controlling for all other effects that have been hypothesised to affect the endogenous latent variable in question.

Hypothesis 5: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning motivation*.

Hypothesis 6: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *mastery learning goal orientation*.

Hypothesis 7: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *mastery classroom goal structure* and *learning motivation* is mediated by *mastery learning goal orientation.*

Hypothesis 8: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *inspiring professional vision*.

Hypothesis 9: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *academic self-efficacy*.

Hypothesis 10: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *learning motivation*.

Hypothesis 11: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *mastery classroom goal structure*.

Hypothesis 12: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *learning climate*.

Hypothesis 13: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning climate*.

Hypothesis 14: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *learning climate*.

Hypothesis 15: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *inspiring professional vision*.

Hypothesis 16: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *clarifying learning conceptions and requirements* will positively influence *accuracy of role perceptions*.

Hypothesis 17: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *enhancing student self-efficacy* will positively influence *academic self-efficacy*.

Hypothesis 18: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *promoting a mastery climate* will positively influence *mastery classroom goal structure.*

Hypothesis 19: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *facilitating clarity and understanding* will positively influence *structure in the learning material.*

Hypothesis 20: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding*.

Hypothesis 21: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* will positively influence *learning motivation.*

Hypothesis 22: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *transformational trainer-instructor leadership.*

Hypothesis 23: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *trainer-instructor expert.*

Hypothesis 24: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *structure in the learning material.*

Hypothesis 25: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that the effect of *trainer-instructor expert* on *structure in the learning material* will be moderated by *facilitating clarity and understanding*.

Hypothesis 26: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *providing formative feedback.*

Hypothesis 27: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor emotional intelligence* will positively influence *transformational trainer-instructor leadership*.

These hypotheses, together, form the full Wessels-Van der Westhuizen trainer-instructor competency model, depicted in Figure 2.7

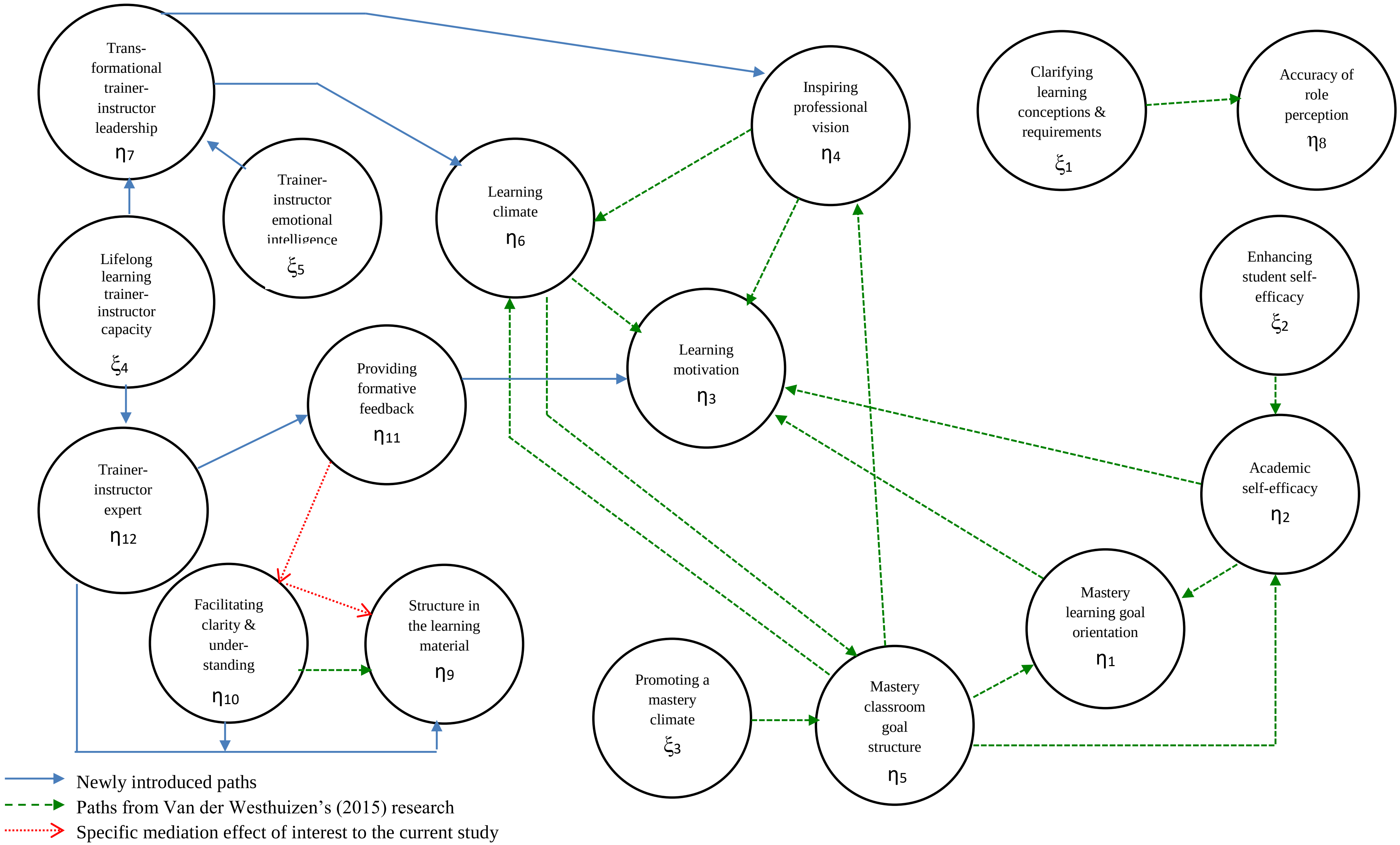


Figure 2.7. **The full Wessels-Van der Westhuizen affirmative development trainer-instructor competency model**

CHAPTER 3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

The purpose of this research study was to investigate and attempt to answer the research initiating question, *"Why is there variance in the performance of affirmative development trainer-instructors?"* The research initiating question prompted various subsequent research questions asking, in essence, *what constitutes affirmative development trainer-instructors' performance? The research initiating question in essence asked which trainer-instructor competency potential latent variables and training situational latent variables determine the level of competence that trainer-instructors achieve on the trainer-instructor competencies and, indirectly through those, the level of competence they achieve on the outcome latent variables, as well as how are these trainer-instructor competency potential latent variables, training situational latent variables, competency latent variables and outcome latent variables structurally related or how do they influence each other?*

In order to investigate the various research questions, and ultimately answer the research initiating question, theorising was utilised to develop a structural model, presented in Figure 2.7. The model identifies and depicts the hypothesised critical *trainer-instructor competency potential latent variables* influencing the *trainer-instructor competency latent variables* and *training situational latent variables*, that in turn, influence the *trainer-instructor performance outcome latent variables*. The full Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, presented in Figure 2.7, complements the existing Van der Westhuizen (2015) affirmative development trainer-instructor competency model.

Should empirical support for the hypothesised structural pathways be obtained, then the model will prove to be valuable to Human Resource Management (HRM) (Van der Westhuizen, 2015) in that it will be able to assist HRM in improving the development and implementation of affirmative development interventions, such as affirmative development training and development programmes. This model can provide assistance in the form of valuable information on how the trainer-instructors can influence and enhance the learning process underlying trainee learning performance (Van der Westhuizen, 2015). It can also be argued, that this model might be able to assist with the selection of affirmative development trainer-instructors. For example, the current *trainer-instructor competency potential latent variables*, *trainer-instructor competency latent variables*, *training situational latent variables* and *trainer-instructor outcome latent variables* might be utilised as predictors in a combined construct- and content-orientated approach for the selection of trainer-instructors. However, future research will need to research and empirically test this latter argument.

The structural model can, however, only be considered valid and permissible if the whole hypothesised model at least closely fits, or is consistent with, the available empirical data (Diamantopoulos & Siguaw, 2000; Babbie & Mouton, 2001). The validity and credibility of the claim that the current research study will reach on the validity of the model will depend on the methodology used to arrive at the verdict (Burger, 2012). Research methodology serves the epistemic ideal of science since it includes the methods, techniques and procedures that are utilised during the process of implementing a research design or plan (Babbie & Mouton, 2001). These methods, techniques and procedures are chosen so as to maximise the objectivity of the methodology. Scientific methodology is objective in that it consciously and purposefully strives to minimise error (Babbie and Mouton, 2001).

Before the latent variables, in the trainer-instructor competency model, can be operationalised and the structural model empirically tested, detailed descriptions and motivation of the methodological choices that were made had to be given. This allows knowledgeable peers to evaluate the rationality of the methodological choices made. This chapter, therefore, discussed the substantive research hypotheses, the research design, statistical hypotheses, statistical analysis techniques, sampling and measuring instruments in sufficient detail to allow knowledgeable peers to assess whether appropriate methodological choices have in fact been made.

3.2 THE REDUCED WESSELS-VAN DER WESTHUIZEN AFFIRMATIVE DEVELOPMENT TRAINER-INSTRUCTOR COMPETENCY MODEL

The objectives of this research study were twofold, namely, to elaborate the Van der Westhuizen (2015) affirmative development trainer-instructor competency model into the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model through theorising and then to empirically test this competency model. The aim of the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model was to identify the *trainer-instructor competency potential latent variables*, additional *trainer-instructor competency latent variables*, the *training situational latent variables*, the *trainer-*

instructor outcome latent variables and to structurally map the manner in which these latent variables are causally related in and across the four competency model domains.

Theorising in the literature study conducted in Chapter 2 resulted in a rather extensive Wessels-Van der Westhuizen affirmative development trainer-instructor competency model [59]. However, when conducting research, one needs to consider the practical feasibility of empirically testing the resultant overarching substantive research hypothesis in a study of this nature. The practical feasibility firstly lies in the burden that the composite research questionnaire will impose on the research participants, in terms of questionnaire length, cognitive load or overload, possible fatigue and time consumption (Van der Westhuizen, 2015). Fatigue in participants may lead to a reduction in cognitive functioning which, in turn, may lead to systematic and/or random errors in reading or answering the questionnaire items. The systematic errors could result in a response bias which may impact the validity of the obtained measures. The random errors will, in turn, lower the reliability of the measures obtained in the study. Consequently, the current study chose to reduce the hypothesised Wessels-Van der Westhuizen-Wessels affirmative development trainer-instructor competency model. An alternative methodological option was to build planned missingness into the data collection procedure. This would have involved a data collection design in which specific items are randomly omitted from the survey questionnaire for subsets of the study sample (Graham, 2009; Graham, Taylor, Cumsille, & Olchowski, 2006; Raghunathan & Grizzle, 1995). Due to the planned missingness of these data collection designs the missing data may legitimately be regarded as truly missing at random (Schafer & Graham, 2002). The fact that the data is missing at random, in turn, then would have allowed the use of a maximum likelihood multiple imputation procedure to impute the missing values in the total data set. This approach, however, requires computational power of the software as well the machines used to run the software that might not currently be available. In addition, a substantially larger sample size would be required due to the larger number of freed parameters in the full model.

In an attempt to reduce the current large structural model and to specifically focus on hypotheses involving the newly introduced *trainer-instructor competency potential latent variables* and *trainer-instructor competency latent variables*, that have never before been

[59] This should not be used as criticism against the study. The research initiating question was purposefully formulated as an open-ended question so as to enforce unbridled theorising. The phenomenon of interest (trainer-instructor performance) is complexly determined. The complexity manifests itself in the extensiveness of the nomological network of latent variables that constitute and determine trainer-instructor performance as well as the richness with which the latent variables comprising the net are structurally interrelated. Through theorising in response to the research initiating question therefore invariably has to result in extensive structural models.

empirically tested, the decision was made to remove all the trainer-instructor latent variables that are not directly influenced by the newly introduced *trainer-instructor competency potential latent variables* or *trainer-instructor competency latent variables*.

The following latent variables, not directly influenced by any of the newly introduced trainer-instructor latent variables, were consequently removed:

- learning competency potential latent variables: *academic self-efficacy* and *mastery learning goal orientation*;
- trainer-instructor outcome latent variable: *accuracy of role perception*;
- training situational latent variable: *mastery classroom goal structure*;
- trainer-instructor competency latent variables: *clarifying learning conceptions and requirements*, *enhancing student self-efficacy*, and *promoting a mastery climate*.

As a result, the following hypotheses were automatically removed:

Hypothesis 2: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery learning goal orientation* will positively influence *learning motivation*.

Hypothesis 3: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *learning motivation*.

Hypothesis 4: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *academic self-efficacy* will positively influence *mastery learning goal orientation*.

Hypothesis 6: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *mastery learning goal orientation*.

Hypothesis 7: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *mastery classroom goal structure* and *learning motivation* is mediated by *mastery learning goal orientation.*

Hypothesis 8: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *inspiring professional vision*.

Hypothesis 9: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *academic self-efficacy.*

Hypothesis 11: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *mastery classroom goal structure*.

Hypothesis 12: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *mastery classroom goal structure* will positively influence *learning climate*.

Hypothesis 16: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *clarifying learning conceptions and requirements* will positively influence *accuracy of role perceptions*.

Hypothesis 17: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *enhancing student self-efficacy* will positively influence *academic self-efficacy*.

Hypothesis 18: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *promoting a mastery climate* will positively influence *mastery classroom goal structure.*

Facilitating clarity and understanding was retained in the structural model, although it was not directly influenced by any newly introduced trainer-instructor latent variables. It is, however, indirectly involved with two newly developed trainer-instructor latent variables. It was hypothesised that the relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding* (i.e., hypothesis 20). It was also hypothesised that *facilitating clarity and understanding* will have a moderating effect on the relationship between *trainer-instructor expert*, a newly introduced *trainer-instructor competency potential latent variable*, and *structure in the learning material* (i.e., hypothesis 25).

In conclusion, the complete list of trainer-instructor latent variables that were retained in the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, include:

- learning competency potential latent variable: *learning motivation*;
- trainer-instructor outcome latent variable: *inspiring professional vision*;
- training situational latent variables: *learning climate* and *structure in the learning material*;
- trainer-instructor competency latent variables: *transformational trainer-instructor leadership, providing formative feedback*, and *facilitating clarity and understanding*;
- trainer-instructor competency potential latent variables: *lifelong learning trainer-instructor capacity*, *trainer-instructor expert*, and *trainer-instructor emotional intelligence.*

The remaining hypotheses, included in the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, are:

Hypothesis 5: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning motivation*.

Hypothesis 10: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *learning motivation*.

Hypothesis 13: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning climate*.

Hypothesis 14: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *learning climate*.

Hypothesis 15: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *inspiring professional vision*.

Hypothesis 19: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *facilitating clarity and understanding* will positively influence *structure in the learning material.*

Hypothesis 20: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding*.

Hypothesis 21: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* will positively influence *learning motivation.*

Hypothesis 22: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *transformational trainer-instructor leadership.*

Hypothesis 23: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *trainer-instructor expert.*

Hypothesis 24: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *structure in the learning material.*

Hypothesis 25: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that the effect of *trainer-instructor expert* on *structure in the learning material* will be moderated by *facilitating clarity and understanding*.

Hypothesis 26: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *providing formative feedback.*

Hypothesis 27: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor emotional intelligence* will positively influence *transformational trainer-instructor leadership*.

The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model is depicted in Figure 3.1 below.

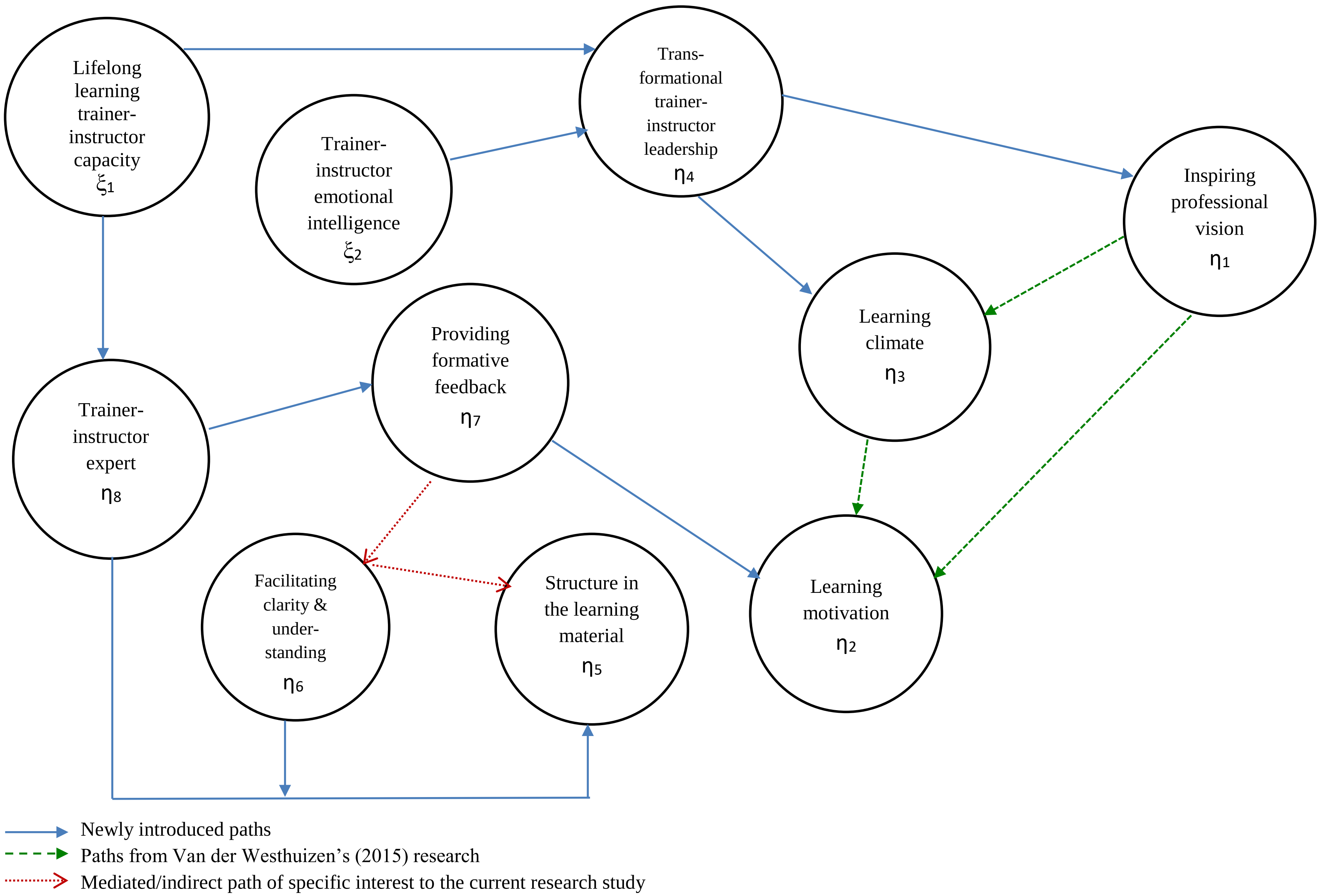


***Figure 3.1*. The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model**

3.3 SUBSTANTIVE RESEARCH HYPOTHESES

Through theorising, an answer to the research initiation question was derived and presented as the overarching substantive hypothesis. The overarching substantive research hypothesis (Hypothesis 1) for this research is that the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model depicted in Figure 3.1 provides a valid description of the psychological mechanism that regulates trainer-instructor performance. Stated differently, the overarching substantive research hypothesis is that reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model provides a valid account of the manner in which the *trainer-instructor competency potential latent variables* affect the *training situational latent variables* and the *trainer-instructor competency latent variables* which then influences the *trainer-instructor competency outcome latent variable* and the *learning competency potential latent variable* that, in turn, also influence each other.

The overarching substantive research hypothesis (Hypothesis 1) was dissected into the following 15 more detailed, path-specific substantive research hypotheses:

Hypothesis 2: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning motivation*.

Hypothesis 3: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* will positively influence *learning motivation*.

Hypothesis 4: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* will positively influence *learning climate*.

Hypothesis 5: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *learning climate*.

Hypothesis 6: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* will positively influence *inspiring professional vision*.

Hypothesis 7: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *facilitating clarity and understanding* will positively influence *structure in the learning material.*

Hypothesis 8: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding*[60].

Hypothesis 9: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* will positively influence *facilitating clarity and understanding*[61].

Hypothesis 10: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* will positively influence *learning motivation.*

Hypothesis 11: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *transformational trainer-instructor leadership.*

Hypothesis 12: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* will positively influence *trainer-instructor expert.*

Hypothesis 13: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *structure in the learning material.*

Hypothesis 14: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that the effect of *trainer-instructor expert* on *structure in the learning material* will be moderated by *facilitating clarity and understanding*.

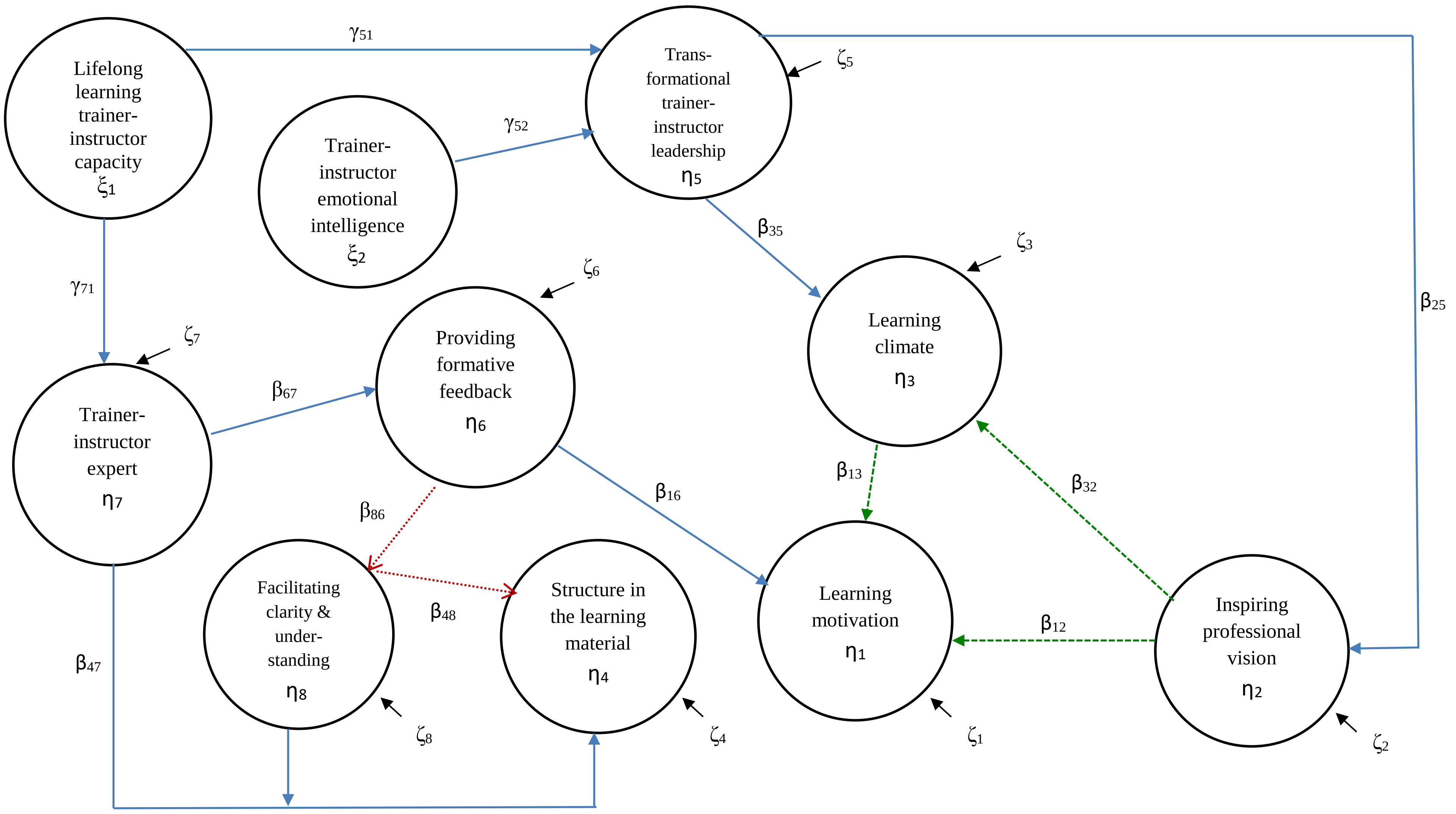
[60] Hypothesis 8 is, in effect, developed based on two sub hypotheses: that *providing formative feedback* will positively influence *facilitating clarity and understanding* (hypothesis 9) and that *facilitating clarity and understanding*, in turn, will positively influence *structure in the learning material* (hypothesis 7).

[61] Hypothesis 9 was not formally formulated as a hypothesis in its own right during the literature study; rather it was formulated as part of the mediating effect of hypothesis 8.

Hypothesis 15: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* will positively influence *providing formative feedback.*

Hypothesis 16: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor emotional intelligence* will positively influence *transformational trainer-instructor leadership*.

The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency or structural model is depicted in the form of a path diagram (structural model), presented in Figure 3.2 below, as well as depicted in the form of a matrix equation, see Figure 3.3.



Newly introduced paths

Paths from Van der Westhuizen's (2015) research

Mediated/indirect path of specific interest to the current research study

Ψ is defined as a diagonal matrix.

All ϕ_{ij} are freed to be estimated but for ϕ_{11} and ϕ_{22}

***Figure 3.2.* The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor performance structural model**

$$
\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix}
=
\begin{pmatrix}
0 & \beta_{12} & \beta_{13} & 0 & 0 & \beta_{16} & 0 & 0 \\
0 & 0 & 0 & 0 & \beta_{25} & 0 & 0 & 0 \\
0 & \beta_{32} & 0 & 0 & \beta_{35} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \beta_{47} & \beta_{48} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \beta_{67} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \beta_{86} & 0 & 0
\end{pmatrix}
\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix}
+
\begin{pmatrix}
0 & 0 & 0 \\
0 & 0 & 0 \\
0 & 0 & 0 \\
0 & 0 & \gamma_{43}{}^{62} \\
\gamma_{51} & \gamma_{52} & 0 \\
0 & 0 & 0 \\
\gamma_{71} & 0 & 0 \\
0 & 0 & 0
\end{pmatrix}
\begin{bmatrix} \xi_1 \\ \xi_2 \\ \xi_3{}^{63} \end{bmatrix}
+
\begin{bmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \\ \zeta_4 \\ \zeta_5 \\ \zeta_6 \\ \zeta_7 \\ \zeta_8 \end{bmatrix}
$$

Ψ is defined as a diagonal matrix.

Figure 3.3. **The reduced Van der Westhuizen-Wessels affirmative development trainer-instructor performance matrix equation**

This matrix equation (Figure 3.3) can also be reduced to the following matrix equation:

$$\boldsymbol{\eta} = \mathbf{B}\boldsymbol{\eta} + \boldsymbol{\Gamma}\boldsymbol{\xi} + \boldsymbol{\zeta}$$

---

[62] Γ_{43} represent the influence of the interaction variable (ξ_3) (i.e., $\eta_8*\eta_7$) on *structure in the learning material* (η_4).

[63] ξ_3 represent the moderating influence of *facilitating clarity and understanding* (η_8) on the relationship between *trainer-instructor expert* (η_7) and *structure in the learning material* (η_4). It therefore represents the product of η_8 and η_7.

3.4 RESEARCH DESIGN

The overarching substantive research hypothesis (aforementioned Hypothesis 1) makes a specific claim with regard to the hypothesised reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model. The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, as depicted in Figure 3.1, hypothesised specific structural relations, or pathways, between the various *trainer-instructor competency potential latent variables*, *trainer-instructor competency latent variables*, *training situational latent variables*, the *trainer-instructor outcome latent variable* and the *learning competency potential latent variable.*

The process of scientific inquiry involves making observations and interpreting of what was observed. However, before one can observe and analyse one will need a plan which will include a detailed account of how, when and what will be observed (Babbie & Mouton, 2001). The research design addresses this planning need (Babbie & Mouton, 2001; Kerlinger, 1986). The research design is a specific plan, structure or strategy of how the researcher intends and expects to conduct the research process with the purpose of investigation hypotheses. In order to obtain answers to research questions and to control variance[64] (Babbie & Mouton, 2001; Kerlinger, 1986).

The first step in testing the overarching substantive research hypothesis was, thus, to decide on a research design (Kerlinger & Pedhazur, 1973; Pretorius, 2014). There are two broad types of empirical research designs to choose from depending on the type of research being conducted (i.e., depending on the research initiating problem or questions), namely, experimental designs and non-experimental (also known as *ex post facto* designs) (Babbie & Mouton, 2001; Kerlinger, 1986). In an *experimental research design* the researcher can randomly assign subjects to groups and treatments to groups and the researcher can experimentally manipulate, via the treatments, the independent variables to systematically vary across the groups. The researcher can thus observe the dependent variable(s) for variation related to the manipulation of the independent variable (Kerlinger, 1986). In a *non-experimental research design* the researcher has no direct control over the variables in the sense that the researchers cannot manipulate variables or assign subjects or treatments at random. The researcher can thus only observe the dependent and independent variables (Kerlinger, 1986).

It is imperative, however, that researchers have a balanced understanding and complete knowledge of the strengths and weaknesses of both types of designs. According to Kerlinger and Lee (2000), a non-experimental, or *ex post facto*, research design has three limitations: the inability to manipulate independent variables, characterised by a lack of power to randomise, and they also have the risk of

[64] Controlling variance includes: maximize systematic variance, control extraneous systematic variance and minimise error variance (Kerlinger, 1986).

improper interpretation. Experimental research designs, on the other hand, can be characterised by manipulation, randomisation and control (Austin, Scherbaum, & Mahlman, 2002).

The first limitation, or weakness, of the non-experimental, or *ex post facto*, research design is that the exogenous or independent latent variables cannot be manipulated to different levels (e.g., introversion cannot be experimentally manipulated to differ across learners). In contrast, the strength of the experimental research design is that the independent latent variables can, in fact, be manipulated into levels or conditions (e.g., learner fatigue can be experimentally manipulated to vary across learners by keeping them awake for varying periods of time) (Kerlinger & Lee, 2000). The extent to which causal conclusions can confidently be derived from empirical results depends on the question whether the hypothesis in question was investigated via an experimental design or not. Causal conclusions on causality can only be derived if the exogenous latent variables in the hypothesis had been experimentally manipulated to vary across observations.

The second limitation of the *ex post facto* research design is that the researcher cannot randomly assign subjects or treatments to groups. Instead, the exogenous latent variables (i.e., the presumed or deduced causes of variance in the endogenous latent variables) are measured and participants are assigned to groups based on these measures. The researcher, conducting an *ex post facto* research design, should be made aware of the influence of self-selection bias. The possibility of self-selection occurs when subjects can 'select themselves' into groups based on characteristics other than those the researcher is interested in. Also, the researcher assumes that the variables have been exposed to naturally occurring 'manipulations'. The researchers have no first-hand knowledge of the naturally occurring treatments that subjects were exposed to prior to any research study. In contrast, the strength of the experimental research design is that the researcher can exercise control by randomisation. Subjects can, in fact, be assigned to groups at random or treatments can be assigned to groups at random (Kerlinger & Lee, 2000; Stone-Romero, 2002).

The third and last limitation of the *ex post facto* research design is the risk of improper interpretations. This refers to the fact that the nature of the *ex post facto* research design prevents the drawing of causal inferences from significant path coefficients, as correlations and differences in group means in an *ex post facto* design do not imply causation (Kerlinger & Lee, 2000). To corroborate a causal hypothesis proposing a cause-and-effect relationship between two or more variables requires that the variance be induced in the variables hypothesised to be the cause and that concomitant variance be demonstrated in the variables hypothesised to be affected by the cause (Hair et al., 2006). Simply interpreting a difference in means or correlation as indicating a causal relationship between variables, in the absence of the manipulation of the exogenous latent variables, is not warranted and can result in misleading conclusions (Hair et al., 2006; Kerlinger & Lee, 2000; Stone-Romero, 2002). In other words, finding statistically significant correlation coefficients or differences in group means does not imply actual causal influences or that one variable will affect another variable, it simply implies that there is a covariance between the variables involved.

Despite the aforementioned limitations associated with the *ex post facto* research design, it remains a significantly valuable research design. This is due to the fact that the nature of research problems, especially research in the social sciences such as psychology, sociology and education do not lend themselves to experimentation or experimental inquiry as the variables considered in these studies cannot always be manipulated (Kerlinger & Lee, 2000). The aim of an *ex post facto* research design is to discover what happens to the levels or states of one variable when the levels or states of other variables changes (Murray & Thomas, as cited in Du Toit, 2014). However, the aforementioned limitations discussed was carefully considered in an attempt to minimise improper and incorrect interpretations.

The nature of the independent or exogenous latent variables considered for the purposes of this research study do not lend themselves to manipulation and therefore an *ex post facto* research design will be utilised. More specifically, an *ex post facto* correlational research design in which the dependent or endogenous latent variables were causally related to each other (i.e., there are causal relations hypothesises between the endogenous latent variables) and in which each latent variable in the reduced structural model, shown in Figure 3.2, was operationalised in terms of at least two or more indicator variables (assuming a covariance matrix of total p exogenous indicator variables and q endogenous indicator variables) was utilised in order to test the overarching and specific substantive research hypotheses.

Latent variables are man-made concepts and can be more formally defined as those variables whose realisation is hidden from us (Skrondal & Rabe-Hesketh, 2004). More specifically, latent variables are those variables whose presence is hidden from us, but whose realisation (i.e., manifestation or expression) is visible to us in the form of thoughts (C. C. Theron, personal communication, September 26, 2017). In order to measure these latent variables, they have to be operationalised into observed or indicator variables. The researcher obtains measures on the observed variables, at least two observed or indicator variables per latent variable, and calculates the observed covariance matrix (Hair et al., 2006). Estimates for the freed structural and measurement model parameters, or estimate parameters [65], are obtained in an iterative fashion, through the application of structural and measurement models in LISREL (Diamantopoulos & Siguaw, 2000; Theron, 2015a).

[65] Parameters refer to the numerical representation of some of the population characteristics (Hair et al., 2006).

Structural equitation modelling (SEM), which can be conducted via a computer programme or software package such as LISREL[66], was utilised to empirically test complex hypotheses on the relationship between latent variables and between latent variables and indicator variables (Kelloway, 1998; Kline, 2011; Hair et al., 2006). SEM is a family of statistical models that seek to explain the relationships among multiple variables in a research study (Hair et al., 2006). Stated differently, the goal or objective of SEM is to explain the patterns of covariance observed among the variables (Kelloway, 1998).

Ideally, the estimated covariance matrix[67] should fit or reproduce the observed covariance matrix[68] as close as possible (Diamantopoulos & Siguaw, 2000; Kelloway, 1998). If the fitted Wessels-Van der Westhuizen structural model fails to fit the data, thus the parameter estimates fail to accurately reproduce the observed covariance matrix, it can be concluded that the structural model does not provide an acceptable explanation for the observed covariance matrix. Consequently, the relationships hypothesised by the model will not provide an accurate account of the process determining the level of the trainer-instructor's job performance. Stated differently, the psychological mechanism hypothesised to underlie the level of competence that the trainer-instructor achieves on the competencies and outcomes constituting performance does not seem to accurately account for the variance in trainer-instructor performance. However, the opposite is not true. If the fitted or reproduced covariance matrix derived from the parameter estimates closely agrees with the observed covariance matrix it does not imply that the process (portrayed in the structural model) necessarily produced the observed covariance matrix. The fact that a particular mechanism could have produced the observed covariance matrix does not mean that another process (equivalent structural model) has actually given rise to the observed covariance matrix. This latter outcome, or opposite, would not permit the conclusion that the process (portrayed in the structural model) must necessarily be the one that operates to determine the level of job performance that trainer-instructors achieves. It could, in fact, be a different mechanism that causes trainer-instructors to perform well (or less well) during teaching or affirmative development programmes. Support received for the structural model only means that the model can only be regarded as one plausible or permissible account of the process that determines the level of performance that trainer-instructors achieve (Theron, 2015a; Theron, 2016). A close-fitting model (a high degree of fit between the observed and estimated covariance matrices), therefore, only implies that it is indeed permissible to regard the structural model and its parameter estimates as one possible description of the psychological mechanism regulating trainer-instructor

[66] LISREL is not the only computer programme through which SEM can be empirically tested (Kline, 2011). However, it is the most widely used SEM programme and the name is derived from LInear Structural RELations (Hair et al., 2006).
[67] The estimated covariance matrix, $\mathbf{\Sigma}_k$ or $\mathbf{\Sigma}$, is comprised of the predicted covariates between all the *indicator variables* involved in a SEM and based on equations that represent the hypothesised model (Hair et al., 2006).
[68] The observed covariance matrix, **S** or $\mathbf{\Sigma}(\mathbf{\Theta})$, is comprised of the observed variance and covariance's for each measured variable (Hair et al., 2006).

performance and interpret the statistical significance and magnitude of the estimated path coefficients. Due to the *ex post facto* nature of the research design statistically significant path coefficients would not permit one to make causal inferences.

For the purposes of this research study, SEM was utilised to evaluate the validity of the proposed Wessels-Van der Westhuizen affirmative development trainer-instructor competency model via the *ex post facto* correlational design with two or more indicators representing each latent variable in the model. The *ex post facto* correlation design utilised in the current study is depicted schematically in Figure 3.4.

[X_{11}]	..	[X_{1j}]	..	[X_{19}[69]]	Y_{11}	..	Y_{1j}	..	$Y_{1,21}$
[X_{21}]	..	[X_{2j}]	..	[X_{29}]	Y_{21}	..	Y_{2j}	..	$Y_{2,21}$
:	:	:		:	:	:	:		:
[X_{i1}]	..	[X_{ij}]	..	[X_{i9}]	Y_{i1}	..	Y_{ij}	..	$Y_{i,21}$
:	:	:		:	:	:	:		:
[X_{n1}]	..	[X_{nj}]	..	[X_{n9}]	Y_{n1}	..	Y_{nj}	..	$Y_{n,21}$

***Figure 3.4.* The ex post facto correlation design utilised in the current study**

3.5 STATISTICAL HYPOTHESES

The reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model comprises of numerous exogenous (ξ) and endogenous (η) latent variables and proposes specific causal paths between the exogenous and endogenous latent variables, as well as between the endogenous latent variables themselves. SEM is, therefore, the only analysis method that will enable the testing of the proposed structural model as an integrated, complex hypothesis (i.e., Hypothesis 1). The explanation as to why trainer-instructors vary in their level of job performance achieved is not located in any specific point in the structural model. Rather it resides in the whole network of relationships between the latent variables (Van der Westhuizen, 2015). For this reason, the empirical testing of the overarching substantive hypothesis (Hypothesis 1) as an integrated whole was considered imperative. The subsequent statistical hypotheses, derived from Hypothesis 1, were formulated using the conventional LISREL notational system (Jöreskog & Sörbom, 1996).

If the overarching substantive research hypothesis is interpreted to mean that the structural model provides a perfect account of the manner in which the *trainer-instructor competency potential latent variables*, *trainer-instructor competency latent variables*, and *training situational latent variables* affect *trainer-instructor outcome latent variables and the learning competency potential latent*

[69] ξ_1 has 2 indicators, ξ_2 has 3 indicators and ξ_3 has 4 indicators

variable, then the substantive research hypothesis translates into the following structural model exact fit null hypothesis:

H_{0123}[70]$_{a}$: RMSEA = 0[71]

H_{a123a}: RMSEA > 0

If, however, the overarching substantive research hypothesis is interpreted to mean that the structural model provides an approximate or close account of the manner in which *trainer-instructor competency potential latent variables*, *trainer-instructor competency latent variables*, and *trainer-instructor situational latent variables* affect *trainer-instructor outcome latent variables and the learning competency potential latent variable*, then the substantive research hypothesis translates into the following structural model close fit null hypothesis:

H_{0123b}: RMSEA ≤ .05

H_{a123b}: RMSEA > .05

The overarching substantive research hypothesis was separated into 15 detailed, path-specific substantive research hypotheses. These detailed substantive research hypotheses translate into the following path coefficient statistical hypotheses:

Hypothesis 2*[72]*: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* (η_2) will positively influence *learning motivation* (η_1).

H_{0124}: $\beta_{12} = 0$

H_{a124}: $\beta_{12} > 0$

Hypothesis 3*:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *learning climate* (η_3) will positively influence *learning motivation* (η_1).

H_{0125}: $\beta_{13} = 0$

H_{a125}: $\beta_{13} > 0$

[70] The measurement model statistical hypotheses were numbered first because the fitting of the measurement model precedes the fitting of the comprehensive LISREL model.

[71] The exact and close fit null hypotheses for the structural model is numbered in such a way as to indicate that the measurement model's exact and close fit null hypotheses will also be empirically tested or tested prior to the structural model's exact and close fit hypotheses. The measurement model will also be evaluated in term of the success with which the latent variables in the affirmative development trainer-instructor performance model has been operationalised.

[72] The numbering of the substantive research hypotheses reflects the numbering used in section 3.3, the numbering of the statistical hypotheses will follow from the structural model exact and close fit hypotheses.

Hypothesis 4: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *inspiring professional vision* (η_2) will positively influence *learning climate* (η_3).

H_{0126}: $\beta_{32} = 0$

H_{a126}: $\beta_{32} > 0$

Hypothesis 5: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* (η_5) will positively influence *learning climate* (η_3).

H_{0127}: $\beta_{35} = 0$

H_{a127}: $\beta_{35} > 0$

Hypothesis 6: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *transformational trainer-instructor leadership* (η_5) will positively influence *inspiring professional vision* (η_2).

H_{0128}: $\beta_{52} = 0$

H_{a128}: $\beta_{52} > 0$

***Hypothesis 7**:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *facilitating clarity and understanding* (η_8) will positively influence *structure in the learning material* (η_4).

H_{0129}: $\beta_{48} = 0$

H_{a129}: $\beta_{48} > 0$

***Hypothesis 8**:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that relationship between *providing formative feedback* (η_6) and *structure in the learning material* (η_5) is mediated by *facilitating clarity and understanding* (η_8).

H_{0130}: $\beta_{86}\beta_{48}$[73] $= 0$

H_{a130}: $\beta_{86}\beta_{48} > 0$

[73] The mediating effect of *facilitating clarity and understanding* (η_8) in the relationship between *providing formative feedback* (η_6) and *structure in the learning material* (η_4) is captured by the product of the two path coefficients. The product of the two β-estimates will be derived and the statistical significance of the calculated indirect effect will be evaluated by calculating the appropriate standard error and z-score.

***Hypothesis 9**:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* (η_6) will positively influence *facilitating clarity and understanding* (η_8).

H_{0131}: $\beta_{86} = 0$

H_{a131}: $\beta_{86} > 0$

***Hypothesis 10**:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *providing formative feedback* (η_6) will positively influence *learning motivation* (η_1).

H_{0132}: $\beta_{16} = 0$

H_{a132}: $\beta_{16} > 0$

Hypothesis 11: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* (ξ_1) will positively influence *transformational trainer-instructor leadership* (η_5).

H_{0133}: $\gamma_{51} = 0$

H_{a133}: $\gamma_{51} > 0$

***Hypothesis 12**:* In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *lifelong learning trainer-instructor capacity* (ξ_1) will positively influence *trainer-instructor expert* (η_7).

H_{0134}: $\gamma_{71} = 0$

H_{a134}: $\gamma_{71} > 0$

Hypothesis 13: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* (η_7) will positively influence *structure in the learning material* (η_4).

H_{0135}: $\beta_{47} = 0$

H_{a135}: $\beta_{47} > 0$

Hypothesis 14: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that the effect of *trainer-instructor expert* (η_7) on *structure in the learning material* (η_4) will be moderated by *facilitating clarity and understanding* (η_8).

H_{0136}: γ_{43}[74] $= 0$

H_{a136}: $\gamma_{43} > 0$

Hypothesis 15: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor expert* (η_7) will positively influence *providing formative feedback* (η_6).

H_{0137}: $\beta_{67} = 0$

H_{a137}: $\beta_{67} > 0$

Hypothesis 16: In the proposed Wessels-Van der Westhuizen trainer-instructor competency model it is hypothesised that *trainer-instructor emotional intelligence* (ξ_2) will positively influence *transformational trainer-instructor leadership* (η_5).

H_{0138}: $\gamma_{52} = 0$

H_{a138}: $\gamma_{52} > 0$

Psi hypotheses

H_{0i}: $\psi_{kk} = 0$; i =139, 140. …, 146; k =1, 2, …, 8

H_{ai}: $\psi_{kk} > 0$; i =139, 140. …, 146; k =1, 2, …, 8

3.6 MEASUREMENT INSTRUMENTS

Latent variables are man-made concepts which cannot be seen and can therefore not be measured through direct observation. In order to measure the various exogenous (ξ) and endogenous (η) latent variables comprising the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, or more specifically in order to empirically test this reduced competency model, these latent variables have to be operationalised by developing observed or indicator variables in which these latent variables express themselves. Furthermore, the extent to which valid and credible conclusions and inferences can be made on the ability of the proposed Wessels-Van der Westhuizen affirmative development trainer-instructor competency model to

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[74] ξ_3 represent the moderating influence of *facilitating clarity and understanding* (η_8) on the relationship between *trainer-instructor expert* (η_7) and *structure in the learning material* (η_4). Thus, ξ_3 represents the product of η_8 and η_7 and is hypothesised to influences *structure in the learning material* (η_4).

explain variance in trainer-instructor job performance would depend on the extent to which the indicator variables are indeed valid and reliable measures of the latent variables they are tasked to represent.

Unless the quality of the measurement instruments used, which empirically tests the latent variables, can be trusted any assessment and analysis of the substantive relations of interest will be problematic (Diamantopoulos & Siguaw, 2000). Consequently, standardised measuring instruments are utilised to operationalise each latent variable. Evidence is also needed to establish the psychometric properties and integrity of these selected measurement instruments. Evidence should be obtained via two avenues. The first is through psychometric research findings reported in existing literature. In order to justify the choice of measuring instruments from an existing group of measuring instruments, literature on the reliability and construct validity of these existing instruments has to be consulted. The second is through empirical testing that forms part of the current study. The psychometric integrity of the selected measuring instruments was therefore also empirically evaluated as part of this study via item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

For one of the measurement instruments, selected to operationalise *learning motivation*, Van der Westhuizen (2015) utilised the motivation to learn questionnaire (MLQ), that was originally developed Nunes (2003) but reduced by Burger (2012). For one of the measurement instruments, selected to operationalise *learning climate*, Van der Westhuizen (2015) utilised existing measures, but adapted the items to accommodate the dimensions of *learning climate*. For the rest of the trainer-instructor latent variables included in the reduced Van der Westhuizen (2015) partial affirmative development trainer-instructor competency model Van der Westhuizen (2015) could not find existing measurement instruments. Consequently, these latent variables had to be operationalised by developing new items and item scales. For the purpose of this research study, these measurement instruments and items, developed by Van der Westhuizen (2015), was utilised to measure *inspiring professional vision*. The newly introduced trainer-instructor latent variables (i.e., *transformational trainer-instructor leadership*, *providing formative feedback*, *lifelong learning trainer-instructor capacity*, *trainer-instructor expert*, and *trainer-instructor emotional intelligence*) could not be operationalised by existing measurement instruments. As a result, items for these trainer-instructor latent variables were developed based on their definitions and information gathered during the literature review.

In the event that new items, or measurement instruments, are developed the most appropriate course of action would be to assess the quality and psychometric properties of the newly developed measures as an integral part of the empirical evaluation of the hypothesised model. This assessment must, however, be conducted prior to testing the measurement and structural model in order to obtain evidence that the indicator variables are indeed valid and reliable measures of the latent variables they are linked to. If the newly developed indicator variables indeed reflect the latent variables they were assigned to reflect, it would maximise the probability of obtaining valid and credible conclusions on the ability of the hypothesised reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model to explain variance in trainer-instructor performance. The empirical testing of newly developed items or instruments is generally called pre-testing. Pre-testing typically involves the administration of the newly developed measurement instruments on a separate sample of respondents from the target population in order to screen the items (Hair et al., 2006). The pre-test is done in an identical manner to the testing of the final model analysis with the aim of refining and deleting poor items in order to avoid issues of validity and reliability when the final model is analysed but for the fact that it is performed on a different data set obtained from a separate sample, albeit from the same target population. However, Van der Westhuizen (2015) did not conduct a pre-test, on the newly developed items, due to several resource constraints. The psychometric integrity of the selected measurement instruments was empirically evaluated for the first time as part of the final model analysis. For the purposes of the current research study, the same process was followed due to time and logistical constraints. The same data that was used to psychometrically evaluate (and possibly refine) the newly developed scales was therefore also used to empirically evaluate the measurement and structural models. This is acknowledged as a methodological limitation.

One composite research questionnaire (the Composite Trainer-Instructor Research Questionnaire), subdivided into 10 sections or scales representing the 10 latent variables being measured, was provided to the sample group. Each subsection includes a number of items, representing the indicator variables. Each item was rated on a five-point Likert-type scale. For the purposes of this study, a Cronbach alpha of .80 or higher was deemed an acceptably high internal reliability (Theron, 2015b). A copy of the composite research questionnaire can be found in Appendix A.

3.6.1 LEARNING MOTIVATION

Learning motivation or the *motivation to learn* denotes a desire or intention, on the part of the trainee or learner, to engage in and invest high levels of consistent effort or energy in order to learn and master the content or training material of the training and development programme (Ames, 1992a; Burger, 2012; Colquitt et al., 2000; Hicks & Klimoski, 1987; Nunes, 2003; Tziner et al., 2007).

Learning motivation was conceptualised as a unidimensional latent variable in the current study.

Nunes (2003) designed and developed a combined questionnaire to measure the trainee’s motivation and intention to learn. The motivation to learn questionnaire (MLQ) consists of three sections. Section

A (Demographic Information) was designed to give an indication of and collect the demographic data of the trainees. Section B (Motivation to Learn) designed to provide an assessment of *learning motivation*, which is the specific desire of a trainee to learn the content of the training program. Section C (Intention to Learn) designed to provide a description of the trainee's intention to learn the training material during this training programme. The items are scored by means of a seven-point Likert-type scale (Nunes, 2003). As part of the development process of the measuring instruments, the motivation to learn questionnaires was pilot tested, or pre-tested, with a sample of 15 trainees to ensure clarity of wording and instructions. Item analysis produced satisfactory results for most scales and sub-scales exceed the recommended reliability of .70. The motivation to learn (MLQ) scale including 20 items revealed a Cronbach Alpha of .94 (Nunes, 2003).

Nunes' (2003) MLQ has been used in numerous studies conducted by Burger (2012), Mahembe (2014), Van Heerden (2013), Prinsloo (2013), Du Toit (2014) and Van der Westhuizen (2015). Burger (2012) also empirically tested Nune's (2003) MLQ. However, Burger (2012) only included and administered a reduced MLQ of six items on a seven-point Likert-type scale to a sample of 460 high school students. The scale obtained a Cronbach alpha of .899. The means and standard deviations revealed the absence of extreme means and small standard deviations and thereby denoting the absence of poor items. The results of the dimensionality analysis found that only one factor could be extracted and that all the items, as a result, loaded onto one factor satisfactorily. This scale was, thus, found to be unidimensional (Nunes, 2003; Van der Westhuizen, 2015).

Mahembe's (2014) study found a Cronbach alpha coefficient of .895, Prinsloo (2013) found .854, Van Heerden (2013) found .855 and Du Toit (2014) found a Cronbach alpha coefficient of .883. All four studies were conducted on a six-item measurement instrument with a seven-point Likert-type scale. Van der Westhuizen (2015) found a Cronbach alpha .817, for her six-item measurement instrument that was conducted on a five-point Likert-type scale, the scale was unidimensional and no items were deleted.

The current research study utilised the motivation to learn questionnaire (MLQ) that was originally developed by Nunes (2003) but reduced by Burger (2012) to measure *learning motivation.* The measurement instrument for learning motivation consists of the six items, as utilised and adapted in Van der Westhuizen's (2015) research. Item wording was adapted slightly to more accurately represent the current research study. Similar to Van der Westhuizen's (2015) research, item responses were recorded on a five-point Likert scale anchored with *strongly disagree, disagree*, *neutral*, *agree* and *strongly agree* as response option descriptors.

The *learning motivation* latent variable was operationalised via two item parcels formed randomly from the items of the six items of the learning motivation scale by taking the mean of all even-numbered items and the mean of all uneven numbered items.

3.6.2 INSPIRING PROFESSIONAL VISION

For the purposes of this research study, *inspiring professional vision* denotes "…*a positive professional vision in the mind of the trainee that inspires effort and a desire to learn*" (Van der Westhuizen, 2015, p. 110).

Inspiring professional vision was conceptualised as a unidimensional latent variable in the current study.

Van der Westhuizen (2015) found no existing scale in the literature to measure *inspiring professional vision*, a *trainer-instructor outcomes latent variable*. Van der Westhuizen (2015), therefore, developed eight items based on the definition provided in her study where the responses to the items were measured on a five-point Likert scale ranging from *strongly agree* to *strongly disagree*. Van der Westhuizen (2015) found a highly satisfactory Cronbach alpha of .914, the assumption of unidimensionality was met (i.e., only one factor was extracted in the EFA) and no item had to be deleted since none of the items was flagged as problematic items.

In the current research study, the scale developed by Van der Westhuizen (2015) was utilised to measure *inspiring professional vision* and it consists of the original eight items. Item wording was adapted to more accurately represent the current research study. Item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

The *inspiring professional vision* latent variable was operationalised via two item parcels formed randomly from the eight items of the inspiring professional vision scale by taking the mean of all even-numbered items and the mean of all uneven numbered items.

3.6.3 LEARNING CLIMATE

Based on Van der Westhuizen's (2015) definition of *learning climate*, a *training situational latent variable*, the classroom learning climate construct consists of five dimensions: *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *autonomy*, and *interest and involvement*.

Learning climate was therefore conceptualised for the purpose of the current research study as a five-dimensional construct comprising the dimensions (1) *teacher emotional support*, (2) *teacher* *academic support*, (3) *psychological safety and fairness*, (4) *interest and involvement, and (5) autonomy*.

Teacher emotional support and teacher academic support

Van der Westhuizen (2015) utilised and slightly adapted the *teacher emotional support* and *teacher academic support* subscales, each consisting of four items rated on a five-point Likert-type scale, from the Classroom Life Measure (D. W. Johnson, R. Johnson, & Anderson, 1983). The measure of *teacher emotional support* assessed the belief that the teacher cared about and liked the student as a person and it also assessed the issue of equality. The measure of *teacher academic support* assessed the perception that the teacher cared about how much the student learned and wanted to help him or her learn and do their best (Johnson et al., 1983). Patrick et al., (2007) obtained a Cronbach alpha of .84 for the *teacher emotional support* scale and .64 for the *teacher academic support* scale. Patrick et al. (2011) found a Cronbach alpha of .84 for the *teacher emotional support* scale and .76 for the *teacher academic support* scale.

In Van der Westhuizen's (2015) study the responses to these eight items were measured on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. For the subscale *teacher emotional support*, consisting of four items, Van der Westhuizen (2015) found a Cronbach alpha of .866, the assumption of unidimensionality was supported (i.e., only one factor was extracted in the EFA) and no item had to be deleted since none of the items was flagged as problematic items. For the subscale *teacher academic support*, consisting of four items, Van der Westhuizen (2015) found a Cronbach alpha of .855, the assumption of unidimensionality was supported (i.e., only one factor was extracted in the EFA) and no item had to be deleted since none of the items was flagged as problematic items.

In the current research study, the eight items developed by Van der Westhuizen (2015) were utilised to measure *teacher emotional support* and *teacher academic support*. Item wording was adapted slightly to more accurately represent the current research study. Item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

Psychological safety and fairness

Van der Westhuizen (2015) measured *psychological safety and fairness* by selecting and adapting four-items from Ryan and Patrick's (2001) promoting mutual respect scale and Van der Westhuizen (2015) developed five additional items for this subscale. This subscale consisted of a total of nine items. Patrick at al., (2007) obtained a Cronbach alpha of .65 for the promoting mutual respect scale.

In Van der Westhuizen's (2015) study the responses to these nine items were measured on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. For *psychological safety and fairness* Van der Westhuizen (2015) found a Cronbach alpha of .86, but the assumption of unidimensionality was not supported (i.e., two factors were extracted in the EFA). Van der Westhuizen (2015) argued that *psychological safety* and *fairness* might be two separate components. However, the current research study found support that these two components are linked and they will thus remain as one single construct. Van der Westhuizen (2015) continued her research under the assumption that *psychological safety and fairness* is one single construct by forcing the extraction of a single factor in a second factor analysis and found acceptable factor-loadings on the second-order *psychological safety and fairness* factor. Therefore, although the assumption of unidimensionality was not supported the assumption that all nine items of the scale may be considered valid measures of a second-order factor was supported and no item had to be deleted since none of the items was flagged as problematic items.

In order to reduce or prevent fatigue or boredom on the part of the research participants, the current research decided to reduce these nine items. The decision, regarding which items to include in the current research study, was based on their factor loadings. The three items with the lowest factor loadings were E17 ("*In our class, students feel free to disagree with the instructor and to ask questions*") with a factor loading of.506; E14 ("*In our class, students are not scared to answer questions, even if they might be wrong*") with a factor loading of .575; and E10 ("*In our class, students are treated fairly and equally*") with a factor loading of .591. It was decided to delete item E17[75] and item E14. Item E10 was retained since it is related to the concept of fairness and since there are only two items related to the concept of fairness. The final item that was deleted is item E12[76] (*"In our class, students do not make fun of each other's ideas"*). Additionally, items E12, E14 and E17 had slightly lower inter-item correlations, corrected item-total correlations and squared multiple correlations compared to the other items in the *psychological safety and fairness* scale (Van der Westhuizen, 2015). Consequently, in the current research study six (i.e., E9, E10, E11, E13, E15 and E16) of the nine items, developed by Van der Westhuizen (2015), was utilised to measure *psychological safety and fairness*. Item wording was adapted slightly to more accurately represent the current research study. Item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

[75] Item E17 was deleted since it has the lowest factor loading when only one factor was extracted and when two factors where extracted item E17 did not load on any one of the two factors.
[76] Item E12 had the fourth lowest factor loading, a factor loading of .616 when only one factor was extracted.

Interest and involvement

Van der Westhuizen (2015) selected six of the eight items from the involvement subscale of the *What is happening in this class* (WIHIC) questionnaire to measure *interest and involvement* and Van der Westhuizen (2015) developed four additional items. This subscale, therefore, consisted of a total of ten items. The WIHIC subsection *involvement* scale measures the extent to which students have attentive interest, participate in class, are involved with other students in assessing the viability of new ideas and allowed to raise own opinions during class discussions (MacLeod & Fraser, 2010; Van der Westhuizen, 2015). The original subscale obtained a Cronbach alpha of .88 (MacLeod & Fraser, 2010). Den Brok, Fisher, Rickards and Bull (as cited in Van der Westhuizen, 2015) obtained a reliability coefficient of .86 for this subscale.

In Van der Westhuizen's (2015) study the response to these ten items were measured on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. For *interest and involvement* Van der Westhuizen (2015) found a Cronbach alpha of .878, but the assumption of unidimensionality was not supported (i.e., two factors were extracted in the EFA). Van der Westhuizen (2015) stated that this, the result for the two factors, suggests that it might be useful to distinguish between *active participation* (of students in class activities) and *encouragement to participate* (in class activities) as two facets of *interest and involvement*. However, for the purpose of this research study, in accordance with Van der Westhuizen (2015), *interest and involvement* were conceptualised as a unidimensional construct with no design intention or suggestions to distinguish between these two components. Van der Westhuizen (2015) further argued that it would not be meaningful to create a three-item subscale reflecting *encouragement to participate* since items E22 ("*In our class, students show interest in the work and activities*") and E23 (*"In our class, students want to learn, understand and explore the work")* did not load onto any one of the two factor loadings. Consequently, Van der Westhuizen (2015) forced extraction of a single factor on the second factor analysis and found a single factor. Therefore, although the assumption of unidimensionality was not supported the assumption that all ten items of the scale may be considered valid measures of a second-order factor was supported and no item had to be deleted since none of the items was flagged as problematic items.

In order to reduce or prevent fatigue or boredom on the part of the research participants the current research decided to reduce these ten items. The decision, regarding which items to include in the current research study, was based on their factor loadings. The five items with the lowest factor loadings were E21 ("*In our class, students are encouraged to ask questions*") with a factor loading of .616; E20 ("*In our class, students are encouraged to answer questions*") with a factor loading of .628; E19 ("*In our class, students give their opinions during class discussions*") with a factor loading of .631; E26 (“*In our class, students put a lot of energy in class work and activities*”) with a factor loading of .639; E23 (“*In our class, students want to learn, understand and explore the work*”) with a factor loading of .640. Consequently, in the current research study five (i.e., E18, E22, E24, E25, E27) of the ten items, developed by Van der Westhuizen (2015), was utilised to measure *interest and involvement*. Item wording was adapted slightly to more accurately represent the current research study. Item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

Autonomy

Van der Westhuizen (2015) developed items to measure *autonomy* based on Stefanou, Perencevich, DiCintio, and Turner’s (2004) conceptualisation of autonomy. In their research various autonomy support strategies were listed to demonstrate the different dimensions of their conceptualisation of autonomy. Van der Westhuizen (2015) utilised ten of the examples provided in their study and adapted these examples into items to form the autonomy subscale.

In Van der Westhuizen’s (2015) study the response to these ten items were measured on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. For *autonomy* Van der Westhuizen (2015) found a Cronbach alpha of .842, but the assumption of unidimensionality was not supported (i.e., two factors were extracted in the EFA). Van der Westhuizen (2015) deleted item E30 (“*In our class, students have opportunities to choose their group members*”) before conducting the factor analysis. Literature on autonomy suggested that three types of autonomy exist, namely, procedural, organisational and cognitive (Van der Westhuizen, 2015). Van der Westhuizen (2015) conceptualised autonomy as a single latent variable and developed items E28 to E32 related to organisational and procedural autonomy and items E33 and E37 related to cognitive autonomy. However, the results were slightly different. Items E29, E31, E32, E33, E34 and E37 loaded onto factor 1 and items E35 and E36 loaded onto factor 2. Item 28 (“*In our class, students have opportunities to take responsibility for due dates for assignments*”) did not load onto any one of the two items. After Van der Westhuizen (2015) deleted item 28 the factor analysis was run again and, again, two factors were extracted. Van der Westhuizen (2015) decided to run a forced extraction of one factor and the remaining items showed satisfactory loadings onto a single factor, except for item E36 (“*In our class, students have opportunities to use mistakes as learning experiences*”) which did not load onto the single factor. Van der Westhuizen (2015) decided to retain this item since it represented cognitive autonomy. Therefore, although the assumption of unidimensionality was not supported the assumption that eight of the ten items of the scale may be considered valid measures of a second-order factor was supported since two items were flagged to be deleted.

In order to reduce or prevent fatigue or boredom on the part of the research participants the current research decided to reduce these original ten items. Item 30 ("*In our class, students have opportunities to choose their group members"*), in accordance with Van der Westhuizen's (2015) research, was deleted since it increased the autonomy subscale's Cronbach's alpha from .842 to .844. Item 28 ("*In our class, students have opportunities to take responsibility for due dates for assignments*"), in accordance with Van der Westhuizen's (2015) research, was deleted since it did not load onto any one of the two factors extracted. Although item E36 ("*In our class, students have opportunities to use mistakes as learning experiences*") had a factor loading of only .496, it was decided to retain this item, in accordance with Van der Westhuizen's (2015) research. The following item had the second lowest factor loadings, after only one factor was extracted, item E35 ("*In our class, students have opportunities to be independent problem solvers*") with a factor loading of .500. However, item E35, like item E36, load on to the second factor and thus represents cognitive autonomy which justifies the retention of item E35. After items E36 and E35 the following items had the lowest factor loadings: item E29 ("*In our class, students have opportunities to create and implement classroom rules*") with a factor loading of .517; item E32 ("*In our class, students have opportunities to decide how to complete assignments/projects*") with a factor loading of .599; and item E31 ("*In our class, students have opportunities to talk about their needs*") with a factor loading of .658. Consequently, in the current research study five (i.e., E33, E34, E35, E36, E37) of the ten items, developed by Van der Westhuizen (2015), was utilised to measure *autonomy*. Item wording was adapted slightly to more accurately represent the current research study. Item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

For the purpose of this research study, the complete scale for measuring *learning climate*, a *training situational latent variable*, consists of twenty-four items. All item responses were recorded on the original five-point Likert scale as developed by Van der Westhuizen (2015).

Five item parcels were created to represent the *learning climate* latent variable by calculating the mean of the items assigned to each of the five learning climate subscales.

3.6.4 STRUCTURE IN THE LEARNING MATERIAL

Structure in the learning material was defined as "…*a meaningful structure within which the constituent parts of the learning material are presented as a meaningfully integrated*" (Van der Westhuizen, 2015, p. 153).

Structure in the learning material was conceptualised for the purpose of the current research study as a unidimensional construct.

Van der Westhuizen (2015) did not include *structure in the learning material*, a *training situational latent variable*[77], in her reduced affirmative development trainer-instructor competency model. As a result, Van der Westhuizen (2015) did not develop any items of sub-scales for this latent variable. Additionally, the current research could not find any existing questionnaires, measurements or related items for this latent variable, as it pertains to a learning setting.

Deep learning, an important goal of any training and development programme, is enhanced when trainer-instructors provide their students with basic learning concepts that they, the students, themselves should critically think about, understand and connect to previous knowledge (Zirbel, 2006). In other words, when learners are able to make sense of learning material they are able to recall previous knowledge and make proper connections between different concepts (Zirbel, 2006). Learning will be enhanced when the learning material or subject knowledge is presented in a format that makes it easy for the students to find meaningful structure, or meaningful connections, as well as when the information is bunched together (Van der Westhuizen, 2015; Zirbel, 2006). Based on this information the following items were developed "*The learning material was presented in a format that made it easy to find structure*"; "*Meaningful connections could be found between the various sections or information in the learning material*" and "*The learning material was presented in a format that allows for critical thinking and understanding*".

Identifying key points and structuring the learning material or information and repeating or pointing out relevant aspects of the learning material will assist the students in building a clear picture of subject being discussed and can help them to establish links between the contents in the learning material, leading to, finding meaningful structures within of the learning material or contents (Mayer, as cited in Hübner et al., 2010; Van der Westhuizen, 2015; Zirbel, 2006). Based on this information the following item was developed "*The crucial and important aspects of the work or learning material stood out clearly for me*".

In the current research study, *structure in the learning material* was measured via four items. Item responses were recorded on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree* and *strongly agree* as response option descriptors.

The *structure in the learning material* latent variable was operationalised via two item parcels formed randomly from the four items of the structure in the learning material scale by taking the mean of all even-numbered items and the mean of all uneven numbered items.

[77] *Structure in the learning material* was categorised as a *trainer-instructor outcome latent variable* in Van der Westhuizen's (2015) research.

3.6.5 TRANSFORMATIONAL TRAINER-INSTRUCTOR LEADERSHIP

A trainer-instructor competency that allows the trainer-instructor to combine teacher practises inside the classroom with transformational leadership inside and outside the classroom (e.g., individualised consideration, which includes demonstrating individualised consideration and autonomy support; intellectual stimulation, which includes stimulating interest and involvement and autonomy support; idealised influence or charisma, which includes autonomy support and fostering psychological safety and fairness, as well as inspirational motivation, which includes providing inspirational motivation) in order to, ultimately, attain academic goals.

Transformational trainer-instructor leadership was conceptualised for the purpose of the current research study as a four-dimensional construct comprising the dimensions (1) *individualised consideration*, (2) *intellectual stimulation*, (3) *idealised influence or charisma*, and (4) *inspirational motivation.*

No existing questionnaires or measurements for *transformational trainer-instructor leader* could be found in the literature. As a result, items from Van der Westhuizen's (2015) research were utilised to create items for the measurement of transformational trainer-instructor leader.

Individualised consideration

For the purpose of measuring individualised consideration the following two items, from the demonstrating individualised consideration measure as developed by Van der Westhuizen (2015), were selected based on their factor loadings: item I9 ("*The instructor shows concern for students*") with a factor loading of .841 and item I11 ("*The instructor is patient when helping students with their problems*") with a factor loading of .841. However, for the purpose of this research study, these two items' wording were adapted slightly. Based on the theorising on individualised consideration and *demonstrating individualised consideration*, the following item was developed: "*The lecturer paid close attention to each individual student's learning needs*".

Intellectual stimulation

For the purpose of measuring intellectual stimulation the following two items, from the stimulating interest and involvement measure as developed by Van der Westhuizen (2015), were selected based on their factor loadings: item J10 ("*The instructor gives students the chance to explain their ideas and to assess and refine them*") with a factor loading of .813 and item J11 ("*The instructor provides learners with the opportunity to give and receive help*") with a factor loading of .802. However, item J11's face validity appeared to be low and, as a result, item J4 ("*The instructor shows interest in the student's viewpoint*") with the 3rd highest factor loading, a factor loading of .762, were consulted.

Again, item J4's face validity appeared to be low. Therefore, item J12 ("*The instructor makes students feel excited or interested in the class material*") with the 4th highest factor loading, a factor loading of .759, was selected for the purposes of this study. Item wording was adapted slightly to more accurately represent the current research study. Based on the theorising on intellectual stimulation and *stimulating interest and involvement*, the following item was developed: "*The lecturer stimulated the students' innovation and creativity*".

Idealised influence or charisma

For the purpose of measuring idealised influence or charisma the following two items, from the fostering psychological safety and fairness measure as developed by Van der Westhuizen (2015), were selected based on their factor loadings: item H8 ("*The instructor shows respect and positive regard for others and wants us to do the same*") with a factor loading of .829 and item H6 ("*The instructor gives us the change to share our feelings and ideas in a way that makes us feel safe*") with a factor loading of .776. Item wording was adapted slightly to more accurately represent the current research study. Based on the theorising on idealised influence or charisma and *fostering psychological safety and fairness*, the following item was developed: "*The lecturer did not abuse his/her authoritative power in order to gain the students trust and respect*".

Inspirational motivation

For the purpose of measuring inspirational motivation, the following two items from the providing inspirational motivation measure as developed by Van der Westhuizen (2015), were selected based on their factor loadings: item K4 ("*The instructor helps students to create a positive vision or view of their career*") with a factor loading of .849 and item K5 ("*The instructor encourages students to see future challenges as learning opportunities*") with a factor loading of .846. Item wording was adapted slightly to more accurately represent the current research study. Based on the theorising on inspirational motivation and *providing inspirational motivation*, the following item was developed: "*The lecturer used positive and inspirational messages and verbal communication to motivate students*".

For the purpose of this research study, the complete scale for measuring *transformational trainer-instructor leadership*, a *trainer-instructor competency latent variable*, consists of twelve items. All item responses were recorded on the original five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree* and *strongly agree* as response option descriptors.

The *transformational trainer-instructor leadership* latent variable was operationalised via four item parcels formed by taking the mean of the three items assigned to each of the four transformational trainer-instructor leadership subscales.

3.6.6 FACILITATING CLARITY AND UNDERSTANDING

Van der Westhuizen (2015) did not include *facilitating clarity and understanding* in her reduced affirmative development trainer-instructor competency model. As a result, Van der Westhuizen (2015) did not develop any items for this latent variable. Additionally, the current research could not find any pre-existing questionnaires, measurements or related items for this latent variable, as it pertains to a learning setting.

Facilitating clarity and understanding was conceptualised for the purpose of the current research study as a unidimensional construct.

Facilitating clarity and understanding, a *trainer-instructor competency latent variable*, includes the instructional behaviour that facilitates the creation of a learning structure and can be defined as *"…instructional behaviour that makes lectures easy to outline, cases being well organised, and learning material being explained clearly*" (Van der Westhuizen, 2015, p. 184). Teacher clarity is defined as "…a variable which represents the process by which an instructor is able to effectively stimulate the desired meaning of course content and processes in the minds of students through the use of appropriately-structured verbal and nonverbal messages" (Chesebro & McCroskey, 1998, p. 448).

Based on the literature on teacher clarity in that teachers should structure their lessons, messages and presentations clearly and they should also be verbally clear (Chesebro, 2003) and on the definition of *facilitating clarity and understanding* developed by Van der Westhuizen (2015), the following items were developed "*The lecturer clearly verbally explained the module content and information (e.g., effective use of examples)*"; "*The lecturer clearly non-verbally explained the module content and information (e.g., through enthusiasm)"; "The lecturer's classes were well organised (e.g., effective use of summaries)*"; and "*The lecturer spoke clearly (e.g., he/she was easily heard and/or speed and tone of his/her voice fostered clarity and understanding)*".

Based on the discussion of facilitating clarity and understanding two additional items were developed: "*The lecturer frequently asked whether we were still following him/her*" and "*The lecturer was willing to again explain aspects of the work that we did not initially understand*".

For the purpose of this research study, this scale contains a total of six items which was measured on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree*, and *strongly agree* as response option descriptors.

The *facilitating clarity and understanding* latent variable was operationalised via two item parcels formed randomly from the items of the six items of the facilitating clarity and understanding scale by taking the mean of all even-numbered items and the mean of all uneven numbered items.

3.6.7 PROVIDING FORMATIVE FEEDBACK

Providing formative feedback is a newly introduced *trainer-instructor competency latent variable* and was defined as *providing trainees with verbal praise and recognition directly or immediately after correct responses, ideal learning performance or behaviours as well as providing trainees with corrective information on responses or behaviours not yet done correctly or perfectly according to and directly related to learning outcomes in an attempt to allow trainees to adjust or change their learning strategies and behaviours to ensure correct future learning performance*. *Providing formative feedback* also denotes providing feedback on a continuous basis (i.e., during the entire learning experience or programmes).

Providing formative feedback was conceptualised as a unidimensional latent variable in the current study.

No existing questionnaires for *providing formative feedback* could be found in the literature. As a result, items were created for the measurement of this *trainer-instructor competency latent variable*.

Based on the work of Rust and colleagues (2003), Shute (2008) identified features required for formative feedback to be effective in enhancing students' learning. Based on these features the following items were developed "*The lecturer gave feedback directly or at least timeously after each learning activity, action or assessment*"; "*The lecturer provided critical and detailed yet supportive feedback*"; "*The feedback information the lecturer gave me was directly related to the learning outcomes, assessment or task criteria*"; "*The feedback information the lecturer gave me was focused only on my academic work and not on my personality, gender, race or religion*", and "*The lecturer clearly stated the purpose for the information or feedback when given*".

Based on the definition of providing formative feedback the following items were developed: "*The lecturer informed me of behaviour or performance not yet done correctly and then provided an opportunity to rectify it or improve it*" and "*The lecturer provided too little feedback during the course of the module*."

For the purpose of this research study, the providing formative feedback scale contains a total of seven items which was measured on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree,* and *strongly agree* as response option descriptors.

The *providing formative feedback* latent variable was operationalised via two item parcels formed randomly from the seven items of the providing formative feedback scale by taking the mean of all even-numbered items and the mean of all uneven numbered items.

3.6.8 LIFELONG LEARNING TRAINER-INSTRUCTOR CAPACITY

Lifelong learning trainer-instructor capacity is a newly introduced *trainer-instructor competency potential latent variable* and was defined as *the ability of an individual trainer-instructor to continuously engage in reflection, research and development or learning and to continuously shares his/her knowledge and information with others over the course of his/her professional teaching career.*

Lifelong learning trainer-instructor capacity was therefore conceptualised for the purpose of the current research study as a two dimensional construct comprising the dimensions (1) *the ability of an individual trainer-instructor to continuously engage in reflection (including anticipatory reflection, reflection-in-action and reflection-on-action), as well as (2) continuously engaging in research, development or learning and to continuously share this newly acquired knowledge and information with others.*

Only three questionnaires were found that measure lifelong learning, namely the WielkLLS, the Kirby LLS and the "Teachers' motivation for lifelong learning questionnaire".

The WielkLLS is a 16-item measure that was designed to be a measure of actual behaviour, and some attitudes, related to the core construct of lifelong learning and associated to learning, curiosity and critical thinking aimed university students (Wielkiewicz & Meuwissen, 2014). The KirbyLLS is a 14-item measure that was designed to measure the tendency of university students to engage in lifelong learning and is based on five competencies of lifelong learners, namely, goal setting, application of knowledge and skills, self-direction and evaluation, locating information and adaptable learning strategies (Kirby, Knapper, Lamon, & Egnatoff, 2010). Only one, of these three questionnaires, was found to be specifically related to trainer-instructor's lifelong learning, namely, the "Teachers' motivation for lifelong learning questionnaire" (Majerič, Žvan, & Zajec, as cited in Majerič, Leskošek, & Erpič, 2011). This questionnaire consists of 12 items that measure the teacher's motivation for lifelong learning, four items measure intrinsic motivation, four items measure extrinsic motivation and four measure group motivation measured on a six-point Likert-type scale ranging from *not at all important* to *extremely important*.

None of these three questionnaires was, however, utilised or incorporated for the purposes of this research. The first two were not related to teachers, the last one was mainly focused on motivation and very little information is available in English. Additionally, none of the three was related to the definition of lifelong learning trainer-instructor as developed for this research.

Based on the definition for *lifelong learning trainer-instructor capacity* as well as the traits and skills a lifelong learner should possess the following items were developed: (1) the items related to continuous reflection include: "*The lecturer was continuously reinventing and creating new ways of presenting the lesson which lead to a positive class atmosphere*"; "*The lecturer had the ability to change his/her lecture style mid lesson if he/she saw it was not working*"; and "*The lecturer asked feedback from the class about his/her lecture styles*"; (2) the items related to continuous learning and sharing of knowledge include: "*The lecturer continuously shared newly learned/read knowledge and research findings related to his/her subject or teaching styles with the class*"; "*The lecturer conducted research, on a specific topic or question asked by a student when my lecturer did not have the knowledge or answer, and got back to us*"; and "*The lecturer continuously went on short courses and workshops and other learning, training and development programmes*."

For the purpose of this research study, this scale contains a total of six items which were measured on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree*, and *strongly agree* as response option descriptors.

The *lifelong learning trainer-instructor capacity* latent variable was operationalised via two item parcels formed by taking the mean of the three items assigned to each of the two lifelong learning capacity subscales.

3.6.9 TRAINER-INSTRUCTOR EXPERT

Trainer-instructor expert is a newly introduced *trainer-instructor competency potential latent variable* and was defined as *the ability of a trainer-instructor to acquire and retain extensive knowledge and deep understanding of the specific subject being taught and of the all learning and the teaching processes as well as appropriate teaching methods.*

Trainer-instructor expert was therefore conceptualised for the purpose of the current research study as a two dimensional construct comprising the dimensions (1) *the extent to which the trainer-instructor is an expert on content knowledge (i.e., formal knowledge and subject matter content knowledge*, and, (2) *the extent to which the trainer-instructor is an expert on teaching and learning* *practices or practical knowledge (i.e., practical knowledge, self-regulative knowledge, pedagogical content knowledge, curricular knowledge, propositional knowledge, case knowledge, and strategic knowledge)* .

No existing questionnaires or measurements for *trainer-instructor expert* could be found in the literature. As a result, items were created for the measurement of *trainer-instructor expert*.

Based on the definition of *trainer-instructor expert* the following items were developed: (1) the items related to content knowledge include: "*The lecturer had the ability to discuss his/her subject with the class in detail*"; "*The lecturer stayed up to date on any changes within his/her specific field of interest or subject*"; and "*The lecturer has been teaching his/her subject for many years and therefore knows the text book and course work articles thoroughly*"; (2) the items related to practical knowledge include: "*The lecturer had the ability to manage and adapt to changes in technology utilised in the classroom*"; "*The lecturer had the ability to provide many additional examples of the learning material as related to real-life situations"*; and "*The lecturer's teaching style or ability to present and explain the subject or course work was effective for enhancing learning*".

For the purpose of this research study, this scale contains a total of six items which was measured on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree,* and *strongly agree* as response option descriptors.

The *trainer-instructor expert* latent variable was operationalised via two item parcels formed by taking the mean of the three items assigned to each of the two trainer-instructor knowledge expert subscales.

3.6.10 TRAINER-INSTRUCTOR EMOTIONAL INTELLIGENCE

Trainer-instructor emotional intelligence is a newly introduced *trainer-instructor competency potential latent variable* and was defined as *the ability of the trainer-instructor to recognise, monitor and manage their own feelings and emotions (i.e., identifying emotions and managing emotions), to recognise and monitor their trainees' feelings and emotions (i.e., identifying emotions and empathy) and to use this information to guide their own thinking, actions, behaviours and plans, as well as to guide and manage their relationships with others (i.e., understanding emotions, the facilitation of emotions, empathy, motivation, and social skills) within the classroom in order to create an emotionally stable classroom climate that promotes trainee learning and academic success.*

Trainer-instructor emotional intelligence was therefore conceptualised for the purpose of the current research study as a three dimensional construct comprising the dimensions (1) *own emotions (ability of the trainer-instructor to recognise, monitor and manage their own feelings and emotions),* (2) other's emotions (*the ability to recognise and monitor their trainees' feelings and emotions)*, and (3) using emotions (*the ability to use this information to guide their own thinking, actions, behaviours and plans, as well as to guide and manage their relationships with others).*

In terms of specifically measuring teacher's EI only two questionnaires were found, namely, *Reactions to Teaching Situations* (Perry, Ball, & Stacey, 2004) and *Teacher Emotional Intelligence Measure* (Friedman, 2014).

Reactions to Teaching Situations or RTS is directly associated with the work of school teachers and it collects information about the levels of EI among beginning teachers, or teachers at the beginning of their teaching careers. This questionnaire contains a series of ten teacher- or teaching-specific situations, based on the four-branch model of EI[78], each with a choice of six possible reactions to which participants need to answer according to how they think and feel about each situation. The six reactions are measured five-point Likert scale ranging from *never likely* to *always likely* (Perry et al., 2004; Perry & Ball, 2008). However, this measure was utilised for the purpose of this research. The reason being that this questionnaire was aimed at teacher assessing their own EI, not trainees assessing the EI of their trainer-instructor, and since this questionnaire was specifically developed for beginner teachers, and not experienced trainer-instructors.

The Teacher Emotional Intelligence Measure of TEIM was developed by Friedman (2014) to measure teacher EI. This questionnaire includes a series of open-ended, pen-and-paper questions following a specific (single) vignette of a disciplinary interaction within a classroom (i.e., where a student explicitly challenged the authority of the teacher during classroom interaction to which the teacher then had to explain how they would respond to such a situation). The teachers have to write responses to this vignette created the following eight dimensions of EI, namely perception of their own emotions, managing their own emotions, using thoughts and cognition to generate emotions, perception of the group's emotions, managing the group's emotions, perception of disputant's/challenging student's emotions, understanding the disputant's emotions and managing the disputant's emotions (Friedman, 2014). This measure was, however, also not utilised for the purpose of this research since it utilised one specific event or situation followed by open ended questions. Additionally, the purpose of this research was to measure how trainees rate their trainer-instructor's EQ in the classroom. Not how teachers rate themselves in terms of a specific case study or vignette.

Based on the definition and theorising of trainer-instructor emotional intelligence, the following items were developed: (1) the items reflecting own emotions: "*The lecturer had the ability to control his/her*

[78] The four-branch model focuses on identifying emotions, using emotions, understanding emotions and managing emotions (Perry et al., 2004).

emotions during heated debates on sensitive topics discussed during class time" and "*The lecturer never lost his/her tempter during lectures*"; (2) the items reflecting others' emotions: "*During stressful times, where the academic pressure was high, the lecturer was considered of our feelings*"; and "*The lecturer had the ability to understand how the class felt even when the class did not say anything*"; and (3) the items reflecting using emotions: "*The lecturer had the ability to adapt his/her teaching style based on the emotions in the class*" and "*The lecturer had the ability to manage our learning expectations and feelings*".

For the purpose of this research study, this scale contains a total of six items which was measured on a five-point Likert scale anchored with *strongly disagree*, *disagree*, *neutral*, *agree*, and *strongly agree* as response option descriptors.

The *trainer-instructor emotional intelligence* latent variable was operationalised via three item parcels formed by taking the mean of the two items assigned to each of the three EI subscales.

3.6.11 LATENT INTERACTION EFFECTS

Research in the social sciences regularly includes arguments on and hypotheses about interaction effects between latent variables on a given outcome variable (Little, Bovaird, & Widamen, 2006; Marsh et al., 2007; Steinmetz, Davidov, & Schmidt, 2011). The current research is not much different. In the current research study there is one mediating interaction effect (It is hypothesised that relationship between *providing formative feedback* and *structure in the learning material* is mediated by *facilitating clarity and understanding*) and one moderating interaction effect (It is hypothesised that the effect of *trainer-instructor expert* on *structure in the learning material* will be moderated by *facilitating clarity and understanding*).

3.6.11.1 The inclusion of the moderating effect

There are many different ways or approached of empirically testing interaction or moderating effects (Little et al., 2006; Mahembe, 2014) such as The Kenny and Judd (1984) approach to latent interactions, the constrained approach to latent interactions, the mean centred constrained approach, the unconstrained mean-centered approach proposed by (Marsh, Wen, & Hau, 2004), residual centering or orthogonalising strategy, and double-mean-centering strategy to estimating latent interactions in structural equation models (Mahembe, 2014). Both Mahembe (2014) and Van der Westhuizen (2015) utilised the orthogonalised interaction approach which was developed by Little et al. (2006) to assess the moderating effects.

According to Kenny and Judd (1984), interactions among latent variables (i.e., interaction effects) are dealt with in a similar manner than nonlinear effects. Indicators of the interaction effects are developed and their loading matrix can be obtained by means of simple algebra, namely COSAN (Algina & Moulder, 2001; Kenny & Judd, 1984). Kenny and Judd (1984) formulated, for the purposes of estimating the latent interaction effects, a nonlinear equation: $y = \mu_y + \gamma_1\xi_1 + \gamma_2\xi_2 + \gamma_3\xi_1{*}\xi_2 + \zeta$, where ξ_1 and ξ_2 represent latent variables (Algina & Moulder, 2001; Mahembe, 2014). In essence, Kenny and Judd (1984) developed indicators for measuring the latent interaction effects. The loadings of these indicators are derived by multiplying together structural equations (Kenny & Judd, 1984). However, Kenny and Judd (1984) acknowledged that their procedure was merely the first step in the process of developing an approach to measure latent interaction effects.

As mentioned, there are many different methods for calculating the latent interaction effect. However, when it comes to estimating these effects, and in particular when performing structural equation modelling (SEM), there appears to be a lack of consensus on how to do so accurately (Little et al., 2006). Little et al. (2006) employed an all-possible-pairs strategy to develop interaction indicators for latent interaction effects (Marsh et al., 2007). This method, or all-possible-pairs, involves creating orthogonalised indicators for a latent interaction construct (interaction effect) by forming each possible product term from x sets of indicators for x latent constructs or variables. The subsequent uncentred product terms are individually regressed onto the first-order effect indicators of the latent variables. The residual for this regression is then saved and utilised as an indicator for the interaction construct or interaction effect latent variable. This procedure is then repeated for each of the uncentred product terms. These orthogonalised product terms, created after this process has been completed, are then included as indicators of a single latent interaction construct (Little et al., 2006; Van der Westhuizen, 2015). The residual centering approach, or orthogonalised interaction approach, makes use of residuals as product indicators for the latent variable interactions. In addition, this approach avoids any statistical dependence between indicators of first-order effect variables and the indicators of the latent product variables (Mahembe, 2014; Steinmetz et al., 2011).

The advantages of this orthogonalising approach include: (a) the latent variable interactions are derived from the observed covariation pattern among all possible indicators of the interaction; (b) no constraints on any particular estimated parameter need to be placed; (c) no re-calculations of parameters are required; and (c) the model estimates are stable and interpretable (Little et al., 2006; Mahembe, 2014).

In addition, the correlations between the residual variances, of the interaction indicators, should be specified and should also be allowed to have correlated residuals. Furthermore, the latent interaction term or effect is not allowed to correlate with the main effect latent variables, to indicate the uniqueness of the interaction effect (Little et al., 2006; Van der Westhuizen, 2015).

For the purpose of this research study, the orthogonalising approach to assessing moderating effects was used.

3.6.11.2 The testing of the mediating effect

The hypothesised indirect effect was tested via LISREL 8.8 by translating the SIMPLIS syntax into the LISREL syntax. This allowed the use of the AP command to define the hypothesises indirect effect and to test its statistical significance. The calculation of the indirect effect did not require the estimation of additional model parameters. The degrees of freedom of the comprehensive LISREL model was therefore not affected and neither were the fit statistics affected.

3.7 SAMPLING

3.7.1 SAMPLING CONSIDERATIONS

The target population denotes the theoretical totality, or specified aggregation, of the elements in a study or those elements implied by the research initiating question (Babbie, 2013; Theron, 2015a). The methodological ideal would be to include the whole target population in the research study (Theron, 2015a). However, it may not always be practical or possible to administer measurements and obtain data from every single subject in the target population (of size N) (De Goede, 2007). Consequently, a more practical option or alternative would be to focus only on a smaller representative sample (of size n), or sample of elements, of the target population (De Goede, 2007; Theron, 2015a). The rationale underlying sampling is, therefore, to select a subset of individuals from the sampling population that are representative of the target population in the research study. A sample will be regarded as representative when it provides an accurate portrayal of the characteristics of the target population from which it was selected (Van der Westhuizen, 2015). Ideally, the sampling and target populations should coincide otherwise, the inferences made from the data collected from the research participants, or sample group, cannot be generalised to the target population. However, this is seldom the case in practice. Consequently, the researcher of any research study should aim to minimise this discrepancy between the target and sampling populations, known as the sampling gap.

De Goede and Theron (2010) stated that the degree to which observations can, or may be generalised, to the target population is a function of the number of subjects in the chosen sample, as well as the representativeness of the sample, while the power of inferential statistics tests also depends on sample size. Given the nature of this study, the sample size will be addressed from the perspective of SEM. SEM, a large sample technique, denotes that the estimation methods and the tests of the model fit are both based on the assumption of large samples (Kelloway, 1998, Kerlinger, 1986). Kline (2011) argued that it is difficult to provide a single and exact number of a ‘large enough’ sample size since there can be many different factors and limitations affecting the sample size required for a specific research study. In general sample sizes of 200 or more observations would appear to be satisfactory or appropriate minimum for most SEM applications (Kelloway, 1998; Kline, 2011). Jackson (as cited in Kline, 2011) proposed a rule of size-to-parameters or *N*: *q*, as opposed to a fixed numbered sample size, to determine the ratio between sample size and model complexity especially when maximum likelihood (ML) estimation is used. Jackson (as cited in Kline, 2011) argued that researchers should think about minimum sample size in terms of the ratio of cases (*N*) to the number of model parameters that require statistical estimates (*q*), concluding that an ideal sample size-to-parameters ratio would be 20:1. Bentler and Chou (as cited in Kelloway, 1998) recommend that the ratio of sample size to estimated number of parameters should range between 5:1 and 10:1.

Based on the proposed structural model and Bentler and Chou's (as cited in Kelloway, 1998) guideline the sample size for the purposes of this research study would require a sample of 410 to 820 research participants to provide a convincing test of the proposed affirmative development trainer performance structural model (82 freed parameters). As a result, and based on the recommendation of Jackson's *N*: *q* rule (as cited in Kline, 2011), the appropriate sample sizes to investigate the proposed model for the purposes of this research study would be 1640 respondents. Final decisions regarding the sample size can be influenced or obstructed by practical and logistical considerations, such as costs related to printing of questionnaires, the availability of suitable respondents, buy-in and willingness from the employer to allocate the required number of employees to the research.

The statistical power of the statistical analyses of the structural model [$1-\beta = P(\text{Reject } H_0|H_0 \text{ false})$] is a function of sample size (Theron, 2015a). According to Theron (2016), statistical power refers to the conditional probability of rejecting the null hypothesis, given that the null hypothesis is false (P[reject H0: RMSEA = 0|H0 false]). Stated differently, statistical power is associated with the test of exact fit and close fit (Theron, 2016). From the standpoint of SEM statistical power is, thus, associated with the probability of rejecting the null hypothesis of close fit (H_{0128b}: RMSEA $\leq$ .05) when in fact it should not be rejected. If the statistical power is excessively high then even a small deviation from the close fit would result in the rejection of the close fit null hypothesis. As a result, any attempt to empirically substantiate the validity of the model would then be pointless. On the other hand, if the statistical power is excessively low, the close fit null hypothesis would still not be rejected, where it should since the model fails to fit closely. As a result, failure to reject the close fit hypothesis, under conditions of low power, will then lead to not being able to deliver convincing evidence on the validity of the model (Theron, 2016; Van der Westhuizen, 2015).

To determine the required sample size to ensure adequate but not excessive statistical power when testing the close fit null hypothesis and assumption needs to be made about the RMSEA value under the assumption that H_0 is false. A reasonable value to assume is .08 since this value is typically regarded as denoting mediocre fit (Diamantopoulos & Siguaw, 2000). The Preacher and Coffman software developed in R was used to calculate the required sample size to ensure statistical power of at least .80 when testing the null hypothesis of close fit. A significance level of .05 was assumed (Preacher & Coffman, 2006). RMSEA under H_a was assumed to be .08. The Preacher and Coffman software returned a required sample size of 57. The small sample size can be attributed to the large degrees of freedom.

The Preacher and Coffman (2006) software was in this instance used to determine the required sample size required to allow a sufficiently powerful test of the close fit null hypothesis. The same software will again be used once the close and exact fit hypotheses have been tested to determine the statistical power of the tests given the sample size that was actually obtained.

3.7.2 CHOICE OF SAMPLING METHOD

There are two broad types or methods of sampling, namely, probability sampling procedures and non-probability sampling procedures (Babbie, 2013). Non-probability sampling is a procedure where the probability of selection for each element of the sampling population is unknown and probability sampling are procedures where each element in the sampling population has a known and positive probability of being selected into the sample (Theron, 2015a). A detailed discussion of these two types, including their sub-categories as well as their advantages and disadvantages, is beyond the scope of this research. However, a brief discussion on the types of sampling methods will follow below in order to assist the choice and critical evaluation of sampling method to be utilised for the purposes of this study.

Non-probability sampling is used when the population is not completely known, the individual probabilities are not known and where the sampling method is based on factors such as common sense or ease (Van der Westhuizen, 2015). Although non-probability is appropriate in some research studies, this particular sampling method does not provide any ground for confidence that the observed sample is a representative of the general target population (Babbie, 2013).

According to Babbie (2013), the key to generalising is making inferences from a sample and applying it to the general target population is probability sampling and it is central to social research. Therefore, when researchers want precise, statistical descriptions regarding the target population probability sampling should be used (Babbie, 2013). In probability sampling, the total sampling population is known and each individual element in the population has a specific non-zero probability of selection (Groves et al., 2004). Furthermore, probability sampling involves the idea of random selection, where sampling is done by a random process based on probabilities (Babbie, 2013, Van der Westhuizen, 2015).

There are many different types of probability sampling, namely, simple random sampling, systematic random sampling, stratified random sampling, cluster random sampling and multistage cluster sampling (Babbie, 2013; Theron, 2015a). However, as previously mentioned, discussing these further falls beyond the scope of this research study.

3.7.3 SAMPLING PROCEDURE

The current research study, ultimately, aims to enhance the effectiveness of HR interventions. Especially those HR interventions that plan to select and develop affirmative development trainer-instructors who, in turn, have to facilitate the successful learning of the previously disadvantaged employees, with potential, during affirmative development training in South Africa. This affirmative development training ultimately aims at enhancing the competencies of the affirmative development employees that will lead to enhanced performance. The target population in terms of this aim is, therefore, South African affirmative development training-instructors who will be planning, organising and presenting affirmative development programmes (Van der Westhuizen, 2015). The sampling population is the population of South African trainer-instructors teaching at South African technical training colleges, universities and other training facilities (e.g., at the organisation or company) focused on serving the training and developmental needs of affirmative development individuals. Van der Westhuizen (2015), thus, argued selecting a sample that only includes research participants that qualify as affirmative development candidates would be regarded as the most appropriate sample. Furthermore, Van der Westhuizen (2015) also argued that the ideal would be to select only those affirmative action candidates participating in an affirmative development programme. However, in reality, these programmes are not easy to locate or widely implemented. Additionally, logistical and practical problems may impede finding a large enough sample of willing participants that qualify as affirmative development candidates enrolled in or trainer-instructors providing affirmative development training programme (Van der Westhuizen, 2015).

Testing the validity of the affirmative development trainer-instructor performance structural model on this sampling population will, however, not be practically feasible (Van der Westhuizen, 2015) since very few such programmes exist and since, even fewer, such trainer-instructor exists. As a result, rather than focusing on the few trainer-instructors evaluating themselves, the focus should be on the trainees evaluating their trainer-instructors. The sampling population should therefore rather include the affirmative development trainees or learners and their perceptions of their trainer-instructors. However, the discussion on the sample population can be further developed, based on an argument that Van Heerden (2013) made regarding her structural model. Van Heerden (2013) argued that the value of her structural model (which focused on learning potential) extends to all forms of formal training and teaching and thus not restricted to affirmative development programmes and candidates. Van Heerden (2013) further stated that the psychological dynamics (i.e., nomological network of latent variables) underlying the learning performance of affirmative development programmes do not, in essence, differ from those of other learning performance programmes or contexts. The level at which the latent variables influence each other and the learning performance of students, will however, most likely differ across different teaching situations (Van Heerden, 2013). Therefore, a similar argument can be made for the value of the current Wessels-Van der Westhuizen affirmative development trainer-instructor competency model. The nomological network of latent variables underlying the affirmative development trainer-instructor performance does not, in essence, differ from those of other trainer-instructors, educators or teachers. Stated differently, the same latent variables that influence or determine the affirmative development trainer-instructor's performance might also play a part in influencing or determining the performance of other trainer-instructors, educators or teachers in other educational settings, such as high schools or all other universities[79]. Moreover, an argument has been made previously that these latent variables might also later be utilised as selection criteria during recruitment and selection of trainer-instructors in all educational settings.

Consequently, since affirmative development trainer-instructors and other trainer-instructors could possess the similar competency potential, competencies and outcome latent variables; since this research is the first to introduce trainer-instructor competency potential latent variables; and since this reach might, in the future, be utilised for selection, for the purposes of this research the sample population was third-year and honours students in the faculty of Economic and Management Sciences at the University of Stellenbosch. Third-year students/honours students will serve as more appropriate participants, as opposed to school learners, since students are seen as adult learners and affirmative development training programmes are aimed training adults that have already left school.

Institutional permission was obtained from Stellenbosch University, prior to conducting the research in the form of an electronic questionnaire. Informed consent[80] was also obtained from the students who participated in the study, which was also be done prior to conducting the research study.

Van der Westhuizen (2015) utilised a non-probability sampling, however, due to the non-probability sampling procedure that was used to select the sample it cannot be stated that the sample is an

[79] It is acknowledged that in the final analysis this claim needs to be supported by empirical evidence. A multi-group structural invariance and equivalence study will be required to give credence to this line of reasoning. Future research should be conducted to verify this legitimacy of this claim.
[80] A copy of the informed consent is available in Appendix A, see page 1.

appropriate representative of the sampling population. According to Van der Westhuizen (2015), the substantial sampling gap, between the target and sampling populations, added to the sampling problem. As a result, it can also not be stated that the sample is representative of the target population (Van der Westhuizen, 2015).

For the purposes of this research, a sample consisting of *circa* 400 research participants should be selected for the purposes of empirically testing the proposed reduced Wessels-Van der Westhuizen trainer-instructor performance structural model. A non-probability sampling procedure was utilised in the current study. This decision was basically forced on the current study by the following consideration. The researcher could select a random sample of students and then approach them with the request to complete the composite research questionnaire. The researcher cannot, however, insist that because the students in question had been selected in a random sample that they have to complete the questionnaire. To the extent that students randomly selected into the sample decline the invitation to participate so the sample in effect becomes a non-probability sample. Only approaching a random sample of students also increases the risk of not obtaining a sufficiently large sample given the very real risk that a substantial number of students will not accept the invitation to participate in the research. It was, therefore, decided to rather approach the whole of the sampling population and to invite all third-year and honour's students in the Faculty of Economic and Management Sciences to complete the composite research questionnaire. Due to the non-responses, this procedure will yet again in effect result in a non-probability sample.

The methodological limitations imposed by the large and non-ignorable sampling gap and the non-probability sampling procedure are formally noted.

3.8 STATISTICAL ANALYSIS

3.8.1 MISSING VALUES

Multivariate data sets commonly have missing values due to factors like non-responses, absenteeism in response and options containing no real answer (Mels, as cited in Pretorius, 2014). Missing, quantitative, data plagues almost all surveys and designed experiments and it is a prevailing problem to researchers, no matter how careful an investigator tries to have all questions fully answered or how well designed an experiment is (Babbie, 2013; Pigott, 2001; Scheffer, 2002; Switzer & Roth, 2002). In the current study, an electronic web-based questionnaire was used. The questionnaire was set up so that all items had to be responded to. To prevent fabricated responses in cases where respondents truly are unable to respond a response option was added to all response scale that presented respondents with the option "unable to respond". This response was then coded as a 6 and declared as a user-defined missing value. The problem is not the missing values themselves but how to deal with the missing data or what to do once it has occurred, once it has become impossible to recover the actual missing values (Scheffer, 2002; Switzer & Roth, 2002).

Before data can be analysed further, the presence of missing values must be investigated and addressed. The number of missing values, as well as the nature of the data, determine which missing data technique (MDT) will be utilised (Switzer & Roth, 2002). According to Raghunathan (as cited in Van der Westhuizen, 2015), a researcher's choice of which method to utilise when investigating missing values should be based on the potential of the method to improve the inferential validity of the results.

Deletion techniques, in essence, involve throwing out data or, more specifically, it entails dropping or removing cases with missing data points from the analysis, leaving a smaller data set than was originally collected, but with an observed value for every variable and case (Switzer & Roth, 2002). Imputation techniques were developed to deal with missing data without the loss of power[81] associated with the deletion of cases and they work on the bases of creating or assigning estimate scores to the missing values or lost data, instead of deleting them (Carter, 2006; Switzer & Roth, 2002). Some of the popular missing data techniques are discussed below.

3.8.1.1 List-wise deletion method

List-wise deletion, a deletion technique, is the most 'basic' deletion technique used. It involves removing all incomplete cases or missing data from the data set prior to any analysis (Carter, 2006; Switzer & Roth, 2002). The result is that only cases with complete data, or answers, are left in the data set (Mels, as cited in Van der Westhuizen, 2015). A disadvantage, though, is that sample size available for data analysis could be dramatically reduced, resulting in a loss of power (Carter, 2006; Switzer & Roth, 2002).

3.8.1.2 Pair-wise deletion method

Pair-wise deletion, a deletion technique, is an attempt to maintain the 'conservative' approach of deleting data whilst minimising the amount of data lost (Switzer & Roth, 2002). Pairwise deletion involves the calculation of the covariance estimates for each pair of variables from those cases where complete observations for both variables are available (Wothke, as cited in Carter, 2006). Pairwise deletion is often an improvement on list-wise deletion since more of the original data is retained rather than deleted (Switzer & Roth, 2002). However, this method does not solve the problem of item level

[81] When deletion techniques can reduce the sample size and if the amount of loss (regarding the sample size) is substantial the study power can be negatively affected. This can be seen as major disadvantage of deletion techniques (Switzer & Roth, 2002).

missing data. It also results in the reduction of the size of the sample available for data analysis (Switzer & Roth, 2002; Van der Westhuizen, 2015).

3.8.1.3 Imputation by matching

Imputation by matching, or hot deck imputation, is an imputation method that uses "donors". In other words, this method involves using other cases or sources, from another subject that had a similar profile of scores across the other variables, to provide or act as substitutes for the missing values or missing data points (Carter, 2006; Switzer & Roth, 2002). Ideally, matching variables should be used that will not be utilised in the confirmatory factor analysis. However, this is frequently not possible. The items least plagued by missing values are therefore typically identified to serve as matching or donor variables (Van Heerden, 2013). The advantage of this method is that it makes less stringent assumptions, than the multiple imputation procedures. The disadvantage is that when the cases are not successfully imputed they are eliminated from the imputed data set (Van der Westhuizen, 2015).

3.8.1.4 The multiple imputation method

Multiple imputation (MI)[82], an imputation technique, involves "…approach in which more than one value is imputed for each missing data point" (Switzer & Roth, 2002, p. 317). A new and complete data set is created for each set of imputed values (Switzer & Roth, 2002). The researchers will then generate several possible values for each missing observation in the data, which then create a number of complete data sets rather than a single reconstituted data set (Pigott, 2001; Switzer & Roth, 2002). The parameter of interest can then be calculated on each one of these data sets. Where the final parameter estimate is an average value calculated across all data sets (Switzer & Roth, 2002). A disadvantage is that the concept of more than one data sheet for a particular survey can be daunting for some end-users or non-statisticians. However, multiple imputation is always better than case deletion (Scheffer, 2002).

3.8.1.5 The Full Information Maximum Likelihood (FIML) method

FIML is one method for estimating unknown parameters of a model. The likelihood of the observed data is more complex when missing values occurs than in normal or usual data analysis situation (Pigott, 2001). Dempster, Laird, and Rubin (as cited in Pigott, 2001) suggested the use of an iterative solution, termed the EM algorithm, to find the estimate of a parameter. FIML estimation procedures are probably more efficient than the available multiple imputation procedures. However, a

[82] To avoid a reduction in sample size or when working with a or being left with a small data set requires alternative methods of dealing with data including missing values, two such alternative methods include Multiple Imputation (MI) and Full Information Maximum Likelihood (FIML) (Du Toit, 2014; Mahembe, 2014).

disadvantage is that a new separate imputed data set is created which then prevents item and dimensionality analyses as well as the calculation of item parcels (Van Heerden, 2013). The development of item parcels was required for the purposes of this research study since the research design is that of an *ex post facto* correlational design, as a result, FIML will not be utilised.

When considering which MDT should be used for the purpose of this research, the disadvantages were consulted first. For the purpose of this study the multiple imputation (MI) method was utilised to solve the problem regarding, potential, missing values when gathering data, provided that no more than 30% of the total number of possible data points are missing and provided that the item distributions are not excessively skewed (Mels, as cited in Van der Westhuizen, 2015).

3.8.2 ITEM ANALYSIS

A number of scales[83] were developed which was used to operationalise the latent variables constituting the structural model (as depicted in Figure 3.2). These scales were developed in such a manner that they are assumed to measure a specific construct or dimension of a latent variable carrying a specific constitutive definition. However, before these items can be utilised in composite indicators by calculating item parcels to operationalise the latent variables they are intended to reflect, they have to be analysed to determine whether or not they are poor terms or not.

Item analysis can be defined as "an assessment of whether each of the items included in a composite measure makes an independent contribution or merely duplicates the contribution of other items in the measure" (Babbie, 2013, p. 209). Item analysis is useful in discriminating between good and poor items. Items are considered to be poor items firstly if they are unable to elicit different responses from respondents that differ relatively little in terms of their standing on the latent variable that the item is earmarked to reflect (i.e., the item must sensitively discriminate between relatively subtle differences on the latent variable). Items are considered to be poor items secondly if they do not respond in unison with the other items in the scale/subscale designated to reflect the latent variable or dimension of the latent variable (i.e., items must be valid indicators of the latent variable). Item analysis adds value to item development and, as a result, it also adds value to the development of the measurement measure in general (Foxcroft & Roodt, 2013). More specifically, item analysis determines which of the items in a scale (if there are any) have a negative effect on the overall reliability of the scale or measure due to their inclusion (Van der Westhuizen, 2015). Ideally, all the items in a particular scale should reflect a single common underlying factor or latent variable.

[83] A copy of the proposed scales and questionnaire can be found in Appendix A.

There are two statistical approaches or methods that can be utilised in order to analyse items or to conduct item analysis, namely, classical test theory and item response theory. However, a combination of the two can also be utilised (Foxcroft & Roodt, 2013). For the purpose of this research study, only classical test/measurement theory item analysis was used.

3.8.2.1 Classical test theory (CTT)

"CTT involves the estimation of an attribute as a linear combination of response to test items" (Ellis & Mead, 2002, p.325). CTT has two purposes: to determine the item validity and to determine the discriminating power. *Item validity* reflects the extent to which variance in the item responses is due to variance in the underlying latent trait the item was designed to reflect. Item validity is inferred from the item-item correlations, the item-total correlations in which the total scores serve as an approximation of the latent trait and the squared multiple correlations when regression the item on a weighted composite of the remaining items in the scale or subscale. Valid items would consistently measure or reflect the same aspect or variable that the total measure is intended to measure. *Item difficulty* is the proportion or percentage of individuals who answered the item correctly compared to the total number of individuals who took the measure. A high percentage (a large number of individuals answered correctly) indicates that item was easy. The lower the percentage the more difficult the item (Foxcroft & Roodt, 2013). Item difficulty holds implications for the discriminating power of the item. *Discriminating power* is utilised to discover which items succeed in reflecting relatively small differences in test-taker's standing on the construct that the measure intended to assess. Discriminating power is inferred from the item standard deviations. Extreme low or extreme high item difficulty implies little variation in item responses and therefore low item standard deviations. (Foxcroft & Roodt, 2013).

3.8.2.2 Item analysis process

SPSS 25 (SPSS, 2017) was utilised to run the classical measurement theory item analysis. Various item statistics was considered, during the item analysis phase, to determine whether or not an item should be removed from a particular scale, such as the items means and standard deviations, item-total correlations, inter-item correlations, the squared multiple correlation, the change in subscale reliability when/if an item is deleted, as well as the change in subscale variance when/if an item was deleted. In applied settings, where important decisions are made based on specific test scores, a minimally accepted reliability should be to the value of .90 and desirable standard reliability should be to the value of .95 (Nunnally, 1978). However, values between .80 and .89 are also considered good (Nunnally, 1978; Pallant, 2007). Anatastasi and Urbina (as cited in Foxcroft & Roodt, 2013) stated that standardised measures should obtain reliabilities between .80 and .90. Depending on the type of measure used (i.e., personality, interest or aptitude) and whether the decisions (regarding the test scores) are made about individuals or groups reliability can range from .65 to .90 or higher (Foxcroft & Roodt, 2013). For the purposes of the current research study, a cut-off point of .80 for the Cronbach Alpha was considered acceptable.

The screening of items, which will be included in the final questionnaire, will be based on the following evaluative criteria. Items will be considered problematic to the extent that the following conditions apply to them:

- Extreme item means;
- Small item standard deviations; item standard deviations were considered small to the extent that they were distinct outliers to the lower end in the distribution of item standard deviations;
- Consistently smaller correlations with the remaining items in the scale or subscale; correlations were considered small if they are smaller than the mean inter-item correlation;
- Small item-total correlations; item-total correlations were considered small to the extent that they were distinct outliers to the lower end in the distribution of item-total correlations;
- Small squared multiple correlations; item-total correlations were considered small to the extent that they were distinct outliers to the lower end in the distribution of squared multiple correlations;
- An increase or small decrease in scale variance upon deletion of an item;
- An increase in the Cronbach alpha upon deletion of an item.

Extreme means or small standard deviations and a noticeable increase in the alpha when compared to the scale's Cronbach's Alpha will also be considered as cut-off values for selecting items. Items, or poor items, will be considered for elimination if these items exhibit characteristics that as outlined above or where the deletion of such poor items results in a substantially increased Cronbach's Alpha. However, in the end, only consulting the Cronbach Alpha is not ideal. Therefore, the researcher consulted a basket of evidence gathered before any final decisions were made. Moreover, the deletion of items that affects a small gain on an already high Cronbach alpha was not considered. Too aggressive culling of items based on marginally problematic item statistics can result in a loss of the richness/breath of a construct.

3.8.3 DIMENSIONALITY ANALYSIS USING EXPLORATORY FACTOR ANALYSIS (EFA)

The design of each of the scales and subscales used to operationalise or measure the latent variables, comprise the proposed reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, reflects the intention to construct essentially one-dimensional or unidimensional sets of items[84]. The purpose of the items is to operate as stimulus sets to which the research participants respond with observable behaviour that is primarily an expression of the specific unidimensional in questions or underlying that latent variable (Theron, as cited in Prinsloo, 2013). In the composite research questionnaire, items were removed that have weak or inadequate factor loadings, and, where necessary, to divide heterogeneous scales into two or more homogenous sets of items (De Goede, 2007; Theron, as cited in Van der Westhuizen, 2015).

Support for unidimensionality would be obtained if the eigenvalue-greater-than-unity rule (supported by the scree plot) result in the extraction of a single factor; if the magnitude of the factor loadings are reasonably high (> .50); and only a small percentage (less than 30 per cent) of the residual correlations are greater than .05 (Theron, as cited in Pretorius, 2014). EFA is used to test the unidimensionality assumption. EFA can be defined as "…an inductivity method designed to *discover* an optimal set of factors that accounts for the covariation among the items" (Skrondal & Rabe-Hesketh, 2004, p. 255).

Strictly speaking, the use of confirmatory factor analysis (CFA), conducted on each of the scales, should have been a more appropriate methodological choice to examine the unidimensionality assumption. This assumption, conducted by CFA, includes fitting single-factor measurement models on the data obtained for each scale or subscale for which the unidimensionality assumption applies. EFA was chosen over CFA for this purpose in the interest of expediency. This decision is formally acknowledged as a methodological limitation. However, CFA was conducted on the multidimensional scales (using the individual items).

Principal axis factoring (PAF), via SPSS 25 (2018), was utilised as the extraction technique (Tabachnick & Fidell, as cited in Van der Westhuizen, 2015). PAF is interested only in finding common variance (i.e., common underlying dimensions or factors per latent variable within the data); it seeks the least number of factors that can account for common variance of a set of latent variables; it only analyses common factor variability, removing uniqueness or unexplained variance from the model; and it only accounts for co-variation which it is preferred over PCA's account for total (i.e., common, unique and error/random) variance (Field, 2005).

In the occurrence of factor fission or in the event that there is more than one factor underlying the items, factor rotation was employed. Factor rotation is a technique utilised to discriminate between factors (Field, 2005). There are two types of rotation, namely orthogonal and oblique. Orthogonal rotation denotes the rotating factors while keeping them independents and therefore ensures that the

[84] It is formally acknowledged that all the latent variables in the proposed Wessels-Van der Westhuizen trainer-instructor competency model have not been conceptualised as unidimensional latent variables. Some have explicitly been conceptualised as multidimensional latent variables, for example, *learning climate, transformational trainer-instructor leadership, lifelong learning trainer-instructor, trainer-instructor expert* and *trainer-instructor emotional intelligence*. Nonetheless each of the latent dimensions comprising the se multidimensional latent variables have been conceptualised to be unidimensional.

factors remain uncorrelated. Oblique rotation allows factors to correlate (Field, 2005). Oblique rotation was employed in the current study since it allows for the possibility that the extracted factors may be correlated. Although this method might be slightly more difficult to interpret, it generally produces more realistic results (Van der Westhuizen, 2015).

In the case of factor fission, a second-order factor model based on the loading pattern shown in the pattern matrix and/or a bifactor model was fitted via confirmatory factor analysis to evaluate whether the use of the items as indicators of the latent variable interpreted as a second-order factor or interpreted as a multidimensional construct comprising a number of narrow, more specific, factors as well as a broader, more general factor was justified. When the second-order factor model showed at least close fit the statistical significance of the indirect effects of the second-order factor on the items were tested. The indirect effects were calculated by translating the Simplis syntax to Lisrel syntax and the use of the CO command.

SPSS 25 was utilised to assess the unidimensionality of the scales (EFA) with oblique rotation to operationalise the latent variables included in the proposed reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model. LISREL 8.8 (Du Toit and Du Toit, 2001) was used to perform the confirmatory factor analysis in the case of factor fission.

3.8.4 STRUCTURAL EQUATION MODELLING

For the purpose of this research study, an *ex post facto* correlational research design with two or more indicator variables or items, structural equation modelling (SEM), via LISREL, was used as a statistical analysis technique with the intention of testing the proposed reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model's fit.

3.8.4.1 Variable type

SEM can be performed by either utilising the individual items or item parcels. Parcelling is used most frequently in multivariate approaches to psychometrics, particularly for use of latent variable analysis techniques (e.g., exploratory factor analysis and SEM) (Little, Cunningham, Shahar, & Widaman, 2002). Item parcelling entails summing or averaging item scores from two or more items and using these parcel scores as a substitute for the single item scores in SEM analysis (Bandalos, 2002). An item parcel can therefore also be defined as an aggregate-level indicator comprised of the sum or average of two or more items, responses, or behaviours (Little et al., 2002). Item parcelling was utilised for the purposes of this study to reduce the number of freed measurement model parameters that need to be estimated so as to reduce the pressure on the sample size.

Little et al. (2002) suggests that there are various techniques or strategies available to build parcels generally, they all share a common prerequisite: that the dimensionality of the items to be parcelled must be determined prior to parcelling (Little et al., 2002). Theron (as cited in Van der Westhuizen, 2015) suggests that parcel formation should be based on either the factor loading information or the split-half method. Van der Westhuizen (2015) employed the split-half method in her study and two item parcels were created per subscale or latent variable. In order to design these item parcels, Van der Westhuizen (2015) had the first item parcel contain all the even-numbered items and the second item parcel contain all the odd numbered items. The same logic was followed for the purposes of this research study, in that the split-half method of creating item parcels was utilised.

In short, the trainer-instructor latent variables comprising the Wessels-Van der Westhuizen trainer-instructor performance structural and measurement models was operationalised, or empirically tested, by creating two item parcels per latent variable. These item parcels are seen as continuous latent variables. This, then, allows for the covariance matrix to be analysed, assume multivariate normality, using the maximum likelihood estimation.

3.8.4.2 Multivariate normality and normalisation

Incorrect standard errors and chi-square estimates is a result of the inappropriate analysis of continuous non-normal variables in SEM (Van der Westhuizen, 2015). According to Theron (2016), the failure to use the appropriate estimation technique (if the assumption of a multivariate normal distribution was not supported) can have significant negative effects on model fit. It is, therefore, essential that the univariate and multivariate normality of the indicator variables are assessed, which will be conducted via PRELIS (LISREL's data management programme) in order to select the estimation technique best suitable for the data (Van der Westhuizen, 2015).

When data is continuous, LISREL will use, by default, the maximum likelihood estimation to estimate the parameters that are freed in the model, which makes the assumption that the data follows a multivariate normal distribution (Theron, 2015a; Theron, 2016). First, the multivariate normality assumption will be tested. If the multivariate normality assumption is not met, then secondly normalisation will be attempted. Lastly, robust maximum likelihood estimation will be utilised if this attempt is unsuccessful. Robust maximum likelihood estimation is used in to get more credible parameter estimates and tests of their significance when the multivariate normality assumption has not been met (Jöreskog & Sörbom, 1996; Mels, as cited in Du Toit, 2014; Theron, 2015a; Theron, 2016).

3.8.4.3 Confirmatory factor analysis

Before the structural model can be fitted the fit and evaluation of the measurement model, used to operationalise the trainer-instructor competency model, should be inspected[85]. Unless the quality of the measures used to operationalise the latent variables in the structural model can be trusted, no other assessment of the links and causal pathways between the latent variables can be made (Diamantopoulos & Siguaw, 2000)[86]. Stated differently, if the measurement model does not fit and the magnitude and statistical significance of the parameter estimates do not indicate reliable and valid measures, assessing the structural hypotheses would be amount to a waste of time and resources. Additionally, it will not provide any real credible information.

Confirmatory factor analysis (CFA) is utilised to provide a confirmatory test of a measurement hypothesis that describes the manner in which the test items or composite indicator variables are hypothesised 'tap into' the underlying constructs (Foxcroft & Roodt, 2013). CFA involves the testing of specific hypotheses on the number of latent variable (i.e., factors) underlying the observed inter-item covariance matrix, the nature of the relationships between the factors as well as the nature of the loading patterns of the items (or composite indicator variables) on the factors (i.e., factor loadings or lamdas). CFA is designed to test hypotheses about the relationships between the items (or composite indicator variables) and the factors, where the number and interpretation of the factors are known in advance (Hair et al., 2006; Skrondal & Rabe-Hesketh, 2004). CFA is utilised to provide a confirmatory test of the measurement model, which specifies how measured or indicator variables logically and systematically represent constructs or latent variables in the model. The validation of the measurement model could, therefore, be accomplished by confirming that the various indicators hypothesised to measure the latent variables do, in fact, measure their intended latent variables (Hair et al., 2006). Stated differently, "The purpose of assessing a model's overall fit is to determine the degree to which the model *as a whole* is consistent with the empirical data at hand" (Diamantopoulos & Siguaw, 2000, p. 82).

3.8.4.3.1 Measurement model statistical hypotheses

The measurement model includes both latent variables (in this case exogenous latent variables) and indicator or observable variables (in this case X indicator variables of exogenous latent variables). CFA fits the hypothesised measurement model by finding model parameter estimates that allow for the estimation (or reproduction) of the covariance matrix, which would subsequently be compared to

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[85] As previously indicated by the numbering of the statistical hypotheses.

[86] Confirmatory factor analysis will be used to test the fit of the measurement model part of the comprehensive LISREL model. Prior to that, confirmatory factor analysis will also be used to test the fit of the measurement models implied by the constitutive definition of the latent variable and the design intention underlying the scales developed to measure the multidimensional latent variables in the reduced Wessels-Van der Westhuizen trainer-instructor structural model.

the observed covariance matrix. The ideal would be if the measurement model fits the data exactly and when it can perfectly explain the manner in which the indicator variables co-vary.

Exact fit means that the stance that the measurement model parameters can reproduce the observed covariance exactly in the parameter is permissible. The exact fit, depicted as a null hypothesis H_0: $\Sigma = \Sigma(\Theta)$, denotes that the reproduced covariance matrix $\boldsymbol{\Sigma}(\boldsymbol{\Theta})$ implied by the model and the observed population covariance matrix Σ are exactly the same in the population (Diamantopoulos & Siguaw, 2000; Kelloway, 1998). The exact fit for the measurement model can be expressed as statistical hypothesis 1a, exact fit null hypothesis:

$$H_{01a}\text{: RMSEA} = 0$$
$$H_{a1a}\text{: RMSEA} > 0$$

The exact fit null hypothesis is, however, a very ambitious stance to hold or implausible. A more realistic stance would be that the measurement model fits the population approximately or closely (Theron, 2015; Diamantopoulos & Siguaw, 2000). The close fit measurement model can be expressed as statistical hypothesis 1b, close fit null hypothesis:

$$H_{01b}\text{: RMSEA} \leq .50$$
$$H_{a1b}\text{: RMSEA} > .05$$

Should either the null hypothesis of exact fit or null hypothesis of close fit not be rejected, it would be permissible to interpret the parameter estimates, by interpreting the following hypotheses:

Lambda hypotheses

H_{0i}: $\lambda_{jk} = 0$; i = 2, 3, …, 32; j =1, 2, …, 30; k =1, 2, …, 11

H_{ai}: $\lambda_{jk} > 0$; i = 2, 3, …, 32; j =1, 2, …, 30; k =1, 2, …, 11

Theta-Delta variance hypotheses

H_{0i}: $\theta_{\delta jj} = 0$; i = 33, 34,..., 63; j = 1, 2.....30

H_{ai}: $\theta_{\delta jj} > 0$; i = 33, 34,..., 63; j = 1, 2.....30

Theta-Delta covariance hypotheses

H_{0i}: $\theta_{\delta jp} = 0$; i = 64, 65,..., 67; j = 1, 2.....30; p = 1, 2, …, 30; $j \neq p$

H_{ai}: $\theta_{\delta jp} > 0$; i = 64, 65,..., 67; j = 1, 2.....30; p = 1, 2, …, 30; $j \neq p$

Phi hypotheses

H_{0i}: $\phi_{kq} = 0$; i = 68, 69, …, 122; k = 1, 2, …, 11; q = 1, 2, …,11; k≠q

H_{ai}: $\phi_{kq} > 0$; i = 68, 69, …, 122; k = 1, 2, …, 11; q = 1, 2, …, 11; k≠q

3.8.4.3.2 Interpretation of the measurement model fit

Interpreting the measurement model' fit depends on a number of fit measures, namely, fit statistics, standardised residuals, as well as the modification indices for the Lambda ($\mathbf{\Lambda}$) and Theta-delta ($\mathbf{\Theta}_\delta$) matrices.

a) Fit statistics

Fit statistics refers to the range of fit indices labelled 'Goodness of Fit Statistics' which is produced by LISREL (Diamantopoulos & Siguaw, 2000). Goodness of fit (GOF) is a measure that indicates how well a model reproduces the covariance matrix among the indicator variables (Hair et al., 2006).

The first fit measure included in the output labelled 'Goodness of Fit Statistics' is the chi-square statistic, the Satorra-Bentler chi-square (χ^2) (Diamantopoulos & Siguaw, 2000). A large χ^2-value denotes a bad fit in the sample and a small χ^2-value denotes a good fit in the sample. A statistically significant χ^2 ($p < .05$) would result in the rejection of the exact fit null hypothesis (H_{01a}: RMSEA = 0), denoting that the hypothesised model does not fit the parameter or population data perfectly (Diamantopoulos & Siguaw, 2000). On the other hand, a statistically non-significant χ^2 ($p > .05$) would not result in the rejection of the exact fit null hypothesis, denoting that there is no significant discrepancy between the covariance matrix (or fitted hypothesised model) and the population covariance matrix (Kelloway, 1998). Therefore, the fitted hypothesised model can reproduce the observed covariance matrix to a degree of accuracy that can only be explained in terms of sampling error (Theron, 2015a). Furthermore, the degrees of freedom[87] can serve as a standard in supporting the determination of whether χ^2 is large or small. The model would be considered to have good fit if the chi-square value approximates the degrees of freedom with a χ^2-df ratio between 2 and 5 indicating good fit (Kelloway, 1998). However, in the end, it is highly unlikely that the model fits the population perfectly and, therefore, the rejection of the exact fit null hypothesis is expected for the purposes of this research study (Diamantopoulos & Siguaw, 2000).

The second fit measure to be considered in the output labelled 'Goodness of Fit Statistics' is the Root Mean Square Error of Approximation (RMSEA) (Diamantopoulos & Siguaw, 2000). The RMSEA

[87] Degrees of freedom (*df*) denotes the amount of mathematical information available to estimate the model parameters (Hair et al., 2006).

provides an indication of "…how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available" (Diamantopoulos & Siguaw, 2000, p. 85). RMSEA is based on the analysis of residuals, where smaller values indicate a better fit to the data (Kelloway, 1998). RMSEA is interpreted in the following manner, sample values smaller than .05 are indicative of very good fit, values ranging between .05 and .08 indicate reasonable fit, values ranging between .08 and .10 indicate mediocre fit, and values greater than .10 indicate a poor fit (Diamantopoulos & Siguaw, 2000; Steiger, as cited in Kelloway, 1998). Steiger (as cited in Kelloway, 1998) stated that RMSEA values smaller than .01 indicate an outstanding fit to the data. However, these values are rarely obtained and should thus not be expected for the purposes of this research study. The sample RMSEA estimate is used to test the close fit null hypothesis (H_{0128b}: RMSEA≤.05).

b) Standardised residuals

A *residual* is the difference between the estimated (derived from the model that has been fitted) and the observed covariance or variance (Hair et al., 2006). *Fitted residuals* are covariance residuals that denote the difference between an observed sample covariance matrix and the fitted or predicted covariance matrix (derived from the fitted model) (Diamantopoulos & Siguaw, 2000; Kline, 2011). If the model fit is good these fitted residuals should be small. However, the problem with fitted residuals is that their size varies with the unit of measurement and that the unit of measurement can vary from variable to variable (Diamantopoulos & Siguaw, 2000). A solution to this problem is *standardised residuals*. Standardised residuals are the "…fitted residuals divided by their estimated standard errors" (Diamantopoulos & Siguaw, 2000, p. 87). In large samples, these standardised residuals can be interpreted as z scores where a raw score equal to the mean is equal to a z-score of zero (Foxcroft & Roodt, 2013; Kline, 2011). Each standardised residual can be interpreted as standard normal deviate and are considered to be large if when they exceed +2.58 or -2.58 (Diamantopoulos & Siguaw, 2000). The percentage of large standardised covariance residuals were used to provide an additional comment on the fit of the measurement model.

c) Modification indices for the Lambda ($\mathbf{\Lambda}$) *and Theta-delta* ($\mathbf{\Theta}_{\delta}$) *matrices.*

Modification indices (MI), associated with fixed parameters of the model, denote the extent to which the normal theory chi-square (χ^2) fit statistic decreases or changes when a currently fixed parameter in the model is freed and the model re-estimated (Jöreskog & Sörbom, 1996; Hair et al., 2006; Kelloway, 1998). Large modification index values indicate measurement model parameters that could improve the model fit, if they were freed. If a large percentage of fixed parameters in the model would result in a significant improvement ($p < .01$) in model fit, then it implies that several possibilities exist to improve the model's fit (De Goede, 2007). That, in turn, comments negatively on the fit of the model. MI values greater than 6.64 represent statistically significant improvements in model fit (p <

.05). The percentage of statistically significant ($p < .01$) modification indices were calculated for $\mathbf{\Lambda}$ and $\mathbf{\Theta}_\delta$.

3.8.4.3.3 Interpretation of the measurement model parameter estimates

Only if the measurement model shows at least close fit (after analysing the fit statistics, standardised residuals, and modification indices for the $\mathbf{\Lambda}$ and $\mathbf{\Theta}_\delta$) the measurement model parameter estimates can be interpreted. Interpreting parameter estimates involves evaluating the statistical significance and magnitude of the freed[88] factor loadings $\mathbf{\Lambda}_x$, the statistical significance and magnitude of the measurement error variances in the main diagonal in $\mathbf{\Theta}_\delta$, the statistical significance and magnitude of the measurement error covariances in the off-diagonal section of $\mathbf{\Theta}$[89] and the statistical significance and magnitude of the covariance between the latent variables in $\mathbf{\Phi}$.

The operationalisation of the latent variables, comprising the structural model, will be considered successful if (Theron, 2015a, Hair et al., 2006):

a) the measurement model reflecting the allocation of item parcels to the latent variable they were designed to reflect shows, at least close fit (H_{01b}: RMSEA $\leq .05$ is not rejected);
b) the (unstandardised) freed factor loadings ($\mathbf{\Lambda}_x$) are all statistically significant ($p < .05$) and the (completely standardised) freed factor loadings are all large ($\lambda_{ij} \geq .71$) for all item parcels;
c) the (unstandardised) measurement error variances ($\mathbf{\Theta}_\delta$) are statistically significant ($p < .05$), and the (completely standardised) measurement error variances are small for all item parcels, and
d) the squared multiple correlations (R^2)[90] values are large ($R^2 \geq .50$) for all item parcels.

In the event that the measurement model close fit null hypothesis (H_{02a}) fails to be rejected or if a reasonable measurement model fit is obtained and if the conditions listed above are satisfied, only then will the comprehensive structural model be tested by fitting it in LISREL.

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[88] A free element in a LISREL matrix denotes the same pathway or connection between the variables, as in the case of hypotheses, represented by the column and the row, in the case of a matrix. A fixed element in a LISREL matrix denotes no path or connection between variables represented by the column and the row (Kelloway, 1998). Freed elements are free to be tested for their connections or hypothesised pathways, where fixed elements are not free for testing and cannot be included when fitting the model.

[89] This applies to the specific measurement error terms that should be allowed to correlate. The conclusion of successful operationalisation is not dependent on the significance or magnitude of these error covariances.

[90] R^2 denotes the proportion of variance in X explained in terms of the latent variable it represents ($R^2 = \lambda^2$). High R^2 values are desirable since they imply that the indicator assigned to a specific latent variable are reliable (Theron, 2015).

3.8.4.4 Fitting the comprehensive LISREL model[91]

As in the case of interpreting the measurement model's fit, the comprehensive structural model's fit also depends on a number of fit measures, namely, fit statistics and standardised residuals.

a) Fit statistics

The Satorra-Bentler chi-square (χ^2) statistic is consulted since it provides a measure of overall model fit (the goodness or badness of fit). The Satorra-Bentler chi-square (χ^2) statistic, in the case of the structural model, also provides a test of perfect fit by testing the exact fit null hypothesis, H_{0123a}: RMSEA = 0. The sample estimate of the Root Mean Square Error of Approximation (RMSEA) will, also be interpreted and used to test the close fit null hypotheses, H_{0123b}: RMSEA $\leq$ .05 against H_{a123b}: RMSEA > .05 (Diamantopoulos & Siguaw, 2000). The full spectrum of fit statistics provided by LISREL 8.8 will be briefly reported.

d) Standardised residuals

The same information and interpretation as per the measurement model, also applied to the structural model.

3.8.4.4.1 Interpretation of the structural parameter estimates

When evaluating the structural model, the focus is on the substantive relationships or links between various endogenous and exogenous latent variables. The objective is to determine whether or not these relationships or hypotheses are supported by the data (Diamantopoulos & Siguaw, 2000). However, according to Diamantopoulos and Siguaw (2000), there are the following issues of relevance:

a) The statistical significance of the parameter estimates: the (unstandardised) γ_{ij} and β_{ij} estimates should be statistically significant ($p < .05$);
b) The signs: the sign (positive or negative) hypothesised for the parameter under H_a should match the sign of the parameter estimate that was obtained to allow the rejection of H_0;
c) The magnitude of the parameter estimates: the strength of the (completely standardised) parameters estimates provide important information regarding the strengths of the hypothesised relationships,
d) The proportion of variance explained in the endogenous latent variables by the model: the R^2 values calculated for each endogenous latent variable provides important information

[91] The comprehensive LISREL model refers to the combined measurement and structural models. The measurement model depicts the structural relationships hypothesised to exist between the latent variables and the indicator variables. The structural model depicts the structural relationships hypothesised to exist between the latent variables. The structural model, as such, cannot be directly empirically tested. An inference on the fit of the structural model needs to be derived from the fit of the measurement and comprehensive LISREL models.

regarding the success with which the model accounts for variance in the endogenous latent variables.

e) The proportion of variance explained in the endogenous latent variables by the measurement error terms ζ_k: the ψ_k values calculated for each endogenous latent variable provides important information regarding the extent with which the endogenous latent variables are plagued by structural error.

Similar to the measurement model discussed above, the exact fit of the structural model means that the stance that the parameter values for the comprehensive model in the parameter can exactly reproduce the observed covariance matrix in the parameter is permissible. The exact fit, depicted as a null hypothesis H_0: $\Sigma = \Sigma(\Theta)$, denotes that the reproduced covariance matrix $\mathbf{\Sigma}(\mathbf{\Theta})$ implied by the model and the observed population covariance matrix Σ are exactly the same in the population (Diamantopoulos & Siguaw, 2000; Kelloway, 1998). The exact fit for the structural model can be expressed as statistical hypothesis H_{0123a}, the null hypothesis of exact fit:

$$H_{0123a}: \text{RMSEA} = 0$$

$$H_{a123a}: \text{RMSEA} > 0$$

However, as with the measurement model, the exact fit null hypothesis is a very ambitious stance to hold or implausible. A more realistic stance would be that the structural model fits the population approximately or closely (Theron, 2015a; Diamantopoulos & Siguaw, 2000). The close fit structural model can be expressed as statistical hypothesis 123b, the null hypothesis of close fit:

$$H_{0123b}: \text{RMSEA} \leq .50$$

$$H_{a123b}: \text{RMSEA} > .05$$

Once again, if support is obtained for the close fit null hypothesis (i.e., H_{0123b} is not rejected) and the examination of the complete range of LISREL fit statistics and standardised residuals indicate satisfactory fit of the comprehensive model, the estimates obtained for the freed parameters of the structural model can be evaluated by testing the statistical hypotheses formulated in section 3.5 (H_{0124} – H_{0146}).

The unstandardised beta (**B**) matrix will be examined in order to assess and determine the statistical significance of the causal relationships between the endogenous and endogenous latent variables (Diamantopoulos & Siguaw, 2000) and to decide on the β hypotheses. This matrix is a 8 by 8 (*m* by *m*) matrix of regression coefficients or path coefficients β_{ij} describing the strength (slope) of the regression of η_i on η_j (Theron, 2015a). Stated differently, it contains the partial regression coefficients signifying the strength of the causal relationship between the endogenous and endogenous latent variables when statistically controlling for the remaining effects in the model. These causal relationships, or beta hypotheses, will be regarded as statistically significant ($p < .05$) if the *t*-values are greater than 1.6649 because of the directional nature of the alternative hypotheses.

The unstandardised gamma (**Γ**) matrix will be examined in order to assess and determine the statistical significance of the causal relationships between the exogenous and endogenous latent variables in the structural model (Diamantopoulos & Siguaw, 2000) and to decide on the γ hypotheses. This matrix is a 3 by 8 (*m* by *n*) matrix of regression slope coefficients or path coefficients γ_{ji} describing the strength (slope) of the regression of ξ_i on η_j (Theron, 2015a). Stated differently, it contains the coefficient correlations signifying the causal relationship between the exogenous and endogenous latent variables. These causal relationships, or gamma hypotheses, will be regarded as statistically significant ($p < .05$) if the *z*-values are greater than 1.6649 because of the directional nature of the alternative hypotheses.

The unstandardised psi (**Ψ**) matrix will be examined in order to assess and determine the statistical significance of the structural error variance estimates (Diamantopoulos & Siguaw, 2000) and to decide on the ψ hypotheses. The variance-covariance matrix psi (**Ψ**) is a 8 by 8 (*m* by *m*) matrix of variance (in the diagonal) and covariance (in the off the diagonal) terms ψ_{ij} which describes the variance in and covariance between the residual terms of the *m* endogenous latent variables η_i and η_j. Covariance or correlation between the residual error terms implies a common latent variable, which is not included in the model, that influences the endogenous variables in question (Theron, 2015a). The off-diagonal covariances in Ψ have consequently been set to zero.

The unstandardised phi (**Φ**) matrix will be examined in order to assess and determine the statistical significance of the correlational relationships between the exogenous latent variables in the structural model and to decide on the ϕ_{kp} hypotheses (Theron, 2016). In the phi matrix, the main diagonal contains variance terms for the exogenous latent variables and the off-diagonal contain covariance terms. The exogenous latent variables are assumed to be correlated (Theron, 2016). The main diagonal variance terms have been set to unity because the latent variables have been assumed to be standardised.

3.8.4.4.2 Modification indices for the Beta (Β) and Gamma (Γ) matrices

As mentioned earlier, the modification indices indicate to which extent the normal theory chi-square (χ^2) fit-statistic will decrease if existing fixed parameters in the model are freed. Additionally, examining the modification indices of the **Γ** and **B** matrices, for current fixed parameters of the structural model, can provide means or information in order to determine if adding one or more paths would significantly improve the fit of the model. According to Theron (as cited in Van der Westhuizen, 2015), modification indices with values greater than 6.64 indicated that the current fixed parameters would improve the fit of the model significantly ($p < .05$) if freed. However, when considering model modifications, Diamantopoulos and Siguaw (2000) advocated that these modifications should also be theoretically or substantially justified.

The modification indices calculated for **Γ** and **B** will be used to derive possible data-driven suggestions for future research. Only in the event of a poor initial model fit will the modification indices calculated for **Γ** and **B** be used to improve the fit of the current model.

3.9 ETHICAL CONSIDERATIONS

Ethical issues in social research are important. Therefore, social research is shaped and guided by not only technical and scientific considerations, but also by administrative and ethical considerations (Babbie, 2013). Ethical issues in social research is what the research community agree on what is ethical and what is unethical, such as: before conducting any form of research researchers should evaluate their competence in conducting the research and their knowledge of ethics; participation in any research should be voluntary; the participant has the right to informed consent; the research study self should not harm (physically or psychologically) the participants; in the case of sensitive data collection the researcher should ensure the anonymity of the participant; participants information should be kept confidential and private; experiments almost always involve some kind of deception, however it is important to determine if a particular deception is essential for the research and whether the value derived from the study outweighs the or justifies the ethical violation (such as conducting a cost/benefit analysis); researchers are obligated to collect and analysis data and report on findings honestly (reporting includes additional ethical issues such as censoring and plagiarism), even if it goes against what is hypothesised; and researchers making subjective judgements, especially during qualitative data analysis, should not be biased; and lastly the right to debriefing, after the research has been conducted the participant has the right to seek psychological counsel should they feel the need, therefore the researcher has to provide the participant with contact details of such a counsel (Babbie, 2013; Aguinis & Henle, 2002).

Informed consent is “a norm in which subjects base their voluntary participation in research projects on a full understanding of the possible risks involved” (Babbie, 2013, p. 34). In other words, an informed consent is a written document that informs the test-taker or research participant, in advance, on matters such as: when and where the assessment or research is going to be conducted; what sort of material it will contain; what will be assessed; why the assessment is being conducted (the importance and purpose of the research study); what is expected of/from the participant (such as their time and involvement). This information is made available to the participant in order to prepare (mentally, physically and/or intellectually) as well as to assess them in making an informed decision regarding their voluntary participation in the research (Foxcroft & Roodt, 2013). Therefore, by signing this document (before the research or assessment is conducted) the research participant agrees that they understand what the research is all about, they are aware of all possible risks and they still choose to participate, even if they have the option of declining or withdrawing from the research (Babbie, 2013; Aguinis & Henle, 2002).

In Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006) it is required of a psychologist doing research to enter into an agreement with participants on the nature of the research, the participants' responsibilities as well as those of the researcher. The agreement in terms of which the research participant provides informed consent should meet the following requirements according to Annexure 12 (Republic of South Africa, 2006, p. 42):

> 89. (1) A psychologist shall use language that is reasonably understandable to the research participant concerned in obtaining his or her informed consent.
>
> (2) Informed consent referred to in subrule (1) shall be appropriately documented, and in obtaining such consent the psychologist shall –
>
> (a) inform the participant of the nature of the research;
>
> (b) inform the participant that he or she is free to participate or decline to participate in or to withdraw from the research;
>
> (c) explain the foreseeable consequences of declining or withdrawing;
>
> (d) inform the participant of significant factors that may be expected to influence his or her willingness to participate (such as risks, discomfort, adverse effects or exceptions to the requirement of confidentiality);
>
> (e) explain any other matters about which the participant enquires;
>
> (f) when conducting research with a research participant such as a student or subordinate, take special care to protect such participant from the adverse consequences of declining or withdrawing from participation;
>
> (g) when research participation is a course requirement or opportunity for extra credit, give a participant the choice of equitable alternative activities; and
>
> (h) in the case of a person who is legally incapable of giving informed consent, nevertheless –
>
> (i) provide an appropriate explanation;
>
> (ii) obtain the participants assent; and
>
> (iii) obtain appropriate permission from a person legally authorized to give such permission.

For the purposes of this research, all research participants were asked to complete an informed consent document (shown in Appendix A as a preamble to the composite research questionnaire) prior to completing the online questionnaire. Only once the research participants agreed to partake in the study were they given access to the questionnaire. Furthermore, since the sample contained individuals over the age of eighteen, no guardian had to be present or sign on behalf of the research participant.

Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p.41) requires psychological researchers to obtain institutional permission from the organisation from which research participants will be solicited:

> A psychologist shall –
> (a) obtain written approval from the host institution or organisation concerned prior to conducting research;
> (b) provide the host institution or organisation with accurate information about his or her research proposals; and
> (c) conduct the research in accordance with the research protocol approved by the institution or organisation concerned.

Informed institutional permission for the research was be obtained from the Division of Institutional Research and Planning of Stellenbosch University prior to conducting the study. No critical latent variables where the possibility of unusually high or low scores could signal serious threats to the well-being of research participants was assessed in the current research study.

Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p.41) requires psychological researchers to disclose confidential information under the following circumstances:

> A psychologist may disclose confidential information –
> (a) only with the permission of the client concerned;
> (b) when permitted by law to do so for a legitimate purpose, such as providing a client with the professional services required;
> (c) to appropriate professionals and then for strictly professional purposes only;
> (d) to protect a client or other persons from harm; or
> (e) to obtain payment for a psychological service, in which instance disclosure is limited to the minimum necessary to achieve that purpose.

No specific steps have therefore been taken to make arrangements for contingency support. The principal outline in Annexure 12 will nonetheless be honoured if results should indicate that the well-being of any research participant is threatened.

The instruments that were used to collect data from research participants were all either developed by the researcher or available in the public domain. None of the instruments could thus be regarded as psychological tests as defined by the Health Professions Act.

CHAPTER 4 RESEARCH RESULTS

4.1 INTRODUCTION

Chapter 4 presents the results of the various statistical analyses, as discussed in Chapter 3, that were performed. The predominant aim of Chapter 4 is to present and examine the results, report on the decisions on the statistical null hypotheses and infer the implications for the overarching and path-specific research hypotheses, as previously discussed in Chapter 3.

Firstly, the results of the descriptive analyses are presented, namely the distribution of missing values across items, the demographic composition of the sample and the resultant size. Secondly, the results of the item analysis and dimensionality analysis, performed only on the unidimensional scales and subscales, are presented. The results of the classical measurement theory (CMT) item analysis and exploratory factor analysis were presented and interpreted to assess the psychometric integrity of the indicator variables (i.e., individual items) meant to represent the various latent variables comprising the structural model developed in response to the research initiating question. Thirdly, the results of the confirmatory factor analyses are presented, following the test of multivariate normality. CFA was firstly conducted on each of the multidimensional scales utilising individual items as indicators, then secondly to evaluate the success with which the item parcels operationalised the latent variables comprising the trainer-instructor structural model. Fourthly, the fit of the comprehensive LISREL model is presented and evaluated. Lastly, the estimates obtained for the freed parameters of the structural model are presented and evaluated.

4.2 MISSING VALUES

As discussed in Chapter 3 missing, quantitative data plagues almost all surveys and designed experiments and is, therefore, a prevailing problem to researchers (Babbie, 2013; Pigott, 2001; Scheffer, 2002; Switzer & Roth, 2002). As a result, before commencing with data analysis, the issue of missing values had to be addressed (Theron, 2016). Although data were collected by means of an online questionnaire, missing values were still present. This was due to the fact that test-takers had a sixth option of ‘unable to rate’ as an additional option to the five-point rating scale. This sixth option was coded as a user-defined missing value.

Multiple imputation (MI) was selected, for the purposes of this research study, as the method for addressing missing data, since this approach can be used in combination with other statistical procedures such as item analysis and the calculation of item parcels. MI performs several imputations for each missing value. Each imputation creates a completed data set, which should be analysed separately in order to obtain multiple estimates of the parameters of the model (Davey, Shanahan, & Schafer, 2001; Dunbar-Isaacson, 2006; Van Heerden, 2013).

At the time that the process of data collection was terminated one thousand, seven hundred and thirty-eight (N = 1738) data sets were obtained. Utilising only the complete response data sets, a total of six responses in which test-takers did not give consent to participate in this research study, were deleted. This left a total of one thousand, seven hundred and thirty-two responses (N = 1732) that gave consent. Next, there were five test-takers that did not answer one or more section(s) (i.e., scales that operationalised a specific latent variable) in the questionnaire. These five data sets were deleted. This left a total of one thousand, seven hundred and twenty-seven complete responses (N = 1727), that all gave informed consent to participate in the research study. Lastly, the data sets for the test-takers that selected option 6 'unable to rate' (i.e., missing values) on more than half of the items (i.e., questions) were deleted. As a result, a further seven responses were deleted. In the end, a total of 1720 complete responses were utilised in the research study.

The item with the most missing values was item H6ii ("*The lecturer continuously went on short courses and workshops and other learning, training and development programmes*"), with a total of 476 missing values (i.e., option 6). Thus, 27.67 percent of research participants could not rate this item. This was most likely due to the fact that the lecturers do not share this type of information with their students. Although it was the item with the most missing values, it was still far below 50 percent and thus retained in the data set for the imputation of missing values. The distribution of missing values per item is shown in Table 4.1.

Multiple imputation (via PRELIS) was conducted on the sample of one thousand, seven hundred and twenty (N = 1720) complete responses. A total of 525 different missing-value patterns were detected. Missing values constituted only 2.369357 percent of the total data set[92]. Convergence of the EM-algorithm was obtained after seven iterations. No cases were deleted since multiple imputation was utilised.

The imputed data set was utilised during item analysis and exploratory factor analysis performed in SPSS 25 (SPSS, 2018).

[92] The number of missing values per item shown in Table 4.1 sum to 3464 across the 85 items. In total there were 1720 x 85=146200 data points of which 3464 were missing.

Table 4.1

Distribution of missing values across items

A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5
4	11	18	24	21	34	18	21	17	25	25
B6	B7	B8	C1i	C2i	C3i	C4i	C5ii	C6ii	C7ii	C8ii
12	7	28	12	18	145	22	48	28	31	24
C9iii	C10iii	C11iii	C12iii	C13iii	C14iii	C15iv	C16iv	C17iv	C18iv	C19iv
35	18	26	24	22	55	20	14	20	21	22
C20v	C21v	C22v	C23v	C24v	D1	D2	D3	D4	E1i	E2i
25	36	24	35	50	7	12	13	10	20	17
E3i	E4ii	E5ii	E6ii	E7iii	E8iii	E9iii	E10iv	E11iv	E12iv	F1
49	20	14	24	16	55	29	47	14	22	8
F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
23	16	13	13	15	21	24	46	64	45	127
G7	H1i	H2i	H3i	H4ii	H5ii	H6ii	I1i	I2i	I3i	I4ii
39	24	74	31	36	161	476	18	88	87	40
I5ii	I6ii	J1i	J2i	J3ii	J4ii	J5iii	J6iii			
21	7	180	27	67	90	110	64			

Note: Total Sample Size = 1720

4.3 SAMPLE

Originally, in Chapter 3, an argument was put forth to include third-year and honours students in the faculty of Economic and Management Sciences at the University of Stellenbosch as the sample population. Third-year students/honours students served as more appropriate participants, as opposed to school learners, since students are seen as adult learners and affirmative development training programmes are aimed training adults that have already left school. As a result, and as part of the original ethical clearance application and institutional permission, ethical clearance and institutional permission were granted to send out research invitations per email to all the third-year students[93] in the Faculty of Economic and Management Sciences at the University of Stellenbosch. Based on this an online questionnaire was sent out to said research participants at the end of March 2018. However, since the first questionnaire invitation and a second reminder questionnaire invitation were sent out only 71 completed responses were received towards the end of April 2018. Unfortunately, this was not nearly a sufficient number since a minimum of 400 responses were required for the purpose of this research study. Consequently, ethical clearance was again applied for and granted to conduct data collection via Facebook and LinkedIn. Unfortunately, again, this method of data collection failed to generate the required number of responses. Only 150 completed responses were received towards the middle of May 2018. A last attempt was made to ensure the remaining 250 complete responses can be obtained within a limited amount of time. This included applying for and receiving ethical

[93] Somewhere in the process of applying for ethical clearance the request to apply for honours students as well got lost, on the part of the researcher.

clearance and institution permission from Stellenbosch University to approach all adult learners/post-school learners[94] registered at Stellenbosch University in 2018 for participation in the current research study.

This final decision, to include all students, was based on the following reasoning:

(1) The initial response rate for all final year students at the Faculty of Economic and Management Sciences was only about 4%, and (2) the current research would, therefore, have needed about 6000 students (at a 4% response rate to complete the full 400 responses). However, (i) due to the very low response rate before it was safe to assume that an even lower response rate might apply this time around (of about 2% or 3%) since it was the end of semester 1. Therefore, the current research needed about 10 000 students. (ii) Additionally, not all students that started filling the questionnaires actually completed the full questionnaire. Thus, invitations had to be sent out to about 24 500[95] students. (iii) Finally, it was also safe to assume that not all students access their student emails regularly (if at all). Thus, even more than 24 500 students would have had to be contacted.

During this last attempt at obtaining the remaining 250 complete responses, it became apparent that the term ‘adult learner’, as it was originally termed in the thesis, was too vague. Lundberg (2003) confirms this belief that the term ‘adult learner’ is problematic. Originally, third-year students/honours students in the Faculty of Economic and Management Science were selected to represent these trainees since they serve as more appropriate participants, as opposed to school learners, since students are seen as adult learners and affirmative development training programmes are aimed training adults that have already left school. The term ‘adult learner’ was used to indicate that the learners have left school, at roughly the age of 18 (i.e., adult). Some studies put the age of adult learners at 21 or 22 (e.g., studies conducted by Thorndike, Jones & Conrad, and Wechsler as cited in Knowles, 1973). “Thus from the cross sectional-studies we get a picture of intelligence peaking in the early twenties…” (Knowles, 1973, p. 152). Other studies put the age of adult learners at 25 (Compton, Cox, & Laanan, 2006; Rabourn, BrckaLorenz, & Shoup, 2018). Thus, studies proposed that 18-22-year-old learners are not adult learners (Lundberg, 2003). However, Lundberg (2003) believes that younger students, under 22, should also be seen as adults.

The idea behind the term ‘adult learner’, for the purposes of this research, was to place the focus on learners that ‘have already left school’ and not on learners still in school (i.e., primary or high school or below the age of 18). Thus, any student or learner (i.e., trainee) that have left school and is currently

[94] Thus, all students (1st, 2nd, 3rd, Honours and Masters students) at Stellenbosch University as well as other learning programmes at Stellenbosch University that have adult learners/post-school learners.
[95] At the time of applying for ethical clearance and institutional permission there was about 368 incomplete responses that could not be used as part of the data collection. That is ratio of 1:2.45 (completed responses: incomplete responses).

enrolled in a tertiary education institution that attends face-to-face classes and can directly interact with their lecturer (i.e., trainer-instructor). Therefore, the term 'adult learner' should more accurately have been replaced with the terms 'tertiary learner' or 'post-school learner'[96]. Lunberg (2003) argued, in line with the reasoning of the current research, that the term 'adult learner' should include degree-seeking adult learners that are enrolled in full time, or part-time, degree-granting educational institutions. Moreover, the term 'adult learner' should also include learners that have taken a gap year before starting their tertiary educational journey and those that have been started their tertiary educational journey directly after school (Lundberg, 2003).

In the end, a total of four thousand, one hundred and sixty-seven responses to the electronic questionnaire (N = 4167) were collected over the course of fourteen weeks. However, only one thousand, seven hundred and thirty-eight responses (N = 1738) were indicated as complete responses[97] by the Checkbox system utilised by the Survey platform. The other two thousand, four hundred and thirty responses (N = 2430) were incomplete responses and was thus not utilised for the purpose of this research study. The large number of incomplete responses could indicate that the length of the questionnaire was too lengthy and taxing on the research participants. Future research might need to think about reducing the length of the questionnaire. The large number of incomplete responses could also be due to the research participants being too busy with their academic workload to have sufficient time for participating in the full questionnaire. Alternatively, the large number of incomplete responses could also indicate a certain kind of research participant. One that possibly does not see the need for research and therefore lacks the necessary motivation to exert the effort required to complete the questionnaire. One that possibly only studies for a short-term goal (i.e., examinations or marks) and is thus not invested in long-term outcomes or goals. It could then be argued that by excluding these latter type of research participants the research, the research might lose valuable feedback on trainer-instructor's performance or the education system. Furthermore, the non-probability nature of the sampling procedure from the eventual sampling population[98] invariably meant that the current research study cannot claim that the sample was representative of post-school learners registered at Stellenbosch University in South Africa. The magnitude of the sampling gap between the sampling population and the target population moreover precludes any claim that the sample may be considered as representative of the target population of post-school South African learners. In addition, the selected sample cannot be considered representative of the population of

[96] For the purposes of the current research the term 'post-school learner' was be used instead of 'adult learner'.
[97] Checkbox's evaluation of responses as complete or incomplete is frustratingly lenient. The consequence is that not all responses that Checkbox labels as complete are in fact complete.
[98] The sampling procedure had to be considered a nonprobability sample because, although the whole target population was invited to participate, the decision to take up the invitation rested with the post-school learners.

disadvantaged post-school learners. This is acknowledged as a methodological limitation in the current research study.

In Chapter 3 the size of the sample was calculated utilising Jackson's (as cited in Kline, 2011) proposed size-to-parameters ratio of 20:1 as well as Bentler and Chou's (as cited in Kelloway, 1998) recommended ratio of sample size to estimated number of parameters ranging between 5:1 and 10:1. The maximum sample size that was calculated, for the purpose of this research study, based on Jackson's (as cited in Kline, 2011) proposed size-to-parameters ratio of 20:1, was 1640 respondents. The current study thus utilised a larger sample size (N = 1720) than the one proposed by Jackson (as cited in Kline, 2011). This then allowed the current research study to make inferences, based on the findings, with more confidence.

Full details regarding the biographical information of the sample (N = 1720) is provided in Table 4.2 below.

Table 4.2

Sample characteristics

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	638	37.1	37.1	37.1
	Female	1081	62.8	62.9	100.0
	Total	1719	99.9	100.0	
Missing	System	1	.1		
	Total	1720	100.0		

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20	608	35.3	35.4	35.4
	21-25	675	39.2	39.3	74.6
	26-30	163	9.5	9.5	84.1
	31 or older	273	15.9	15.9	100.0
	Total	1719	99.9	100.0	
Missing	System	1	.1		
	Total	1720	100.0		

Population Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	301	17.5	17.5	17.5
	Coloured	255	14.8	14.8	32.3
	Asian (Indian, Korean, Chinese, Japanese)	59	3.4	3.4	35.8
	White	1082	62.9	62.9	98.7
	Other	22	1.3	1.3	100.0
	Total	1719	99.9	100.0	
Missing	System	1	.1		
	Total	1720	100.0		

Home Language					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	isiZulu	43	2.5	2.5	2.5
	isiXhosa	65	3.8	3.8	6.3
	Afrikaans	733	42.6	42.6	48.9
	English	690	40.1	40.1	89.1
	Tshivenda	7	.4	.4	89.5
	Xitsonga	13	.8	.8	90.2
	Sepedi	17	1.0	1.0	91.2
	Setswana	15	.9	.9	92.1
	Sesotho	23	1.3	1.3	93.4
	isiNdebele	4	.2	.2	93.7
	Siswati	11	.6	.6	94.3
	Other	98	5.7	5.7	100.0
	Total	1719	99.9	100.0	
Missing	System	1	.1		
	Total	1720	100.0		

Highest Level of Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School Grade 12	997	58.0	58.0	58.0
	Certificate	26	1.5	1.5	59.5
	Diploma	43	2.5	2.5	62.0
	Degree	243	14.1	14.1	76.1
	Honours	226	13.1	13.1	89.3
	Masters or PhD	168	9.8	9.8	99.1
	Other	16	.9	.9	100.0
	Total	1719	99.9	100.0	
Missing	System	1	.1		
	Total	1720	100.0		

Degree/tertiary education completion time					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I am still busy completing my degree/tertiary education.	1350	78.5	81.9	81.9
	I completed my degree/tertiary education last year.	92	5.3	5.6	87.5
	I completed my degree/tertiary education in the last 5 years.	206	12.0	12.5	100.0
	Total	1648	95.8	100.0	
Missing	System	72	4.2		
	Total	1720	100.0		

There was only one test-taker that did not specify any gender, age, population group, home language, or highest level of education. This is strange since these settings were marked as compulsory in order to move onto the next page. There were seventy-two test-takers that did not indicate the timing of their degree/tertiary education competition. These were the first responses from the first sample group (i.e., all third-year students in the factuality of Economic and Management Sciences). The data collected from Facebook and LinkedIn, as well as from all the students at Stellenbosch University, necessitated the revision of this biographical question, namely "Regarding my degree/tertiary education:". Here the research participants had three options, namely "I am still busy completing my degree/tertiary education.", "I completed my degree/tertiary education last year.", and "I completed my degree/tertiary education in the last 5 years." These additional options were added to acknowledge the more diverse nature of the post-school learners brought about by the extension of the sampling population that was necessitated by the low response rate during the first data collection attempt.

In general, the sample can be described as typically female, 18-25 years old, Afrikaans or English-speaking, white and still busy completing their bachelor's degree.

The male and female frequencies were not evenly distributed. There was 25.7 percent more female research participants than there were males. This might have an impact on the current research findings should there be statistically significant differences between the way females perceive their lecturers and the criteria that they use to evaluate their lecturers compared to their male counterparts' perceptions and evaluation criteria. However, these differences fall outside the scope of this research study.

The majority of the research participants (74.6 percent) were younger than 25 years old. It could be argued that these research participants have not yet fully developed their intricate cognitive thinking ability to fully grasp and contemplate the impact of their lecturer on their learning performance. However, again, the understanding of cognitive development at this level falls outside the scope of this research study.

More than half of the research participants were white (62.9 percent). Once again, this might have an impact on the current research findings should there be statistically significant differences found after conducting multi-group SEM analysis in future research studies.

In terms of languages spoken about 59.9 percent of all research participants' home language is not English. This might have an impact on the research findings since the questionnaire was provided in English only. However, since the research participants are all post-school learners it can be argued that the majority of their tertiary educational institutions conduct classes in English. As a result, these research participants are studying and thinking in English. Thus, the home language should not negatively affect the data.

In terms of highest level of education, just over half (58 percent) of all research participants have only received their High School Grade 12 qualification. These research participants are currently engaged in obtaining a bachelor's degree.

Lastly, in terms of degree/tertiary education completion time, the 12 percent that completed their tertiary education in the last five years might have experienced older teaching styles from their lecturers. This might have an impact on the way they rate their lecturers. However, although technology and teaching methods do change over time, the last five years did not produce any extreme changes in technology or teaching methods[99] that should seriously negatively influence the current research findings.

The focus of the current research study is on the trainer-instructor's performance and, as a result, research participants had the opportunity to rate either one of their current or former lecturers that they regard as most competent or regard as least competent. The rationale behind this separation was to attempt to maximise the variance in trainer-instructor's standing on *trainer-instructor competency potential latent variables*, their competence on *trainer-instructor competency latent variables*, their competence or indirect influence on the *training situational latent variables*, and the *trainer-instructor outcome latent variables* (i.e., *learning competency potential latent variables*). Details on the choice respondents made as to whether to rate a lecturer they regard as competent or incompetent of is found in Table 4.3.

Table 4.3

Distribution of the choice made by respondents whether to rate a competent or incompetent lecturer

Rating competency of lecturer						
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The most competent lecturer	1324	77.0	77.0	77.0
	The least competent lecturer	396	23.0	23.0	100.0
	Total	1720	100.0	100.0	

Most of the research participants (77 percent) rated the lecturer that they regarded as most competent. A more even distribution would most likely have increased the variance in the indicator variables and this would have positively influenced the chances of finding statistically significant path coefficients if such effects do in fact exist.

4.4 PSYCHOMETRIC EVALUATION OF THE MEASUREMENT INSTRUMENTS

After managing the missing values and analysing the sample a psychometric evaluation of the measuring instruments was conducted. For the purpose of this research study, this evaluation was conducted subscale-by-subscale. In the end, all the unidimensional scales and subscales[100] were analysed first via classical measurement theory item analysis followed by a dimensionality analysis (i.e., exploratory factor analysis). The multidimensional subscales were subsequently analysed, as a whole, by confirmatory factor analysis.

[99] That the current author is aware of.

[100] The subscales of the multi-dimensional scales were also subjected to item analysis and exploratory factor analysis. However, the full multidimensional scales were not subjected to item analysis or exploratory factor analysis only to confirmatory factor analysis.

Item analysis

Item analysis was performed to identify and, if need be, eliminate possible items that do not contribute to an internally consistent description of the various latent variables forming part of the proposed trainer-instructor competency model (Van der Westhuizen, 2015). Item analysis is, therefore, an analysis of reliability. Decisions regarding the deletion of an item were based on a basket of evidence obtained from the classical measurement theory item analysis, including a cut-off point of .80 for the Cronbach Alpha as mentioned in Chapter 3. Items that were considered problematic were not used in the calculation of composite indicator variables (i.e., item parcels) used to operationalise the latent variables in the model. Item analysis was conducted using the SPSS Reliability Procedure (SPSS 25.0).

Dimensionality analysis

Exploratory factor analysis was conducted by performing unrestricted principal axis factor analysis with oblique rotation via SPSS 25 on the various scales and subscales. The purpose of the analysis was to assess whether each scale or subscale measured a single indivisible factor. Furthermore, if only a single factor was extracted, to evaluate the extent to which each item, along with the rest of the items in that particular scale or subscale, measured the underlying latent variable[101]. Poor items that were deleted in the preceding item analysis phase were not included in the factor analysis. In terms of analysing dimensionality analysis, the eigenvalue-greater-than-one rule and scree test were utilised as a guide to determine how many factors, per scale or subscale, are required to adequately explain the observed correlation matrix (Tabachnick & Fidell, 2014; Van der Westhuizen, 2015). The factor loadings of items were considered satisfactory if they were greater than .50. The adequacy of the extracted solution (factor) as an explanation of the observed inter-item correlation matrix was assessed by calculating the percentage of the residual correlations larger than .05.

In the case of the scales and subscales that were designed to measure unidimensional latent variables, or dimensions of multidimensional latent variables were factor fission was found, confirmatory factor analysis (CFA) was used to fit the first-order measurement model indicated by the EFA as well as a second-order measurement model in which the EFA extracted first-order factors loaded on a single second-order factor and a bifactor model (Reise, 2012) in which each item measured a specific, narrow factor (indicated by the EFA) as well as a broad, general factor. The objective with the latter two models was to evaluate the items as indicators of either (depending on which model showed superior fit) a second-order factor or of a broad, general factor and/or a narrower, more specific factor.

[101] The extraction of a single factor on which all items of a specific subscale load with substantial ($\lambda_{ij} > .50$) loadings would not yet allow for the conclusion that the items all successfully measure the specific latent variable they were earmarked to reflect.

This was considered a methodologically more justifiable procedure than forcing a single factor in the EFA analysis and inspecting the magnitude of the factor loadings.

Confirmatory factor analysis

The scales that were conceptualised as multi-dimensional[102] were analysed via confirmatory factor analysis (CFA) as well in order to formally examine the construct validity of these measures.

4.4.1 PSYCHOMETRIC EVALUATION OF THE LEARNING MOTIVATION SCALE

The *learning motivation* scale consists of six items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. The *learning motivation* scale was developed as a unidimensional scale.

4.4.1.1 Item analysis: Learning Motivation

The full results from the item analysis for the learning motivation scale are depicted in Table 4.4.

A satisfactory (above .80) Cronbach's alpha of .863 was obtained, as shown in the Reliability Statistics section of Table 4.4. This indicates that approximately 86% of the variance in the items was systematic or true score variance and only 14% was random error variance.

In the Item Statistics section of Table 4.4, item means ranged from 4.07 to 4.57 on a five-point Likert scale and the item standard deviations ranged from .707 to 1.05. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the scale (Theron, 2017). The absence of extreme means and small standard deviations implies that all the items in this scale were able to detect relatively small differences in test-takers' standing on the latent *learning motivation* dimension. The highest mean was for item A6. Item A6's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was also for item A6.

The inter-item correlation matrix reflects the correlations between each item and every other item in the scale Problematic or poor items will not correlate with the rest of the items because these poor items do not reflect the same underlying factor or fail to do so sensitively (Theron, 2017). The inter-item correlations ranged between .364 and .667. The inter-item correlation matrix indicated that all items correlated moderately with the rest of the items. The mean inter-item correlation was .521. None of the items consistently correlated lower with the remaining items of the scale than this typical

[102] Namely, *learning climate, transformational trainer-instructor leadership, lifelong learning trainer-instructor, trainer-instructor expert* and *trainer-instructor emotional intelligence*.

correlation. In terms of Guilford's informal interpretations of the magnitude of correlations, those correlations below .2 indicates a very slight correlation or no relationship at all and correlations between .9 and 1 indicates a very high correlation or a dependable relationship (Lachenicht, 2002). None of the correlations were below .2, thus indicating that all the items essentially measure the same underlying factor. None of the correlations were between .9 and 1, thus indicating that there are no two items that measured the exact same thing. The inter-item correlation matrix showed that item A4 showed the highest correlations ranging from .424 to .667 and item A2 showed the lowest correlations ranging from .364 to .510.

In the Item-Total Statistics section of Table 4.4, the corrected item-total correlations ranging from .530 to .758 were satisfactory since all the values were greater than .3. Item A2 obtained the lowest corrected item-total correlations. The recommended cut-off for the corrected item-total correlations is values greater than .3 (Mahembe, 2014; Pallant, 2007), thus item A2 still makes the cut-off. The more important finding though was that item A2 could not convincingly be described as an outlier at the lower end of the corrected item-total distribution. This indicates that all the items are measuring the specific latent variable they were earmarked to measure to more or less the same satisfactory degree (Pallant, 2007). The squared multiple correlations ranging from .308 to .608 were satisfactory. The squared multiple correlations of item A2 was, again lower than the other items. This again suggested that the variance in item A2 might originate from a somewhat different source of systematic variance than the remaining items. Thus, marking item A2 as somewhat of an outlier in the distribution of squared multiple correlations and thus as a poor item. The squared multiple correlation indicates the squared multiple correlations when regressing each item on a weighted linear composite of the remaining variables (Theron, 2017). Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item A2 does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the learning motivation scale suggested that item A4 (*"I wanted to learn as much as I could from this module"*) was the strongest item in the scale and item A2 (*"When I did not understand some parts of this module I tried harder by, for example, asking questions"*) was the weakest item in the scale. None of the items were deleted.

Table 4.4

The reliability analysis output for the Learning Motivation scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.863	.867	6

Item Statistics			
	Mean	Std. Deviation	N
A1	4.24128	1.051570	1720
A2	4.07326	.962584	1720
A3	4.32035	.844683	1720
A4	4.29535	.925988	1720
A5	4.15407	1.047497	1720
A6	4.57035	.707102	1720

Inter-Item Correlation Matrix						
	A1	A2	A3	A4	A5	A6
A1	1.000	.364	.466	.614	.582	.444
A2	.364	1.000	.510	.424	.456	.403
A3	.466	.510	1.000	.656	.582	.564
A4	.614	.424	.656	1.000	.667	.548
A5	.582	.456	.582	.667	1.000	.543
A6	.444	.403	.564	.548	.543	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
A1	21.41337	12.693	.628	.437	.847
A2	21.58140	13.787	.530	.308	.863
A3	21.33430	13.401	.709	.541	.831
A4	21.35930	12.654	.758	.608	.821
A5	21.50058	12.074	.732	.549	.825
A6	21.08430	14.598	.630	.412	.848

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.276	4.073	4.570	.497	1.122	.029	6
Item Variances	.867	.500	1.106	.606	2.212	.054	6
Inter-Item Correlations	.521	.364	.667	.304	1.836	.008	6

4.4.1.2 Dimensionality analysis: Learning Motivation

The full six-item learning motivation scale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the six items, written for the learning motivation scale, should all reflect a single underlying dimension.

For the scale to be considered factor analysable the correlation matrix should show numerous statistically significant ($p < .05$) correlations of .3 or greater (> .3), the Bartlett's test of Sphericity[103] should be statistically significant ($p < .05$), and the Kaiser-Meyer-Olkin[104] (KMO) values should be .6 or greater (> .6) (Theron, 2017; Pallant, 2007). The correlation matrix, for the learning motivation scale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .878 (> .6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.63 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.5. Item A2 (*"When I did not understand some parts of this module I tried harder by, for example, asking questions"*) had the lowest, and a very mediocre, factor loading ($\lambda_{i1} = .572$) and item A4 (*"I wanted to learn as much as I could from this module"*) had the highest factor loading ($\lambda_{i1} = .832$). This is consistent with the item analysis conclusion. However, the findings indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, only three (20%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a reasonably sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *learning motivation* scale, was thus corroborated.

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[103] The Bartlett's test of Sphericity (Bartlett's Test) tests the null hypothesis that the correlation matrix is an identity matrix in the population/parameter (i.e., the diagonal elements contain 1 and all off-diagonal elements are zero). When the H_0 is rejected ($p < .05$) it means that correlation matrix is factor analysable (Theron, 2017).

[104] The Kaiser-Meyer-Olkin (KMO) is a measure of sampling adequacy. It reflects the ratio of the sum of the squared inter-item correlations to the sum of the squared inter-item correlations as well as the sum of the squared partial inter-item correlations, summed across all correlations (Theron, 2017). Kaiser (as cited in Field, 2005) recommends considering KMO values greater than .5 as acceptable, values between .5 and .7 as mediocre or average, values between .7 and .8 as good, and values between .8 and .9 as great and values above .9 are superb.

Table 4.5

Factor matrix for the Learning Motivation scale

	Factor
	1
A4	.832
A5	.798
A3	.776
A6	.684
A1	.679
A2	.572

4.4.2 PSYCHOMETRIC EVALUATION OF THE INSPIRING PROFESSION VISSION SCALE

The *inspiring professional vision* scale consists of eight items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. The design intention with the scale was to measure *inspiring professional vision* conceptualised as a unidimensional latent competency.

4.4.2.1 Item analysis: Inspiring Professional Vision

The full results from the item analysis for the inspiring professional vision scale are depicted in Table 4.6.

A highly satisfactory (above .80) Cronbach's alpha of .940 was obtained, as shown in the Reliability Statistics section of Table 4.6. This indicates that approximately 94% of the variance in the items is systematic or true score variance and only 6% is random error variance.

In the Item Statistics section of Table 4.6, item means ranged from 3.38 to 3.89 on a five-point Likert scale and the item standard deviations ranged from 1.135 to 1.22. This indicates that most individual students supported the neither agree or disagree to agree category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the scale or scale that were unable to detect relatively small differences in test-takers' standing on the latent *inspiring professional vision* dimension (Theron, 2017). The highest mean was for item B7. Item B7's mean could not be considered extreme and did not curtail the variance of the distribution. The lowest standard deviation was for item B3. None of the items showed themselves as outliers to the lower end of the standard deviation distribution.

The inter-item correlation matrix calculates the correlations between each item and every other of the remaining items. Problematic or poor items will not correlate with the rest of the items because these poor items do not reflect the same underlying factor (Theron, 2017). The inter-item correlations ranged between .589 and .786. The inter-item correlation matrix indicated that all items correlated moderately with the rest of the items. In terms of Guilford's informal interpretations of the magnitude of correlations (Lachenicht, 2002) none of the correlations were below .2, thus indicating that all the items essentially measure the same underlying factor. None of the correlations were between .9 and 1, thus indicating that there are no two items that measured the exact same thing. The inter-item correlation matrix showed that item B7 showed the highest correlations ranging from .610 to .786 and item B5 showed the lowest correlations ranging from .589 to .692. The mean inter-item correlation was .663. None of the items consistently correlated below this mean inter-item correlation with the remaining items in the scale.

In the Item-Total Statistics section of Table 4.6, the corrected item-total correlations ranging from .739 to .819 were satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item B5 obtained the lowest corrected item-total correlation value compared to the other items. This is consistent with the position that all the items are measuring the specific latent variable they were earmarked to measure (Pallant, 2007). The squared multiple correlations ranging from .579 to .715 were satisfactory. The squared multiple correlation of item B5 was, again, lower than the values of the other items. This again suggested that the variance in item B5 might originate from a somewhat different source of systematic variance than the remaining items. More importantly though, no item showed itself as a clear outlier in either the corrected item-total distribution or the squared multiple distribution. No item, therefore, showed itself therefore to be reflecting the common source of variance to a substantially less degree than the remaining items in the scale. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted.

The basket of evidence from the results of the item analysis of the inspiring professional vision scale suggested that item B7 (*"In this module I could see the value of what I learn for my future career"*) was the strongest item in the scale and item B5 (*"This module assisted me in creating a clear idea of where I want to be in 5 years"*) was the weakest item in the scale. None of the items were deleted.

Table 4.6

The reliability analysis output for the Inspiring Professional Vision scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.940	.940	8

Item Statistics			
	Mean	Std. Deviation	N
B1	3.83953	1.203957	1720
B2	3.53721	1.213560	1720
B3	3.84186	1.135135	1720
B4	3.65756	1.144403	1720
B5	3.38314	1.220465	1720
B6	3.88256	1.140578	1720
B7	3.88721	1.137984	1720
B8	3.76977	1.161940	1720

Inter-Item Correlation Matrix								
	B1	B2	B3	B4	B5	B6	B7	B8
B1	1.000	.679	.686	.657	.594	.670	.700	.619
B2	.679	1.000	.712	.702	.692	.654	.682	.624
B3	.686	.712	1.000	.713	.615	.666	.695	.720
B4	.657	.702	.713	1.000	.678	.618	.652	.606
B5	.594	.692	.615	.678	1.000	.612	.610	.589
B6	.670	.654	.666	.618	.612	1.000	.786	.646
B7	.700	.682	.695	.652	.610	.786	1.000	.687
B8	.619	.624	.720	.606	.589	.646	.687	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B1	25.95930	47.353	.779	.616	.932
B2	26.26163	46.839	.806	.665	.930
B3	25.95698	47.604	.818	.692	.930
B4	26.14128	47.971	.784	.639	.932
B5	26.41570	47.754	.739	.579	.935
B6	25.91628	47.962	.788	.672	.932
B7	25.91163	47.565	.819	.715	.930
B8	26.02907	48.157	.757	.603	.934

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.725	3.383	3.887	.504	1.149	.034	8
Item Variances	1.369	1.289	1.490	.201	1.156	.007	8
Inter-Item Correlations	.663	.589	.786	.198	1.336	.002	8

4.4.2.2 Dimensionality analysis: Inspiring Professional Vision

The full eight-item inspiring professional vision scale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the eight items, written for the *inspiring professional vision* scale, should all reflect a single underlying dimension.

The correlation matrix, for the inspiring professional vision scale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .938 (> .6) was obtained and the Bartlett's Test ($p < .05$) returned a statistically significant chi-square estimate which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the inter-item correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (5.65 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1} > .50), as shown in the resultant factor structure in Table 4.7. Item B5 (*"This module assisted me in creating a clear idea of where I want to be in 5 years"*) had the lowest factor loading (λ_{i1} = .763) and item B7 (*"In this module I could see the value of what I learn for my future career"*) had the highest factor loading (λ_{i1} = .850). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, only four (14%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *inspiring professional vision* scale, was thus corroborated.

Table 4.7

Factor matrix for the Inspiring Professional Vision scale

	Factor
	1
B7	.850
B3	.848
B2	.834
B6	.817
B4	.810
B1	.807
B8	.784
B5	.763

4.4.3 PSYCHOMETRIC EVALUATION OF THE LEARNING CLIMATE SCALE

The, five subscale multi-dimensional, *learning climate* scale consists of a total of twenty-four items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. Each subscale will be analysed separately.

4.4.3.1 Psychometric evaluation of the teacher emotional support subscale

Teacher emotional support is the first subscale in the *learning climate* scale and it consists of four items.

4.4.3.1.1 Item analysis: Teacher Emotional Support

The full results from the item analysis for the teacher emotional support subscale are depicted in Table 4.8.

A satisfactory (above .80) Cronbach's alpha of .908 was obtained for the four-item subscale, as shown in the Reliability Statistics section of Table 4.8. This indicates that approximately 91% of the variance in the items is systematic or true score variance and only 9% is random error variance.

In the Item Statistics section of Table 4.8, item means ranged from 3.58 to 4.23 on a five-point Likert scale and the item standard deviations ranged from 1.135 to 1.22. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the subscale that were unable to detect relatively small differences in test-takers' standing on the latent *teacher emotional support* dimension. (Theron, 2017). The highest mean was for item C1i. Item C1i's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item C3i.

The inter-item correlations ranged between .624 and .777. The inter-item correlation matrix indicated that all items correlated moderately with the rest of the items. The inter-item correlation matrix showed that item C4i showed the highest correlations ranging from .712 to .777 and item C3i showed the lowest correlations ranging from .624 to .712 and the mean inter-item correlation was .715. Although item C3i consistently correlated lower than the mean inter-item correlation with the remaining subscale items the correlations were not substantially lower than the rest of the correlations in the correlation matrix. The items, therefore, more or less to a similar degree reflect a common source of systematic variance (not necessarily unidimensional though and not necessarily the intended latent factor). The results are, however, compatible (i.e., do not refute) with such positions.

In the Item-Total Statistics section of Table 4.8, the corrected item-total correlations ranging from .747 to .834 were satisfactory since all the values were greater than .3. Item C3i obtained the lowest value compared to the other items. The recommended cut-off for the corrected item-total correlations is values greater than .3 (Mahembe, 2014; Pallant, 2007). This indicates that the items are measuring the specific latent variable they were earmarked to measure (Pallant, 2007). The squared multiple correlations ranging from .567 to .700 were satisfactory. The squared multiple correlation of item C3i was again lower than the values of the other items. None of the items showed themselves as outliers at the lower end of the item-total correlation or squared multiple correlation distributions. No item, therefore, responds to a different source of systematic variance than the remaining items of the subscale. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item C3i does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the teacher emotional support subscale suggested that item C4i (*"In our class, students could rely on the lecturer for help when they needed it"*) was the strongest item in the subscale and item C3i (*"In our class, the lecturer tried to help students when they were sad or upset"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.8

The reliability analysis output for the Teacher Emotional Support subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.908	.909	4

Item Statistics

	Mean	Std. Deviation	N
C1i	4.23081	1.061069	1720
C2i	3.90523	1.201984	1720
C3i	3.57965	1.195076	1720
C4i	3.92500	1.263744	1720

Inter-Item Correlation Matrix

	C1i	C2i	C3i	C4i
C1i	1.000	.748	.624	.725
C2i	.748	1.000	.702	.777
C3i	.624	.702	1.000	.712
C4i	.725	.777	.712	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C1i	11.40988	10.999	.772	.615	.890
C2i	11.73547	9.829	.834	.700	.867
C3i	12.06105	10.381	.747	.567	.898
C4i	11.71570	9.507	.828	.688	.869

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.910	3.580	4.231	.651	1.182	.071	4
Item Variances	1.399	1.126	1.597	.471	1.419	.039	4
Inter-Item Correlations	.715	.624	.777	.153	1.245	.002	4

4.4.3.1.2 Dimensionality analysis: Teacher Emotional Support

The full four-item *teacher emotional support* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the four items, written for the *teacher emotional support* subscale of the *Learning Climate* scale, should all reflect the unidimensional *teacher emotional support* latent variable.

The inter-item correlation matrix, for the *emotional support* subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .845 (> .6) was obtained and the Bartlett's Test returned a statistically significant chi-square statistic ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.15 > 1). The elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.9. Item C3i (*"In our class, the lecturer tried to help students when they were sad or upset"*) had the lowest factor loading ($\lambda_{i1} = .785$) and item C2i (*"In our class, the lecturer understood how students' felt about learning in general and other issues"*) had the highest factor loading ($\lambda_{i1} = .894$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a convincing explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *teacher emotional support* subscale, was thus corroborated.

Table 4.9

Factor matrix for the Teacher Emotional Support subscale

	Factor
	1
C2i	.894
C4i	.885
C1i	.819
C3i	.785

4.4.3.2 Psychometric evaluation of the teacher academic support subscale

Teacher academic support is the second subscale in the *learning climate* scale and it consists of four items.

4.4.3.2.1 Item analysis: Teacher Academic Support

The full results from the item analysis for the *teacher academic support* subscale are depicted in Table 4.10.

A satisfactory (above .80) Cronbach's alpha of .918 was obtained for the four-item subscale, as shown in the Reliability Statistics section of Table 4.10. This indicates that approximately 92% of the variance in the items is systematic or true score variance and only 8% is random error variance.

In the Item Statistics section of Table 4.10, item means ranged from 3.98 to 4.26 on a five-point Likert scale and the item standard deviations ranged from .951 to 1.19. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are insensitive items that were unable to detect relatively small differences in test-takers' standing on the latent *teacher academic support* dimension. The highest mean was for item C7ii. Item C7ii's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was for item C5ii. No items should themselves as outliers in the standard deviation distribution.

The inter-item correlations ranged between .684 and .813. The inter-item correlation matrix indicated that all items correlated from moderately to highly with the rest of the items. The inter-item correlation matrix showed that item C8ii showed the highest correlations ranging from .684 to .813 and item C5ii showed the lowest correlations ranging from .684 to .733. The mean inter-item correlation was .743. Although item C5ii consistently correlated below the mean inter-item correlation with the remaining items of the subscale, the correlations were not substantially lower than the remaining values in the inter-item correlation matrix.

In the Item-Total Statistics section of Table 4.10, the corrected item-total correlations ranging from .759 to .858 were satisfactory since all the values were greater than .3. Item C5ii obtained the lowest value compared to the other items. This is compatible with the position that the items are measuring the specific latent variable they were earmarked to measure (Pallant, 2007). The squared multiple correlations ranging from .583 to .739 were satisfactory. The squared multiple correlation of item C5ii was again lower than the values of the other items. None of the items showed themselves as outliers towards the lower end of the corrected item-total or squared multiple correlation distributions. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item C5ii does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the teacher academic support subscale suggested that item C8ii was the strongest item in the subscale and item C5ii (*"In our class, the lecturer enjoyed to see students working"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.10

The reliability analysis output for the Teacher Academic Support subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.918	.920	4

Item Statistics

	Mean	Std. Deviation	N
C5ii	4.22384	.951048	1720
C6ii	3.99593	1.190170	1720
C7ii	4.25523	1.001149	1720
C8ii	4.04012	1.171762	1720

Inter-Item Correlation Matrix

	C5ii	C6ii	C7ii	C8ii
C5ii	1.000	.733	.689	.684
C6ii	.733	1.000	.765	.813
C7ii	.689	.765	1.000	.773
C8ii	.684	.813	.773	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C5ii	12.29128	9.696	.759	.583	.913
C6ii	12.51919	7.929	.858	.739	.880
C7ii	12.25988	9.143	.817	.671	.894
C8ii	12.47500	8.118	.839	.719	.886

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.129	3.996	4.255	.259	1.065	.017	4
Item Variances	1.174	.904	1.417	.512	1.566	.067	4
Inter-Item Correlations	.743	.684	.813	.129	1.189	.002	4

4.4.3.2.2 Dimensionality analysis: Teacher Academic Support

The full four-item *teacher academic support* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the four items, written for the *teacher academic support* subscale of the *Learning Climate* scale, should all reflect the unidimensional *teacher academic support* latent dimension of the multidimensional *learning climate* construct.

The correlation matrix, for the inspiring professional vision subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .845 (> .6) was obtained and the chi-square statistic calculated under the. Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.23 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.11. Item C5ii (*"In our class, the lecturer enjoyed to see students working"*) had the lowest factor loading ($\lambda_{i1} = .793$) and item C6ii (*"In our class, the lecturer cared about how well students learned"*) had the highest factor loading ($\lambda_{i1} = .910$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a valid (i.e., permissible) and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *teacher academic support* subscale, was thus corroborated.

Table 4.11

Factor matrix for the Teacher Academic Support subscale

	Factor
	1
C6ii	.910
C8ii	.886
C7ii	.860
C5ii	.793

4.4.3.3 Psychometric evaluation of the *Psychological Safety and Fairness* subscale

Psychological safety and fairness is the third subscale in the *learning climate* scale and it consists of six items.

4.4.3.3.1 Item analysis: Psychological Safety and Fairness

The full results from the item analysis for the *psychological safety and fairness* subscale are depicted in Table 4.12.

A satisfactory (above .80) Cronbach's alpha of .848 was obtained for the six-item subscale, as shown in the Reliability Statistics section of Table 4.12. This indicates that approximately 85% of the variance in the items is systematic or true score variance and only 15% is random error variance.

In the Item Statistics section of Table 4.12, item means ranged from 3.87 to 4.20 on a five-point Likert scale and the item standard deviations ranged from .853 to 1.15. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the subscale that were able to detect relatively small differences in test-takers' standing on the latent *psychological safety and fairness* dimension (Theron, 2017). The highest mean was for item C10iii. Item C10iii's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item C11iii. None of the items were, however, outliers at the lower end of the item standard deviation distribution.

The inter-item correlations ranged between .284 and .827. The inter-item correlation matrix indicated that all items correlated poorly to highly with the rest of the items in terms of Guilford's informal interpretations of the magnitude of correlations (Lachenicht, 2002). Three of the correlations were below .2, namely the correlation between C9iii (*"In our class, students felt respected"*) and C11iii *("In our class, students respected each other's opinions"*); between C9iii (*"In our class, students felt respected"*) and C14iii (*"In our class, students were considerate of each other's feelings"*), and between C10iii (*"In our class, students were treated fairly and equally"*) and C14iii (*"In our class, students were considerate of each other's feelings"*). The finding that C9ii and C10iii tended to correlate less well with the remaining items but high with each other (.827) suggests the presence of more than one factor. More specifically, both items C9iii and C10iii represent a fairness component. The mean inter-item correlation was .489. No item consistently correlated below the mean correlation.

In the Item-Total Statistics section of Table 4.12, the corrected item-total correlations ranging from .601 to .719 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item C14iii obtained the lowest value compared to the other items. This is compatible with the position that the items were measuring the specific latent variable they were earmarked to measure (Pallant, 2007). The squared multiple correlations ranging from .505 to .703 were satisfactory. The squared multiple correlation of item C11iii was slightly lower than the values of the other items. None of the items showed themselves as outliers towards the lower end of the corrected item-total or squared multiple correlation distributions. No item, therefore, responded to a different source of systematic variance than the remaining items. The inter-item correlation matrix strongly suggested that the common underlying source of variance is not unidimensional in nature. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). Although there were three correlations that only correlated slightly, the results revealed that none of the items would increase the current Cronbach alpha if deleted.

The basket of evidence from the results of the item analysis of the psychological safety and fairness subscale suggested that item C13iii was the strongest item in the subscale and items C9iii and C10iii were the weaker items in the subscale probably due to the fact that they load on a second, somewhat less dominant subfactor of *psychological safety and fairness*. However, they did not raise sufficient item statistic concerns, and because of the strong suspicion that the two weaker items load on a separate factor, none of the items were deleted at this stage.

Table 4.12

The reliability analysis output for the Psychological Safety and Fairness subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.848	.852	6

Item Statistics

	Mean	Std. Deviation	N
C9iii	4.06512	1.148818	1720
C10iii	4.20465	1.062328	1720
C11iii	4.09767	.853965	1720
C12iii	3.93314	1.042246	1720
C13iii	3.99826	.872632	1720
C14iii	3.87267	.891142	1720

Inter-Item Correlation Matrix

	C9iii	C10iii	C11iii	C12iii	C13iii	C14iii
C9iii	1.000	.827	.294	.564	.312	.297
C10iii	.827	1.000	.320	.547	.302	.284
C11iii	.294	.320	1.000	.508	.660	.626
C12iii	.564	.547	.508	1.000	.585	.501
C13iii	.312	.302	.660	.585	1.000	.710
C14iii	.297	.284	.626	.501	.710	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C9iii	20.10640	13.328	.617	.703	.828
C10iii	19.96686	13.791	.622	.697	.825
C11iii	20.07384	15.099	.602	.505	.829
C12iii	20.23837	13.281	.719	.528	.805
C13iii	20.17326	14.729	.647	.620	.821
C14iii	20.29884	14.898	.601	.554	.828

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.029	3.873	4.205	.332	1.086	.014	6
Item Variances	.970	.729	1.320	.591	1.810	.059	6
Inter-Item Correlations	.489	.284	.827	.543	2.914	.030	6

4.4.3.3.2 Dimensionality analysis: Psychological Safety and Fairness

The full six-item *psychological safety and fairness* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the six items, written for the *psychological safety and fairness* subscale of the *Learning Climate* scale, should all reflect the unidimensional *psychological safety and fairness* latent dimension of the multidimensional *learning climate* construct.

The correlation matrix, for the *psychological safety and fairness* subscale, showed that most of the correlations were larger than .3. The corrections between C9iii and C11iii (.294), between C9iii and C14iii (.297), and between C10iii and C14iii (.284) were, as indicated earlier, correlating very poorly. All the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .780 (> .6) was obtained and the chi-square statistic calculated under Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. Some items showed poor correlations, pointing to a possibility for more than one factor (which implies a factor analysable correlation matrix) whilst the remainder of the evidence also showed that the correlation matrix was factor analysable, even though the evidence was not strong.

Two factors were extracted since two factors obtained eigenvalues greater than one (3.45 > 1 and 1.31 > 1). The position of the elbow in the scree plot also suggested that a second factor should be extracted. Given that two factors were extracted oblique rotation (i.e., Direct Oblimin) was utilised in an attempt to rotate the factor matrix to simple structure. The pattern matrix, see Table 4.13, reflects the partial regression slope coefficients when regressing each item of the two extracted factors. The pattern matrix contains the partial slope regression coefficients for the weighted linear combination of the latent variables, were partial regression coefficients reflect the effect of one factor on an item when statistically controlling the effect of the other factors that were extracted in both the item and the focal factor. The pattern matrix therefore formally acknowledges that due to the oblique rotation correlations are likely to exist between the extracted factors and therefore they to some degree share variance. Items C13iii, C14iii, C11iii, and C12iii all grouped together to load on factor 1. Item C12iii (*"In our class, students felt comfortable to discuss their ideas"*) had the lowest partial regression coefficient of .480. Items C9iii and C10iii grouped together to load on factor 2. Item C12iii showed itself somewhat of a complex item with moderate loadings on both factor 1 (.480) and factor 2 (.405). Factor 1 seems to represent a *mutual student respect* factor (with item C13iii: *In our class, students valued one another and the contributions that were made*, item C14iii: *In our class, students were considerate of each other's feelings* and item C11iii: *In our class, students respected each other's opinions*). Factor 2 seems to represent a *lecturer respect* factor (with item C9iii: *In our class, students felt respected* and item C10iii: *In our class, students were treated fairly and equally*). It could be argued that the response to item C12iii (*"In our class, students felt comfortable to discuss their ideas"*) logically then should depend on both factors. Both these factors can be seen as meaningful subfactors of the *psychological safety and fairness* dimension of the *learning climate* construct that the subscale intended measuring. The extent to which student feel psychologically safe in the classroom does not only depend on the trainer-instructor but also on the students themselves. It could be argued though that the trainer-instructor might also have an indirect effect on the extent to which students have mutual respect for each other.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the 2-factor factor solution provides a valid and credible explanation for the observed inter-item correlation matrix. Based on the eigenvalue greater-than-one rule the unidimensionality assumption for the *psychological safety and fairness* subscale was therefore not corroborated. The factor fission was, however, regarded as meaningful. This brought to the fore the question whether the items of the *psychological safety and fairness* subscale may be regarded as sufficiently valid indicators of *psychological safety and fairness* interpreted as either a second-order factor or as a multidimensional construct.

Table 4.13
Pattern matrix for the Psychological Safety and Fairness subscale

	Factor	
	1	2
C13iii	**.900**	-.044
C14iii	**.822**	-.037
C11iii	**.757**	.013
C12iii	**.480**	.405
C9iii	-.024	**.931**
C10iii	-.015	**.905**

Forcing a single factor in the EFA is one possible option. The magnitude of the factor loadings in the resultant single-factor factor structure are then interpreted as indicative of the extent to which the items successfully serve as indicators of the second-order factor (or of a multidimensional construct). This procedure had in the past been used extensively (e.g. Prinsloo & Theron, 2015). The current study, however, would want to question the methodological rigour of this procedure. Firstly, it is not clear in terms of the underlying logic of this procedure whether the single extracted factor should be interpreted as a second-order factor or multidimensional latent variable. Secondly, in as far as the percentage of large residual correlations represent an evaluation of the fit of the factor structure, and given that the forced single-factor factor structure typically fits poorly (i.e., the percentage large residual correlations is large (86% in the case of the current analysis) the validity and credibility of the factor loadings (in the case of the current analysis all loadings exceeded .50) come into question. The inference that all the items satisfactorily reflected a higher-order factor thus becomes unconvincing because of the inability of the single-factor factor structure to accurately reproduce the observed inter-item correlation matrix.

The first-order measurement model in which C9iii and C10iii loaded only on factor 2, C11iii, C13iii and C14iii loaded only on factor 1 and C12iii loaded on both factors fitted the subscale data closely (RMSEA = .035; $p > .05$). All factor loadings were statistically significant. The second-order measurement model in which C9iii and C10iii loaded only on first-order factor 2, C11iii, C13iii and C14iii loaded only on first-order factor 1 and C12iii loaded on both first-order factors while both first-order factors loaded on a single second-order factor fitted the subscale data closely (RMSEA = .032; $p > .05$). The factor loadings and gamma estimates are shown in Table 4.14 and in Table 4.15.

Table 4.14

Unstandardised factor matrix for the second-order Psychological Safety and Fairness measurement model

	Factor 1	Factor 2
C9iii		1.05
C10iii		.96
		(.05)
		19.59
C11iii	.67	
C12iii	.50	.43
	(.32)	(.08)
	1.55	5.54
C13iii	.76	
	(.40)	
	1.92	
C14iii	.71	
	(.36)	
	1.99	

Table 4.15

Unstandardised gamma matrix for the second-order Psychological Safety and Fairness measurement model

	SOF*
Factor 1	0.60
	(0.09)
	6.39
Factor 2	0.68
	(0.06)
	11.73

* SOF = second-order factor

The seven indirect effects were subsequently calculated by calculating the products $\lambda_{ij}\gamma_{j1}$ and testing the statistical significance of these indirect effects[105]. The results are shown in Table 4.16.

Table 4.16

Unstandardised indirect effects for the second-order Psychological Safety and Fairness measurement model

PA(1)*	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)	PA(7)
.71	.65	.29	.40	.30	.45	.42
(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)
29.56	26.90	12.17	16.54	12.42	18.78	17.57

* PA(i); i = 1, 2, …, 7 represents the seven indirect effects as defined in footnote 104

Table 4.16 indicates that all the indirect effects were statistically significant ($p < .05$) despite the fact that the factor loading of C12iii on factor 1 (see Table 4.14) was not statistically significant ($p > .05$). This means that respondents standing on *psychological safety and fairness* as a second-order factor statistically significantly ($p < .05$) affected the scores obtained on each of the six items. This justified the use of all six items of the *psychological safety and fairness* subscale in the calculation of two composite indicators for the Learning Climate latent variable in the model.

4.4.3.4 Psychometric evaluation of *The Interest and Involvement* subscale

Interest and involvement is the fourth subscale in the *learning climate* scale and it consists of five items.

[105] This necessitated translating the SIMPLIS syntax which was used to fit the second-order measurement model to LISREL syntax. The command AP = 7 (additional parameters = 7) was inserted in the model (MO) command line and the following seven additional command lines were inserted just before the path diagram (PD) command line:

```
CO PAR(1) = LY(1,2)*GA(2,1)
CO PAR(2) = LY(2,2)*GA(2,1)
CO PAR(3) = LY(4,2)*GA(2,1)
CO PAR(4) = LY(3,1)*GA(1,1)
CO PAR(5) = LY(4,1)*GA(1,1)
CO PAR(6) = LY(5,1)*GA(1,1)
CO PAR(7) = LY(6,1)*GA(1,1)
```

4.4.3.4.1 Item analysis: Interest and Involvement

The full results from the item analysis for the *interest and involvement* subscale are depicted in Table 4.17.

A satisfactory (above .80) Cronbach's alpha of .872 was obtained for the five-item subscale, as shown in the Reliability Statistics section of Table 4.17. This indicates that approximately 87% of the variance in the items is systematic or true score variance and only 13% is random error variance.

In the Item Statistics section of Table 4.17, item means ranged from 3.86 to 4.06 on a five-point Likert scale and the item standard deviations ranged from .907 to 1.02. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are insensitive items present in the subscale that were unable to detect relatively small differences in test-takers' standing on the latent *interest and involvement* dimension (Theron, 2017). The highest mean was for item C19iv. Item C19iv's mean was, however, not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item C19iv. None of the items were outliers to the lower end of the item standard. The inter-item correlations shown in the Inter-Item Correlation matrix section of Table 4.17 ranged between .402 and .756. The inter-item correlation matrix indicated that all items correlated with the rest of the items. The mean inter-item correlation was .578. None of the items consistently correlated below the mean correlation with the remaining items in the subscale. The inter-item correlation matrix showed that item C18iv showed the highest correlations ranging from .552 to .756 and item C16iv showed the lowest correlations ranging from .402 to .586.

In the Item-Total Statistics section of Table 4.17, the corrected item-total correlations ranging from .617 to .801 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item C16iv obtained the lowest value compared to the other items. This indicates that the items are measuring a common underlying latent variable. Although this finding is consistent with the position that all the items measure the specific (unidimensional) latent variable they were earmarked to measure (Pallant, 2007) the evidence cannot be presented as definitive proof of this position. The squared multiple correlations ranging from .416 to .669 were satisfactory. The squared multiple correlation of item C16iv was again slightly lower than the values of the other items. The squared multiple correlations echo the findings derived from the item-total correlations in that good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item C16iv does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the interest and involvement subscale suggested that item C18iv (*"In our class, students shared ideas with one another"*) was the strongest item in the subscale and item C16iv (*"In our class, students showed interest in the work and activities"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.17

The reliability analysis output for the Interest and Involvement subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.872	.873	5

Item Statistics

	Mean	Std. Deviation	N
C15iv	4.00698	.948934	1720
C16iv	3.86628	1.016228	1720
C17iv	3.96163	.973610	1720
C18iv	3.97965	.921051	1720
C19iv	4.06047	.906865	1720

Inter-Item Correlation Matrix

	C15iv	C16iv	C17iv	C18iv	C19iv
C15iv	1.000	.586	.575	.624	.465
C16iv	.586	1.000	.539	.552	.402
C17iv	.575	.539	1.000	.756	.631
C18iv	.624	.552	.756	1.000	.655
C19iv	.465	.402	.631	.655	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C15iv	15.86802	10.055	.679	.484	.849
C16iv	16.00872	10.037	.617	.416	.866
C17iv	15.91337	9.495	.766	.626	.827
C18iv	15.89535	9.618	.801	.669	.820
C19iv	15.81453	10.468	.639	.473	.858

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.975	3.866	4.060	.194	1.050	.005	5
Item Variances	.910	.822	1.033	.210	1.256	.007	5
Inter-Item Correlations	.578	.402	.756	.353	1.879	.009	5

4.4.3.4.2 Dimensionality analysis: Interest and Involvement

The full five-item *interest and involvement* subscale was factor analysed since none of the items were deleted during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the five items, written for the *interest and involvement* subscale of the *Learning Climate* scale, should all reflect the unidimensional *interest and involvement* latent dimension of the multidimensional *learning climate* latent variable.

The correlation matrix, for the interest and involvement subscale, showed that all of the correlations were larger than .3. All the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .849 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.32 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.18. Item C16iv (*"In our class, students showed interest in the work and activities"*) had the lowest factor loading ($\lambda_{i1} = .657$) and item C18iv (*"In our class, students shared ideas with one another"*) had the highest factor loading ($\lambda_{i1} = .885$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, two (20%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a reasonable explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *interest and involvement* subscale, was thus corroborated.

Table 4.18

Factor matrix for the Interest and Involvement subscale

	Factor 1
C18iv	.885
C17iv	.844
C15iv	.724
C19iv	.699
C16iv	.657

4.4.3.5 Psychometric evaluation of the autonomy subscale

Autonomy is the fifth and last subscale in the *learning climate* scale and it consists of five items.

4.4.3.5.1 Item analysis: Autonomy

The full results from the item analysis for the 5-item *autonomy* subscale of the *Learning Climate* scale are depicted in Table 4.19.

A highly satisfactory (above .80) Cronbach's alpha of .901 was obtained for the five-item subscale, as shown in the Reliability Statistics section of Table 4.19. This indicates that approximately 90% of the variance in the items is systematic or true score variance and only 10% is random error variance.

In the Item Statistics section of Table 4.19, item means ranged from 3.71 to 4.00 on a five-point scale and the item standard deviations ranged from .986 to 1.11. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no problematic or poor items present in the scale or subscale (Theron, 2017). The absence of extreme means and small standard deviations further implies that all the items in this subscale were able to detect relatively small differences in test-takers' standing on the latent *autonomy* dimension. The highest mean was for item C22v. Item C22v's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item C22v. The standard deviation of item C22v could, however, not be regarded as an outlier in the item standard deviation distribution.

The inter-item correlations ranged between .591 and .763. The inter-item correlation matrix indicated that all items correlated moderately with the rest of the items. The mean inter-item correlation was .645. The inter-item correlation matrix showed that item C21v showed the highest correlations ranging from .629 to .763 and item C23v showed the lowest correlations ranging from .591 to .668. Although C23v for the most part correlated below the mean correlation with the remaining items it did not do so consistently and neither were the correlations between C23v and its colleagues substantially below the mean.

In the Item-Total Statistics section of Table 4.19, the corrected item-total correlations ranging from .729 to .812 were all satisfactory since all the values were greater than .3. Item C22v obtained the lowest value compared to the other items. The recommended cut-off for the corrected item-total correlations is values greater than .3 (Mahembe, 2014; Pallant, 2007). This indicates that the items are measuring a common underlying latent variable but not necessarily a unidimensional latent variable and not necessarily the latent variable they were earmarked to measure (Pallant, 2007). The finding is nonetheless consistent with such a position. The squared multiple correlations ranging from .547 to .695 were satisfactory. The squared multiple correlation of item C23v was slightly lower than the values of the other items. The important point though was that no item showed itself as an outlier towards the lower end of the item-total and squared multiple correlation distributions. This suggests that no item shared a substantially lower proportion of variance with the other items in the subscale. All items measure the same underlying (but not necessarily unidimensional) factor (and not necessarily the intended factor) (Theron, 2017). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted.

The basket of evidence from the results of the item analysis of the autonomy subscale suggested that item C21v (*"In our class, students had opportunities to find many different ways of solving problems"*) was the strongest item in the subscale and item C23v (*"In our class, students had the opportunity to use mistakes as learning experiences"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.19

The reliability analysis output for the Autonomy subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.901	.901	5

Item Statistics

	Mean	Std. Deviation	N
C20v	3.79826	1.052158	1720
C21v	3.79070	1.076117	1720
C22v	4.00698	.985620	1720
C23v	3.92733	1.049645	1720
C24v	3.71279	1.105310	1720

Inter-Item Correlation Matrix

	C20v	C21v	C22v	C23v	C24v
C20v	1.000	.763	.599	.591	.627
C21v	.763	1.000	.703	.629	.649
C22v	.599	.703	1.000	.622	.595
C23v	.591	.629	.622	1.000	.668
C24v	.627	.649	.595	.668	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C20v	15.43779	13.043	.755	.619	.878
C21v	15.44535	12.543	.812	.695	.865
C22v	15.22907	13.598	.731	.557	.883
C23v	15.30872	13.221	.729	.547	.884
C24v	15.52326	12.816	.739	.557	.882

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.847	3.713	4.007	.294	1.079	.014	5
Item Variances	1.112	.971	1.222	.250	1.258	.009	5
Inter-Item Correlations	.645	.591	.763	.172	1.290	.003	5

4.4.3.5.2 Dimensionality analysis: Autonomy

The full five-item *autonomy* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the five items, written for the *autonomy* subscale of the *Learning Climate* scale, should all reflect the unidimensional *autonomy* latent dimension of the multidimensional *learning climate* latent variable.

The correlation matrix, for the *autonomy* subscale, showed that all of the correlations were larger than .3. All the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .862 (> .6) was obtained and the Bartlett's Test chi-square statistic was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.58 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.20. Item C23v (*"In our class, students had the opportunity to use mistakes as learning experiences"*) had the lowest factor loading ($\lambda_{i1} = .772$) and item C21v (*"In our class, students had opportunities to find many different ways of solving problems"*) had the highest factor loading ($\lambda_{i1} = .874$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, only two (20%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a reasonable explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *autonomy* subscale, was thus corroborated.

Table 4.20

Factor matrix for the autonomy subscale

	Factor
	1
C21v	.874
C20v	.807
C24v	.784
C22v	.779
C23v	.772

4.4.3.6 Reliability of the complete *learning climate* scale

The coefficient of internal consistency was already calculated for each of the five subscales by means of the preceding Cronbach's alpha. The Cronbach alpha values for the five subscales for the learning climate scale were:

- Teacher emotional support: *r = .908*
- Teacher academic support: *r = .918*
- Psychological safety and fairness: *r = .848*
- Interest and involvement: *r = .872*
- Autonomy: *r = .901*

In order to calculate the reliability of the total score on the *learning climate* scale as a whole, calculated as the unweighted sum of the 5 dimensions scores, the reliability coefficient for the unweighted total scores have to be calculated. This unweighted total score was calculated according to the following formula (Nunnally, 1978, p. 248):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti}S^2{}_i}{S^2{}_t}]$$

Calculating a single Cronbach alpha across all the items for the learning climate as a whole would have provided an underestimation of the reliability of the total scores per subscale as they correlate amongst themselves. The unweighted total score reliability for the complete *learning climate* scale was calculated as:

$$rtot = 1 - \left[\frac{[\sum_{i=1}^{5} S^2 i - \sum_{i=1}^{5} rttiS^2 i]}{S^2 t}\right] = 1 - [\frac{87.408 - 77.64805}{330.278}]$$

$$= 1 - [\frac{9.75995}{330.278}]$$

$$= 1 - \ .0295507118$$

$$= .970446$$

4.4.5.7 Confirmatory factor analysis of the complete *Learning Climate* scale

Confirmatory factor analysis was conducted on the 24-item multidimensional *learning climate* scale as a whole. This was done in order to determine the degree to which the learning climate measurement model as a whole is consistent with the empirical analysed data. The measurement model, in which each of the five *learning climate* dimensions were represented by their individual item indicators, was fitted[106].

Prior to conducting any analysis on the fit of the learning climate measurement model, it was necessary to assess a number of critical assumptions, typically associated with multivariate statistics and structural equation modelling, to see if these assumptions were met (Tabachnick & Fidell, as cited in Van der Westhuizen, 2015). The first critical assumption is that of multivariate normality. The individual items (i.e., indicators) were thus firstly evaluated in terms of their univariate and multivariate normality. All (24) of the indicator variables failed the test of univariate normality ($p < .05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ($\chi^2 = 11350.864$; $p < .05$).

Since the quality of the clarification obtained in structural equation modelling is highly dependent on multivariate normality, it was thus decided to normalise the variables through PRELIS. All (24) of the indicator variables, (somewhat surprisingly) again, failed the test of univariate normality ($p < .05$). The null hypothesis that the data follows a multivariate normal distribution also had to be rejected ($\chi^2 = 4131.748$; $p < .05$) again. However, attempting normalisation worsened the situation. The increase in the chi-square statistic (χ^2) showed that the normalisation procedure did not succeed in reducing the deviation of the observed item indicator distribution from the theoretical multivariate normal distribution. The original data set thus had to be analysed with robust maximum likelihood estimation. This estimation technique is the recommended for fitting measurement models of continuous data not satisfying the multivariate normality assumption (Mels, as cited in Van der Westhuizen, 2015).

The *learning climate* measurement model converged in 14 iterations but displayed poor fit (RMSEA = .123; $p < .05$).

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[106] Although the evaluation of the learning climate subscale can easily be a studied in its own right, the focus of the current research was on the empirical evaluation of the trainer-instructor competency model. Nevertheless, it is important to establish the reliability and validity of the measurement instruments used to operationalise the latent variables comprising the structural model. For this reason and for the sake of brevity, only a brief overview of the results will be provided for the learning climate measurement model. A more comprehensive discussion of the evaluation of the measurement model associated with the fitted comprehensive LISREL model will be provided in paragraph 4.6.2.

4.4.3.8 Bifactor model for the complete learning climate scale

Inspection of the modification associated with the learning climate measurement model as displayed in Figure 4.1 indicates numerous statistically significant ($p < .01$) modification index values associated with the off-diagonal theta-delta matrix.

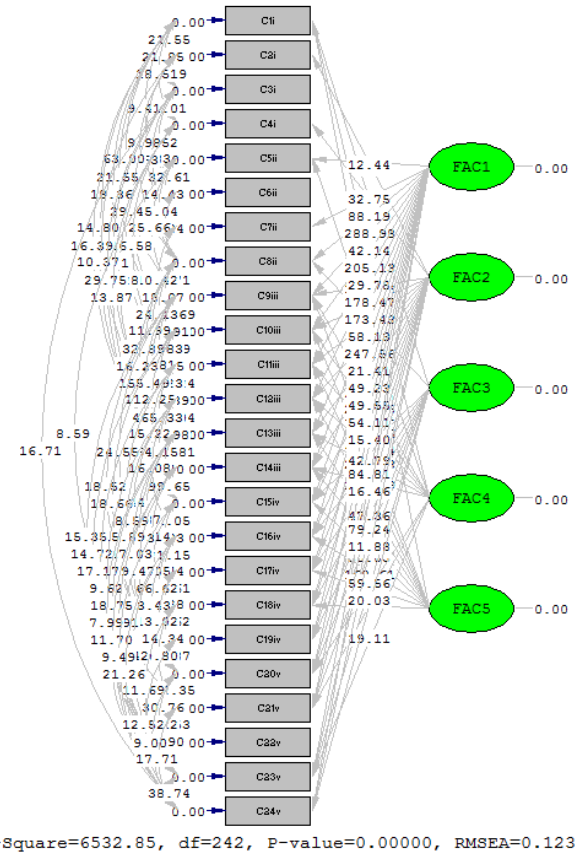

Figure 4.1. **Statistically significant modification indices associated with the learning climate measurement model**

Allowing for correlated measurement error terms would therefore statistically significantly improve the fit of the model. This, in turn, suggests the presence of one or more additional common factors underpinning the items of the *learning climate* scale. This suggests that a bi-factor model (Chen, West & Sousa, 2006; Reise, 2012) in which each item measures one of five narrow, specific learning climate dimensions but in which all 24 items also reflect a broad, more general, learning climate factor might possibly display better fit. Bifactor models, also known as general-specific models or nested models, are theoretically applicable when (a) there is a broad, general factor (e.g., a broad learning climate factor) that is hypothesised to account for the commonality among items; (b) there are multiple domain-specific factors (i.e., the latent learning climate dimensions, for example, teacher emotional support, teacher academic support, psychological safety and fairness, interest and involvement, and autonomy), where each of the factors is hypothesised to account for the unique influence of the specific domain over and above the general factor (e.g., a broad learning climate factor); and (c) when researchers are interested in the domain specific factors (i.e., the latent learning climate dimensions) as well as the common factor (e.g., a broad learning climate factor) (Chen et al., 2006). In terms of bifactor models, the relationship between the general factor (e.g., learning climate) and domain specific factors (i.e., the multidimensional subscales) are assumed to be orthogonal (Chen et al., 2006; Reise, 2012). They are assumed to be orthogonal, or unrelated since the domain specific factors are related to the contribution that is over and above the contribution of the general factor (Chen et al., 2006). Stated differently, a bifactor model specifies that the covariance among a group of item responses can be accounted for by a single general factor (e.g., a broad learning climate factor) that reflects the common variance among all scale items. It also specific group factors (i.e., the latent dimensions) that reflect additional common variance among clusters of items, normally, with highly similar or related content (Reise, 2012).

One of the many advantages of the bifactor model is that it can be used to study the role of domain specific factors independently of the general factor (Chen et al., 2006). Another advantage is that the strength of the relationship between the domain specific factors and their associated items (i.e., factor loadings) can directly be examined (Chen et al., 2006). Additionally, in the bifactor model latent mean differences in both the general factor and domain specific factors can be compared across different groups (given an acceptable level of measurement invariance) (Chen et al., 2006). Should multigroup measurement models be tested in the future, this latter advantage would be of particular interest.

The learning climate learning climate bifactor measurement model is depicted in Figure 4.2 below.

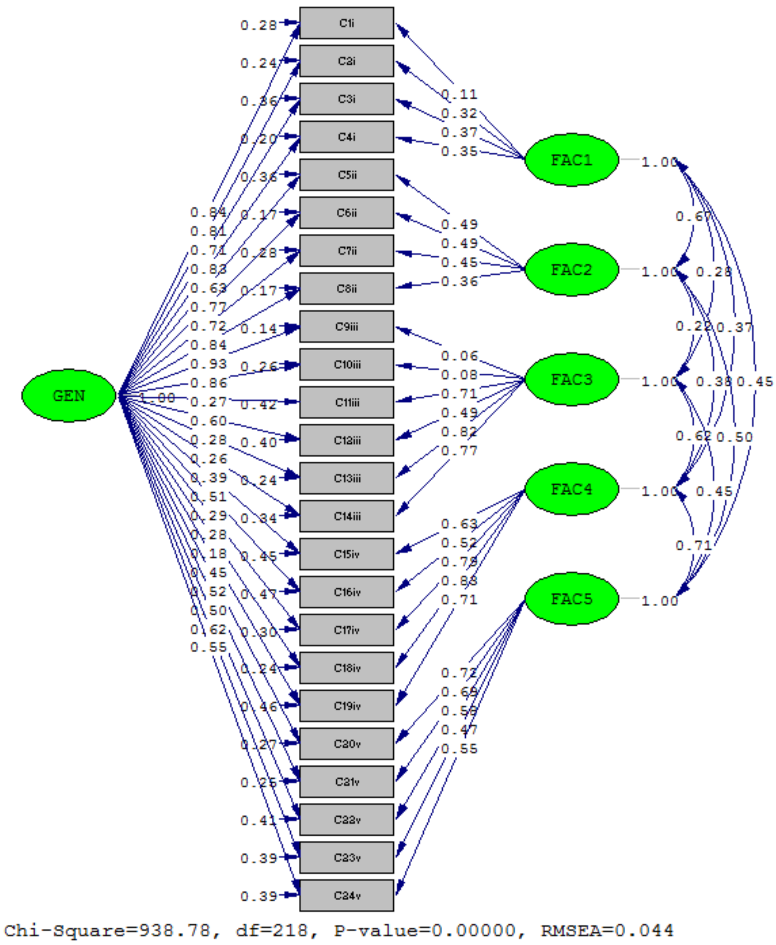

Figure 4.2 **Standardised solution for the learning climate bifactor measurement model**

The Goodness of fit statistics for the bifactor model for learning climate is depicted in Table 4.21.

Table 4.21

The Goodness of fit statistics for the learning climate measurement bifactor model

Goodness of Fit Statistics
Degrees of Freedom = 218
Minimum Fit Function Chi-Square = 1346.313 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1421.566 (P = .0)
Satorra-Bentler Scaled Chi-Square = 938.777 (P = .0)
Chi-Square Corrected for Non-Normality = 903.467 (P = .0)
Estimated Non-centrality Parameter (NCP) = 720.777
90 Percent Confidence Interval for NCP = (629.745 ; 819.344)
Minimum Fit Function Value = .783
Population Discrepancy Function Value (F0) = .419
90 Percent Confidence Interval for F0 = (.366 ; .477)
Root Mean Square Error of Approximation (RMSEA) = .0439
90 Percent Confidence Interval for RMSEA = (.0410 ; .0468)
P-Value for Test of Close Fit (RMSEA < .05) = 1.00
Expected Cross-Validation Index (ECVI) = .642
90 Percent Confidence Interval for ECVI = (.589 ; .699)
ECVI for Saturated Model = .349
ECVI for Independence Model = 69.129
Chi-Square for Independence Model with 276 Degrees of Freedom = 118784.384
Independence AIC = 118832.384

Model AIC = 1102.777 Saturated AIC = 600.000 Independence CAIC = 118987.186 Model CAIC = 1631.684 Saturated CAIC = 2535.024
Normed Fit Index (NFI) = .992 Non-Normed Fit Index (NNFI) = .992 Parsimony Normed Fit Index (PNFI) = .784 Comparative Fit Index (CFI) = .994 Incremental Fit Index (IFI) = .994 Relative Fit Index (RFI) = .990
Critical N (CN) = 494.475
Root Mean Square Residual (RMR) = .0282 Standardized RMR = .0279 Goodness of Fit Index (GFI) = .936 Adjusted Goodness of Fit Index (AGFI) = .911 Parsimony Goodness of Fit Index (PGFI) = .680

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (938.777; $p < .05$) which denotes a significant test statistic. A significant χ^2 denotes that the model does not fit exactly in the parameter. The exact fit null hypothesis (H_0: $\Sigma = \Sigma(\theta)$ or H_0: RMSEA = 0) is therefore rejected ($p < .05$) (Hooper, Coughlan, & Mullen, 2008; Vieira, 2011). What this implies is that the learning climate measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone. The RMSEA value of .0439 indicated a good model fit in the sample. The close fit hypothesis (H0: RMSEA≤.05) was not be rejected ($p > .05$). The learning climate measurement model, thus, showed close fit in the parameter as well as very good fit in the sample.

Since the model fitted, the magnitude and the significance of the slope of the regression, of the observed variables (i.e., individual items) on their respective latent variables could be examined in the unstandardised lambda-X matrix ($\boldsymbol{\Lambda}^X$). The $\boldsymbol{\Lambda}^X$ indicated that all the slope coefficients that describe the regression of the individual items on the latent variables (i.e., *learning climate* general factor and five specific factors[107]) were statistically significant ($p < .05$). All the indicator variables loaded significantly on the latent variables (both the general factor and the specific group factors) that they were designed to reflect. Moreover, the R^2 values associated with the items varied from .505 to .835 thus indicating that a satisfactory proportion of variance in each indicator variable is explained by the broad general factor and the specific narrow facto) they were designed to reflect. The current study interpreted this a sufficient evidence to warrant the use of all 24 items in the calculation of composite indicators for the learning climate latent variable in the structural model.

[107] *Learning climate* contains five dimensions, namely *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *interest and involvement*, and *autonomy*.

4.4.4 PSYCHOMETRIC EVALUATION OF THE STRUCTURE IN THE LEARNING MATERIAL SCALE

The *structure in the learning material* scale consists of four items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. *Structure in the learning material* was conceptualised as a unidimensional latent variable.

4.4.4.1 Item analysis: Structure in the Learning Material

The full results from the item analysis of the *structure in the learning material* scale are depicted in Table 4.22.

A highly satisfactory (above .80) Cronbach's alpha of .931 was obtained for the four-item scale, as shown in the Reliability Statistics section of Table 4.22. This indicates that approximately 93% of the variance in the items is systematic or true score variance and only 7% is random error variance.

In the Item Statistics section of Table 4.22, item means ranged from 3.86 to 4.04 on a five-point Likert scale and the item standard deviations ranged from 1.10 to 1.22. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the scale or scale that were unable to detect relatively small differences in test-takers' standing on the latent *structure in the learning material* dimension (Theron, 2017). The highest mean was for item D2. Item D2's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item D2.

The inter-item correlations ranged between .753 and .804. The inter-item correlation matrix indicated that all items correlated highly with the rest of the items. The mean inter-item correlation was .773. None of the items consistently correlated below the mean inter-item correlation with the remaining items of the scale. None of the items could, therefore, be flagged as responding to a different source of variance than the remaining items. The inter-item correlation matrix showed that item D1 showed the highest correlations ranging from .753 to .804 and item D3 showed the lowest correlations ranging from .753 to .778.

In the Item-Total Statistics section of Table, 4.22 the corrected item-total correlations ranging from .826 to .855 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item D3 obtained the lowest value compared to the other items. The squared multiple correlations ranging from .685 to .730 were satisfactory. The squared multiple correlation of item D3 was, again, slightly lower than the values of the other items. None of the items showed themselves to be outliers in the corrected item-total or squared multiple correlation distributions. All items, therefore, reflected a common source of systematic variance albeit not necessarily the intended latent variable nor necessarily a unidimensional source of variance. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item D3 does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the structure in the learning material scale suggested that item D1 (*"The learning material was presented in a format that made it easy to find structure"*) was the strongest item in the scale and item D3 (*"The learning material was presented in a format that allows for critical thinking and understanding"*) was the weakest item in the scale. None of the items were deleted.

Table 4.22

The reliability analysis output for the Structure in the Learning Material scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.931	.932	4

Item Statistics

	Mean	Std. Deviation	N
D1	3.91686	1.213438	1720
D2	4.04186	1.102904	1720
D3	3.92674	1.178331	1720
D4	3.85756	1.223700	1720

Inter-Item Correlation Matrix

	D1	D2	D3	D4
D1	1.000	.804	.753	.779
D2	.804	1.000	.778	.766
D3	.753	.778	1.000	.761
D4	.779	.766	.761	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
D1	11.82616	10.387	.846	.722	.908
D2	11.70116	11.021	.852	.730	.907
D3	11.81628	10.718	.826	.685	.914
D4	11.88547	10.404	.833	.694	.912

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.936	3.858	4.042	.184	1.048	.006	4
Item Variances	1.394	1.216	1.497	.281	1.231	.016	4
Inter-Item Correlations	.773	.753	.804	.050	1.067	.000	4

4.4.4.2 Dimensionality analysis: Structure in the Learning Material

The full four-item structure in the learning material scale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the four items, written for the structure in the learning material scale, should all reflect a single underlying dimension.

The correlation matrix, for the structure in the learning material scale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .861 (> .6) was obtained and the Bartlett's Test chi-square statistic was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (3.32 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.23. Item D3 (*"The learning material was presented in a format that allows for critical thinking and understanding"*) had the lowest factor loading ($\lambda_{i1} = .864$) and item D2 (*"Meaningful connections could be found between the various sections or information in the learning material"*) had the highest factor loading ($\lambda_{i1} = .895$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *structure in the learning material* scale, was thus corroborated.

Table 4.23

Factor matrix for the Structure in the Learning Material scale

	Factor
	1
D2	.895
D1	.888
D4	.871
D3	.864

4.4.5 PSYCHOMETRIC EVALUATION OF THE TRANSFORMATIONAL TRAINER-INSTRUCTOR LEADERSHIP SCALE

The, four-subscale multi-dimensional, *transformational trainer-instructor leadership* scale consists of a total of twelve items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. Each subscale was analysed separately.

4.4.5.1 Psychometric evaluation of the individualised consideration subscale

Individualised consideration is the first subscale in the *transformational trainer-instructor leadership* scale and it consisted of three items.

4.4.5.1.1 Item analysis: Individualised Consideration

The full results from the item analysis of the *individualised consideration* subscale are depicted in Table 4.24.

A highly satisfactory (above .80) Cronbach's alpha of .906 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.24. This indicates that approximately 91% of the variance in the items is systematic or true score variance and only 9% is random error variance.

In the Item Statistics section of Table 4.24, item means ranged from 3.43 to 3.94 on a five-point Likert scale and the item standard deviations ranged from 1.15 to 1.28. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicated that there are no insensitive items present in the subscale that were unable to detect relatively small differences in test-takers' standing on the latent *individualised consideration* dimension (Theron, 2017). The highest mean was for item E2i. Item E2i's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item E1i.

The inter-item correlations ranged between .742 and .807. The inter-item correlation matrix indicated that all items correlated highly with each other. E3i consistently correlated below the mean inter-item correlation (.768) with the remaining items but not to a sufficient degree to raise serious concerns. The inter-item correlation matrix showed that item E1i showed the highest correlations ranging from .754 to .807 and item E3i showed the lowest correlations ranging from .742 to .754.

In the Item-Total Statistics section of Table 4.24, the corrected item-total correlations ranging from .787 to .835 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item E3i obtained the lowest value compared to the other items. The squared multiple correlations ranging from .620 to .705 were satisfactory. The squared multiple correlation of item E3i was, again, slightly lower than the values of the other items. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017). None of the items showed themselves as outliers towards the lower end of the corrected item-total and squared multiple correlation distributions. These findings are compatible with the position that the items are measuring the specific latent variable they were earmarked to measure (Pallant, 2007). Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item E3i does not present sufficiently problematic to be flagged as a seriously problematic item.

The basket of evidence from the results of the item analysis of the individualised consideration subscale suggested that item E1i (*"The lecturer showed concern for students"*) was the strongest item in the subscale and item E3i (*"The lecturer paid close attention to each individual student's learning needs"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.24

The reliability analysis output for the Individualised Consideration subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.906	.908	3

Item Statistics

	Mean	Std. Deviation	N
E1i	3.82674	1.152777	1720
E2i	3.93663	1.162256	1720
E3i	3.42733	1.281931	1720

Inter-Item Correlation Matrix

	E1i	E2i	E3i
E1i	1.000	.807	.754
E2i	.807	1.000	.742
E3i	.754	.742	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E1i	7.36395	5.207	.835	.705	.850
E2i	7.25407	5.200	.825	.693	.857
E3i	7.76337	4.843	.787	.620	.893

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.730	3.427	3.937	.509	1.149	.072	3
Item Variances	1.441	1.329	1.643	.314	1.237	.031	3
Inter-Item Correlations	.768	.742	.807	.065	1.087	.001	3

4.4.5.1.2 Dimensionality analysis: Individualised Consideration

The full three-item *individualised consideration* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *individualised consideration* subscale of the Transformational Trainer-Instructor Leadership scale, should all reflect the unidimensional *individualised consideration* latent dimension of the *transformational trainer-instructor leadership* multidimensional latent variable.

The correlation matrix, for the individualised consideration subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .751 (> .6) was obtained and the chi-square estimate calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.536 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.25. Item E3i (*"The lecturer paid close attention to each individual student's learning needs"*) had the lowest factor loading ($\lambda_{i1} = .833$) and item E1i (*"The lecturer showed concern for students"*) had the highest factor loading ($\lambda_{i1} = .904$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *individualised consideration* subscale, was thus corroborated.

Table 4.25

Factor matrix for the Individualised Consideration subscale

	Factor
	1
E1i	.904
E2i	.892
E3i	.833

4.4.5.2 Psychometric evaluation of the intellectual stimulation subscale

Intellectual stimulation is the second subscale in the *transformational trainer-instructor leadership* scale and it consists of three items.

4.4.5.2.1 Item analysis: Intellectual Stimulation

The full results from the item analysis of the *intellectual stimulation* subscale are depicted in Table 4.26.

A highly satisfactory (above .80) Cronbach's alpha of .900 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.26. This indicates that approximately 90% of the variance in the items is systematic or true score variance and only 10% is random error variance.

In the Item Statistics section of Table 4.26, item means ranged from 3.76 to 3.91 on a five-point Likert scale and the item standard deviations ranged from 1.08 to 1.34. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the scale or subscale that were unable to detect relatively small differences in test-takers' standing on the latent *intellectual stimulation* dimension (Theron, 2017). The highest mean was for item E4ii. Item E4ii's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item E4ii.

The inter-item correlations ranged between .690 and .864. The inter-item correlation matrix indicated that all items correlated moderately to highly with each other. Item E4ii consistently correlated below the mean inter-item correlation (.752) with the remaining items but not sufficiently so to raise serious concerns. The inter-item correlation matrix showed that item E6ii showed the highest correlations ranging from .701 to .864 and item E4ii showed the lowest correlations ranging from .690 to .701.

In the Item-Total Statistics section of Table 4.26, the corrected item-total correlations ranging from .720 to .860 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item E4ii obtained the lowest value compared to the other items. The squared multiple correlations ranging from .519 to .768 were satisfactory. The squared multiple correlation of item E4ii was, again, slightly lower than the values of the other items. E4ii showed itself to be somewhat of an outlier in the squared multiple correlation distribution but to a lesser degree so in the corrected item-total distribution. These findings raise the concern that item e4ii responded somewhat out of step with its colleagues suggesting that E4ii is underpinned to some degree by a different source of systematic variance. Foremove, the results indicated that the reliability coefficient would increase (from the current $\alpha = .900$ to $\alpha = .927$) if item E4ii was deleted. This indicates that item E4ii ("*The* *lecturer gave students the chance to explain their ideas and to assess and refine them"*) might be problematic. However, E4ii was not deleted since the current Cronbach alpha is substantial enough and since there are only three items in this subscale.

The basket of evidence from the results of the item analysis of the intellectual stimulation subscale suggested that item E6ii (*"The lecturer stimulated the students' motivation and creativity"*) was the strongest item in the subscale and item E4ii was the weakest item in the subscale. None of the items were deleted.

Table 4.26

The reliability analysis output for the Intellectual Stimulation subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.901	3

Item Statistics

	Mean	Std. Deviation	N
E4ii	3.90698	1.081097	1720
E5ii	3.76919	1.343194	1720
E6ii	3.75988	1.305965	1720

Inter-Item Correlation Matrix

	E4ii	E5ii	E6ii
E4ii	1.000	.690	.701
E5ii	.690	1.000	.864
E6ii	.701	.864	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E4ii	7.52907	6.542	.720	.519	.927
E5ii	7.66686	4.854	.851	.761	.816
E6ii	7.67616	4.977	.860	.768	.805

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.812	3.760	3.907	.147	1.039	.007	3
Item Variances	1.559	1.169	1.804	.635	1.544	.117	3
Inter-Item Correlations	.752	.690	.864	.175	1.253	.008	3

4.4.5.2.2 Dimensionality analysis: Intellectual Stimulation

The full three-item *intellectual stimulation* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *intellectual stimulation* subscale of the Transformational Trainer-Instructor Leadership scale, should all reflect the unidimensional *intellectual stimulation* latent dimension of the multidimensional *transformational trainer-instructor leadership* latent variable.

The correlation matrix, for the intellectual stimulation subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .716 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.50 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.27. Item E4ii (*"The lecturer gave students the change to explain their ideas and to assess and refine them"*) had the lowest factor loading ($\lambda_{i1} = .748$) and item E6ii (*"The lecturer stimulated the students' motivation and creativity"*) had the highest factor loading ($\lambda_{i1} = .936$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *intellectual stimulation* subscale, was thus corroborated. The EFA findings also justify the decision to retain item E4ii.

Table 4.27

Factor matrix for the Intellectual Stimulation subscale

	Factor
	1
E6ii	.936
E5ii	.923
E4ii	.748

4.4.5.3 Psychometric evaluation of the idealised influence or charisma subscale

Idealised influence or charisma is the third subscale in the *transformational trainer-instructor leadership* scale and it consists of three items.

4.4.5.3.1 Item analysis: Idealised Influence or Charisma

The full results from the item analysis of the idealised influence or charisma subscale are depicted in Table 4.28.

A satisfactory (above .80) Cronbach's alpha of .876 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.28. This indicates that approximately 88% of the variance in the items is systematic or true score variance and only 12% is random error variance.

In the Item Statistics section of Table 4.28, item means ranged from 3.73 to 4.24 on a five-point Likert scale and the item standard deviations ranged from 1.02 to 1.15. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the subscale that were unable to detect relatively small differences in test-takers' standing on the latent *idealised influence or charisma* dimension (Theron, 2017). The absence of extreme means and small standard deviations further implies that all the items in this subscale. The highest mean was for item E9iii. Item E9iii's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item E9iii.

The inter-item correlations ranged between .633 and .752. The inter-item correlation matrix indicated that all items correlated moderately with each other. The mean inter-item correlation was .703. None of the items consistently correlated below the mean inter-item correlation with the remaining items. The inter-item correlation matrix showed that item E7iii showed the highest correlations ranging from .724 to .75 and that item E9iii showed the lowest correlations ranging from .633 to .724.

In the Item-Total Statistics section of Table 4.28, the corrected item-total correlations ranging from .725 to .817 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item E9iii obtained the lowest value compared to the other items. The recommended cut-off for the corrected item-total correlations is values greater than .3. The squared multiple correlations ranging from .542 to .668 were satisfactory. The squared multiple correlation of item E9iii was, again, slightly lower than the values of the other items. None of the items showed themselves as outliers in the corrected item-total or squared multiple correlation distributions. These findings indicate that the response to all the items of the subscale were dependent on a common source of systematic variance although not necessarily the target leadership dimension nor necessarily unidimensional. These results were, however, compatible with such a position. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted.

The basket of evidence from the results of the item analysis of the idealised influence or charisma subscale suggested that item E7iii (*"The lecturer showed respect and positive regard for all students which inspired the students to do the same stimulated the students' motivation and creativity"*) was the strongest item in the subscale and item E9iii (*"The lecturer did not abuse his/her authoritative power in order to gain the students trust and respect"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.28

The reliability analysis output for the Idealised Influence or Charisma subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.876	.877	3

Item Statistics

	Mean	Std. Deviation	N
E7iii	3.97151	1.131701	1720
E8iii	3.73198	1.147991	1720
E9iii	4.23779	1.023785	1720

Inter-Item Correlation Matrix

	E7iii	E8iii	E9iii
E7iii	1.000	.752	.724
E8iii	.752	1.000	.633
E9iii	.724	.633	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E7iii	7.96977	3.855	.817	.668	.772
E8iii	8.20930	4.006	.749	.582	.837
E9iii	7.70349	4.552	.725	.542	.858

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.980	3.732	4.238	.506	1.136	.064	3
Item Variances	1.216	1.048	1.318	.270	1.257	.021	3
Inter-Item Correlations	.703	.633	.752	.118	1.187	.003	3

4.4.5.3.2 Dimensionality analysis: Idealised Influence or Charisma

The full three-item *idealised influence* or charisma subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *idealised influence* or charisma subscale of the Transformational Trainer-Instructor Leadership scale, should all reflect the unidimensional *idealised influence* latent dimension of the multidimensional *transformational trainer-instructor leadership* latent variable.

The correlation matrix, for the idealised influence or charisma subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .721 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.40 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.29. Item E9iii (*"The lecturer did not abuse his/her authoritative power in order to gain the students trust and respect"*) had the lowest factor loading ($\lambda_{i1} = .781$) and item E7iii (*"The lecturer showed respect and positive regard for all students which inspired the students to do the same stimulated the students' motivation and creativity"*) had the highest factor loading ($\lambda_{i1} = .926$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *idealised influence* or charisma subscale, was thus corroborated.

Table 4.29

Factor matrix for the Idealised Influence or Charisma subscale

	Factor
	1
E7iii	.926
E8iii	.812
E9iii	.781

4.4.5.4 Psychometric evaluation of the *inspirational motivation* subscale

Inspirational motivation is the fourth and last subscale in the *transformational trainer-instructor leadership* scale and it consists of three items.

4.4.5.4.1 Item analysis: Inspirational Motivation

The full results from the item analysis of the *inspirational motivation* subscale are depicted in Table 4.30.

A satisfactory (above .80) Cronbach's alpha of .900 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.30. This indicates that approximately 90% of the variance in the items is systematic or true score variance and only 10% is random error variance.

In the Item Statistics section of Table 4.30, item means ranged from 3.744 to 3.92 on a five-point Likert scale and the item standard deviations ranged from 1.14 to 1.28. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are insensitive items present in the subscale (Theron, 2017). The highest mean was for item E11iv. Item E11iv's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item E11iv.

The inter-item correlations ranged between .738 and .762. The inter-item correlation matrix indicated that all items correlated moderately high with each other. None of the items consistently correlated below the mean inter-item correlation (.752) with the remaining items. The inter-item correlation matrix showed that item E10iv showed the highest correlations ranging from .755 to .762 and item E11iv showed the lowest correlations ranging from .738 to .755.

In the Item-Total Statistics section of Table 4.30, the corrected item-total correlations ranging from .795 to .814 were all satisfactory since all the values were greater than .3 (Mahembe, 2014; Pallant, 2007). Item E11iv obtained the lowest value compared to the other items. The squared multiple correlations ranging from .633 to .662 were satisfactory. The squared multiple correlation of item E11iv was, again, slightly lower than the values of the other items. The inter-item correlation results, taken in conjunction with the item-total and squared multiple correlation results, indicate that all the items responded in relative unison to a common underlying source of systematic variance. It cannot, however, be claimed that this source is unidimensional nor that it is the intended latent leadership dimension. The findings are, however, compatible with the latter claim. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item E11iv does not present sufficiently problematic to be flagged as a seriously problematic item

The basket of evidence from the results of the item analysis of the inspirational motivation subscale suggested that item E10iv (*"The lecturer helped students to create a positive vision or view of their* *career"*) was the strongest item in the subscale and item E11iv (*"The lecturer encouraged students to see challenges and difficulties related to assignments and tests as learning opportunities"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.30
The reliability analysis output for the Inspirational Motivation subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.901	3

Item Statistics

	Mean	Std. Deviation	N
E10iv	3.75349	1.184906	1720
E11iv	3.92384	1.145856	1720
E12iv	3.74360	1.280800	1720

Inter-Item Correlation Matrix

	E10iv	E11iv	E12iv
E10iv	1.000	.755	.762
E11iv	.755	1.000	.738
E12iv	.762	.738	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E10iv	7.66744	5.120	.814	.662	.846
E11iv	7.49709	5.358	.795	.633	.864
E12iv	7.67733	4.767	.801	.643	.860

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.807	3.744	3.924	.180	1.048	.010	3
Item Variances	1.452	1.313	1.640	.327	1.249	.029	3
Inter-Item Correlations	.752	.738	.762	.024	1.032	.000	3

4.4.5.4.2 Dimensionality analysis: Inspirational Motivation

The full three-item *inspirational motivation* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *inspirational motivation* subscale of the Transformational Trainer-Instructor Leadership scale, should all reflect the unidimensional *inspirational motivation* latent dimension of the multidimensional *transformational trainer-instructor leadership* construct.

The correlation matrix, for the inspirational motivation subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .753 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.50 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.31. Item E11iv (*"The lecturer encouraged students to see challenges and difficulties related to assignments and tests as learning opportunities"*) had the lowest factor loading ($\lambda_{i1} = .855$) and item E10iv (*"The lecturer helped students to create a positive vision or view of their career"*) had the highest factor loading ($\lambda_{i1} = .882$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *inspirational motivation* subscale, was thus corroborated.

Table 4.31
Factor matrix for the Inspirational Motivation subscale

	Factor
	1
E10iv	.882
E12iv	.864
E11iv	.855

4.4.5.5 Reliability of the complete transformational trainer-instructor leadership scale

The coefficient of internal consistency was calculated for each of the four subscales by means of Cronbach's alpha. The Cronbach alpha values for the four subscales for the transformational trainer-instructor leadership scale were:

- Individualised consideration: $r = .906$
- Intellectual stimulation: $r = .900$
- Idealised influence or charisma: $r = .876$
- Inspirational motivation: $r = .900$

In order to calculate the reliability of the total scores obtained on *transformational trainer-instructor leadership* scale as a whole, the reliability coefficient for the unweighted total scores had to be calculated. This unweighted total score was calculated according to the following formula (Nunnally, 1978, p. 248):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti} S^2{}_i}{S^2{}_t}]$$

Calculating a single Cronbach alpha across all the items for the transformational trainer-instructor leadership as a whole would have provided an underestimation of the reliability of the total scores per subscale as they correlate amongst themselves. The unweighted total score reliability for the complete *transformational trainer-instructor leadership* scale was calculated as:

$$rtot = 1 - \left[\frac{[\sum_{i=1}^{5} S^2 i - \sum_{i=1}^{5} rttiS^2 i]}{S^2 t}\right]$$

$$= 1 - [\frac{42.274 - 38.925}{147.813}]$$

$$= .970421$$

4.4.5.6 Confirmatory factor analysis of the complete transformational trainer-instructor leadership scale

Confirmatory factor analysis was conducted on the multidimensional *transformational trainer-instructor leadership* scale as a whole. This was done in order to determine the degree to which the transformational trainer-instructor leadership measurement model as a whole is consistent with the empirical analysed data. The measurement model, in which each of the four *transformational trainer-instructor leadership* dimensions were represented by their individual item indicators, was fitted[108].

All (12) of the indicator variables failed the test of univariate normality (p < .05). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected (χ^2 =

[108] Although the evaluation of the transformational trainer-instructor leadership subscale can easily be a studied in its own right, the focus of the current research was on the empirical evaluation of the trainer-instructor competency model. Nevertheless, it is important to establish the reliability and validity of the measurement instruments used to operationalise the latent variables comprising the structural model. For this reason and for the sake of brevity, only a brief overview of the results for the transformational leadership model will be provided.

4050.362; $p < .05$). In an attempt to rectify the lack of multivariate normality, the data was first normalised.

The results indicated that the normalisation procedure partially succeeded in rectifying the multivariate normality problem. All (12) of the indicator variables, again, failed the test of univariate normality ($p < .05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that deviated less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ($\chi^2 = 1430.574$; $p < .05$). The normalised data set thus had to be analysed with robust maximum likelihood estimation.

The transformational trainer-instructor leadership measurement model produced a Satorra-Bentler scaled chi-square of 383.369 with 48 degrees of freedom. The hypothesis of exact model fit had to be rejected ($p < .05$). A root mean square error of approximation (RMSEA) of .0638 with a 90% confidence interval of (.0579 - .0698) was obtained, indicating reasonable fit in the sample. The probability of observing the sample RMSEA value under the close fit null hypothesis was furthermore sufficiently small that the null hypothesis of close also had to be rejected ($p < .05$). The transformational trainer-instructor leadership measurement model did not fit exactly or closely.

The modification indices calculated for the fitted first-order measurement model revealed a large number of statistically significant ($p < .01$) modification indices for the off-diagonal terms in the theta-delta matrix. This suggested that allowing the measurement error terms to covary would statistically significantly ($p < .01$) improve the fit of the model. This, in turn, suggested that the items shared an additional common source of systematic variance. A bifactor model was consequently fitted in which each item loads on one of the four specific, narrow transformational leadership dimensions it was designated to reflect and all items load on a broad general transformational leadership factor.

4.4.3.7 Bifactor model for the complete transformational trainer-instructor leadership scale

The goodness of fit statistics for the transformational trainer-instructor leadership bifactor measurement model for are depicted in Table 4.32 and the transformational trainer-instructor leadership bifactor measurement model is depicted in Figure 4.3.

Table 4.32

The Goodness of fit statistics for the transformational trainer-instructor leadership measurement bifactor model

Goodness of Fit Statistics
Degrees of Freedom = 36
Normal Theory Weighted Least Squares Chi-Square = 214.365 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 142.007 (P = .00)
Chi-Square Corrected for Non-Normality = 150.105 (P = .00)
Estimated Non-centrality Parameter (NCP) = 106.007
90 Percent Confidence Interval for NCP = (73.090 ; 146.494)
Minimum Fit Function Value = .00622
Population Discrepancy Function Value (F0) = .0617
90 Percent Confidence Interval for F0 = (.0425 ; .0852)
Root Mean Square Error of Approximation (RMSEA) = .0414
90 Percent Confidence Interval for RMSEA = (.0344 ; .0487)
P-Value for Test of Close Fit (RMSEA < .05) = .975
Expected Cross-Validation Index (ECVI) = .131
90 Percent Confidence Interval for ECVI = (.112 ; .155)
ECVI for Saturated Model = .0908
ECVI for Independence Model = 32.636
Chi-Square for Independence Model with 66 Degrees of Freedom = 56077.637
Independence AIC = 56101.637
Model AIC = 226.007
Saturated AIC = 156.000
Independence CAIC = 56179.037
Model CAIC = 496.910
Saturated CAIC = 659.106
Normed Fit Index (NFI) = .997
Non-Normed Fit Index (NNFI) = .997
Parsimony Normed Fit Index (PNFI) = .544
Comparative Fit Index (CFI) = .998
Incremental Fit Index (IFI) = .998
Relative Fit Index (RFI) = .995
Critical N (CN) = 710.595
Root Mean Square Residual (RMR) = .0159
Standardized RMR = .0119
Goodness of Fit Index (GFI) = 1.00
Adjusted Goodness of Fit Index (AGFI) = .999
Parsimony Goodness of Fit Index (PGFI) = .461

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (142.01; $p < .05$). The exact fit null hypothesis (H_0: $\Sigma = \Sigma(\theta)$) was therefore rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011). The RMSEA value of .0414 indicated a good model fit in the sample. The probability of observing the sample RMSEA estimate under the close fit null hypothesis was sufficiently large that the close fit null hypothesis did not have to be rejected ($p > .05$). The transformational trainer-instructor leadership measurement model, thus, showed close fit in the parameter as well as very good fit in the sample.

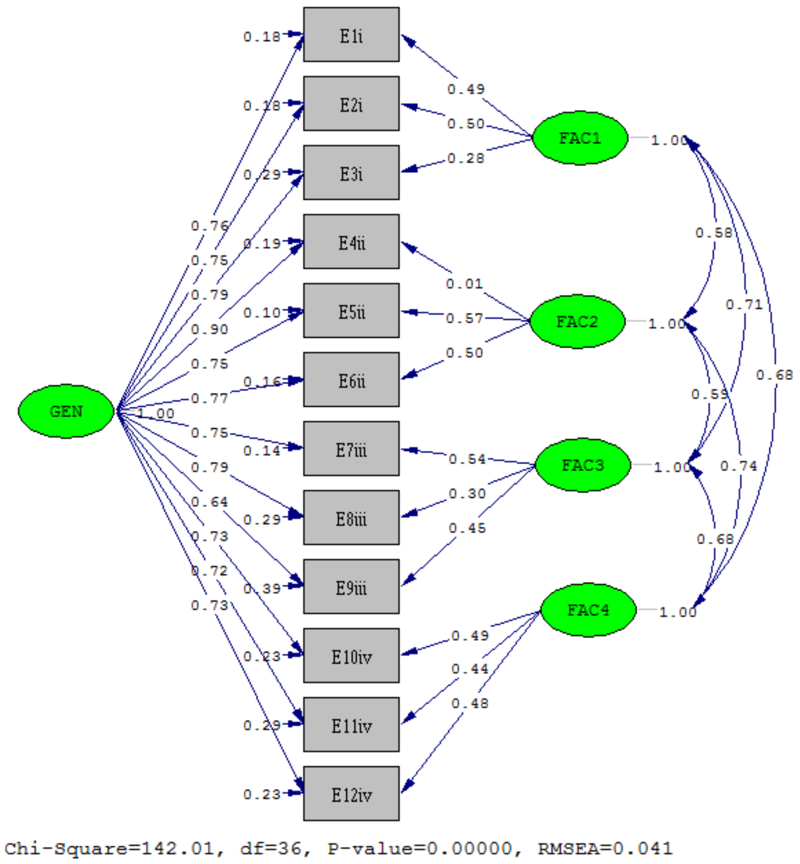

Figure 4.3. **Standardised solution for the transformational trainer-instructor leadership bifactor measurement model**

Since the model fitted, the magnitude and the significance of the slope of the regression, of the observed variables (i.e., individual items) on their respective latent variables, can be examined in the unstandardised lambda-X matrix ($\boldsymbol{\Lambda}^{\mathbf{X}}$). The $\boldsymbol{\Lambda}^{\mathbf{X}}$ indicated that most items loaded statistically significantly ($p < .05$) on their designated narrow latent transformational leadership dimension (E4ii was the only exception if a one-tailed significance tests are applied) and all items statistically significantly ($p < .05$) loaded on the broad transformational leadership factor.

Additionally, the squared multiple correlations (R^2) when regressing each item indicator on the two latent variables that were hypothesised to affect revealed that the items may be considered valid indicators of the general transformational leadership factor and of the four narrow, specific latent transformational leadership dimensions factors since a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variables linked to it in the model (Van der Westhuizen, 2015). The R^2 values ranged from .608 to .986 with the majority exceeding .80. In conclusion, the bifactor learning climate measurement model showed that the variance in the indicators (i.e., individual items) was influenced by both the general factor (i.e., learning climate) and, in most cases, by group sources of variance (of the four specific group factors). The current study interpreted these findings, taken in conjunction with the item analysis and EFA findings, as sufficient justification to utilise all 12 items in the transformational leadership scale in the calculation of composite indicators to operationalise this latent variable in the structural model.

4.4.6 PSYCHOMETRIC EVALUATION OF THE FACILITATING CLARITY AND UNDERSTANDING SCALE

The *facilitating clarity and understanding* scale consists of six items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. *Facilitating clarity and understanding* was conceptualised as a unidimensional latent variable.

4.4.6.1 Item analysis: Facilitating Clarity and Understanding

The full results from the item analysis for the *facilitating clarity and understanding* scale are depicted in Table 4.33.

A highly satisfactory (above .80) Cronbach's alpha of .935 was obtained for the six-item scale, as shown in the Reliability Statistics section of Table 4.33. This indicates that approximately 94% of the variance in the items is systematic or true score variance and only 6% is random error variance.

In the Item Statistics section of Table 4.33, item means ranged from 3.87 to 4.14 on a five-point Likert scale and the item standard deviations ranged from 1.14 to 1.27. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items in the scale that failed to detect relatively small differences in test-takers' standing on the latent *facilitating clarity and understanding* latent variable. (Theron, 2017). The highest mean was for item F4. Item F4's mean was not extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item F1.

The inter-item correlations ranged between .660 and .764. The inter-item correlation matrix indicated that all items correlated moderately with each other. The inter-item correlation matrix showed that item F1 showed the highest correlations ranging from .660 to .764 and item F5 and showed the lowest correlations ranging from .660 to .759. None of the items consistently correlated below the mean inter-item correlation (.708) with the remaining items. All the items, therefore, responded in relative unison to a common source of systematic variance.

In the Item-Total Statistics section of Table 4.33, the corrected item-total correlations ranging from .781 to .827 were all satisfactory. Item F5 obtained the lowest value compared to the other items. The squared multiple correlations ranging from .635 to .702 were satisfactory. The squared multiple correlation of item F4 was slightly lower than the values of the other items. However, none of the items showed themselves as outliers towards the lower end of the corrected item-total or squared multiple correlation distributions. None of the items therefore sufficiently responded to a different source of systematic variance to prevent it from responding in unison with the remaining items. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted. This suggested that item F5 and item F4 did not present as sufficiently problematic to be flagged as seriously problematic items.

The basket of evidence from the results of the item analysis of the facilitating clarity and understanding scale suggested that item F1 (*"The lecturer clearly verbally explained the module content an information (e.g. effective use of examples)"*) was the strongest item in the scale and item F5 (*"The lecturer frequently asked whether we were still following him/her"*) was the weakest item in the scale. None of the items were deleted.

Table 4.33
The reliability analysis output for the Facilitating Clarity and Understanding scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.935	.936	6

Item Statistics

	Mean	Std. Deviation	N
F1	4.12093	1.141233	1720
F2	3.86977	1.252996	1720
F3	3.96977	1.274082	1720
F4	4.14477	1.172437	1720
F5	3.94302	1.228992	1720
F6	4.11512	1.148945	1720

Inter-Item Correlation Matrix

	F1	F2	F3	F4	F5	F6
F1	1.000	.764	.750	.707	.660	.724
F2	.764	1.000	.705	.695	.668	.714
F3	.750	.705	1.000	.712	.670	.711
F4	.707	.695	.712	1.000	.682	.693
F5	.660	.668	.670	.682	1.000	.759
F6	.724	.714	.711	.693	.759	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
F1	20.04244	28.086	.827	.702	.921
F2	20.29360	27.240	.809	.669	.923
F3	20.19360	27.037	.810	.665	.923
F4	20.01860	28.125	.796	.635	.924
F5	20.22035	27.769	.781	.640	.926
F6	20.04826	28.031	.826	.696	.921

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.027	3.870	4.145	.275	1.071	.013	6
Item Variances	1.450	1.302	1.623	.321	1.246	.018	6
Inter-Item Correlations	.708	.660	.764	.103	1.157	.001	6

4.4.6.2 Dimensionality analysis: Facilitating Clarity and Understanding

The full six-item *facilitating clarity and understanding* scale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the six items, written for the *facilitating clarity and understanding* scale, should all reflect a single underlying dimension.

The correlation matrix, for the facilitating clarity and understanding scale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .921 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (4.54 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.34. Item F5 (*"The lecturer frequently asked whether we were still following him/her"*) had the lowest factor loading ($\lambda_{i1} = .812$) and item F1 (*"The lecturer clearly verbally explained the module content an information (e.g. effective use of examples)"*) had the highest factor loading ($\lambda_{i1} = .862$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, one (6%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *facilitating clarity and understanding* scale, was thus corroborated.

Table 4.34

Factor matrix for the Facilitating Clarity and Understanding scale

	Factor
	1
F1	.862
F6	.859
F3	.844
F2	.843
F4	.827
F5	.812

4.4.7 PSYCHOMETRIC EVALUATION OF THE PROVIDING FORMATIVE FEEDBACK SCALE

The *providing formative feedback* scale consists of seven items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. *Providing formative feedback* was conceptualised as a unidimensional latent variable.

4.4.7.1 Item analysis: *Providing Formative Feedback*

The full results from the item analysis for the *providing formative feedback* scale are depicted in Table 4.35.

Prior to item analysis on the *providing formative feedback* scale, the response scale negative worded item G7 (*"The lecturer provided too little feedback during the course of the module"*) had to be reversed (i.e., revG7).

A satisfactory (above .80) Cronbach's alpha of .889 was obtained for the seven-item scale, as shown in the Reliability Statistics section of Table 4.35. This indicates that approximately 89% of the variance in the items is systematic or true score variance and only 11% is random error variance.

In the Item Statistics section of Table 4.35, item means ranged from 3.49 to 4.26 on a five-point Likert scale and the item standard deviations ranged from .996 to 1.43. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items in the scale that failed to discriminate between relatively small differences in test-takers' standing on the latent *providing formative feedback* latent variable (Theron, 2017). The highest mean was for item G4. Item G4's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item G4.

The inter-item correlations ranged between .193 and .802. The inter-item correlation matrix indicated that most of the items, with the exception of revG7, correlated moderately with each other. Item revG7 consistently correlated substantially below the mean inter-item correlation with the rest of the items in the *providing formative feedback* scale (ranging from .225 to .375). Thus, item revG7 was flagged as a problematic item. The inter-item correlation matrix showed that items G3 and G2 showed the highest correlations with the other items in the scale and items revG7 and G4 showed the lowest correlations with other the other items.

In the Item-Total Statistics section of Table 4.35, the corrected item-total correlations ranging from .354 to .854 were all satisfactory in as far as all the values were greater than .3. Item revG7 obtained the lowest value compared to the other items. The squared multiple correlations ranged from .162 to .775. The squared multiple correlation of item revG7 was, again, lower than the values of the other items. Item revG7 showed itself as a clear outlier towards the lower end of the corrected item-total and especially the squared multiple correlation distributions.

Furthermore, the results indicated that the reliability coefficient would increase (from the current α = .889 to α = .919) if item revG7 was deleted. This item was, however, not deleted since the item would only affect a marginal increase in the internal consistency reliability. These findings suggested that test-takers responded somewhat differently to item revG7 compared to the manner in which they responded to the remaining items. This, in turn, could be attributed to the fact that the variance in item revG7 did not originate from the same source as systematic variance as the source which underpinned the remaining items. None of the items were deleted.

Table 4.35

The reliability analysis output for the Providing Formative Feedback scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.889	.896	7

Item Statistics			
	Mean	Std. Deviation	N
G1	3.76395	1.225615	1720
G2	3.69477	1.248327	1720
G3	3.86221	1.126740	1720
G4	4.26163	.995706	1720
G5	3.86570	1.115228	1720
G6	3.49302	1.195278	1720
revG7	4.10058	1.431711	1720

Inter-Item Correlation Matrix

	G1	G2	G3	G4	G5	G6	revG7
G1	1.000	.789	.717	.499	.691	.605	.338
G2	.789	1.000	.802	.516	.768	.692	.375
G3	.717	.802	1.000	.590	.777	.643	.340
G4	.499	.516	.590	1.000	.586	.418	.225
G5	.691	.768	.777	.586	1.000	.697	.313
G6	.605	.692	.643	.418	.697	1.000	.193
revG7	.338	.375	.340	.225	.313	.193	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
G1	23.27791	30.186	.777	.654	.860
G2	23.34709	29.096	.854	.775	.850
G3	23.17965	30.538	.831	.729	.855
G4	22.78023	34.397	.579	.394	.884
G5	23.17616	30.767	.820	.715	.857
G6	23.54884	31.638	.676	.557	.873
revG7	22.94128	34.175	.354	.162	.919

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.863	3.493	4.262	.769	1.220	.065	7
Item Variances	1.435	.991	2.050	1.058	2.068	.110	7
Inter-Item Correlations	.551	.193	.802	.609	4.150	.037	7

4.4.7.2 Dimensionality analysis: *Providing Formative Feedback*

The full seven-item *providing formative feedback* scale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the six items, written for the *providing formative feedback* scale, should all reflect a single underlying dimension.

The correlation matrix, for the *providing formative feedback* scale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .906 (> .6) was obtained and the chi-square statistic associated with Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (4.54 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that most of the items loaded onto one factor satisfactorily since all, but one, factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.36. Item revG7 *("The lecturer provided too little feedback during the course of the module")* had a factor loading substantially below the cut-off value of .50 ($\lambda_{i1} = .370$), item G4 (*"The feedback information the lecturer gave me was* *focused only on my academic work and not on my personality, gender, race or religion*") had the second lowest factor loading (λ_{i1} = .617) and item G2 (*"The lecturer provided critical and detailed yet supportive feedback"*) had the highest factor loading (λ_{i1} = .910). The findings indicated that all the items, with the exception of revG7, can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Item revG7 did not reflect the underlying single factor to the same degree than the rest of the items in this scale.

Furthermore, only one (6%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provided a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *providing formative feedback* scale, was thus corroborated.

Table 4.36

Factor matrix for the Providing Formative Feedback scale

	Factor
	1
G2	.910
G3	.888
G5	.879
G1	.824
G6	.737
G4	.617
revG7	.370

Based on the finding of the item analysis and the dimensionality analysis it was decided to delete item revG7. Item analysis was rerun on the *providing formative feedback* scale, now with only six items. This analysis reported a Cronbach's alpha of .919. Inter-item correlations ranged from .418 to .802 which indicates that all items correlated moderately with the remainder of the items in the scale. Furthermore, the results indicated that the reliability coefficient would increase (from the current α = .919 to α = .927) if item G4 was deleted. This item was, however, not deleted since the item would only affect a marginal increase in the internal consistency reliability and since the current Cronbach alpha is already very high. Consequently, dimensionality analysis was also rerun on the providing formative feedback scale, now with only six items. The result of this second dimensionality analysis is depicted in Table 4.37 below. The factor matrix revealed that all of the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 (λ_{i1} > .50). Moreover, the factor structure depicted in Table 4.37 was able to reproduce the observed inter-item correlations to such a sufficient degree of accuracy (0% of the residual correlations were greater than .05) to warrant the position that the single-factor structure provides a valid explanation of the observed inter-item correlation matrix.

Table 4.37

Factor matrix for the Providing Formative Feedback (less revG7) scale

	Factor
	1
G2	.905
G3	.887
G5	.881
G1	.819
G6	.747
G4	.617

4.4.8 PSYCHOMETRIC EVALUATION OF THE LIFELONG LEARNING TRAINER-INSTRUCTOR CAPACITY SCALE

The, two subscales in the *lifelong learning trainer-instructor capacity* scale consists of a total of six items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. *Lifelong learning trainer-instructor capacity* was conceptualised as a multidimensional construct comprising of the two latent dimensions *reflection* and *continuous learning and sharing of knowledge*. Each subscale was analysed separately.

4.4.8.1 Psychometric evaluation of the *reflection* subscale

Reflection is the first subscale in the *lifelong learning trainer-instructor capacity* scale and it consists of three items.

4.4.8.1.1 Item analysis: Reflection

The full results from the item analysis for the *reflection* subscale are depicted in Table 4.38.

A satisfactory (above .80) Cronbach's alpha of .869 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.38. This indicates that approximately 87% of the variance in the items is systematic or true score variance and only 13% is random error variance.

In the Item Statistics section of Table 4.38, item means ranged from 3.32 to 3.43 on a five-point Likert scale and the item standard deviations ranged from 1.306 to 1.337. This indicates that most individual students supported the neither agree or disagree to agree category. An absence of extreme means and a lack of small standard deviations indicate that there were no insensitive items in the scale that failed to discriminate between relatively small differences in test-takers’ standing on the latent *reflection* dimension (Theron, 2017). The highest mean was for item H1I. Item H1i’s mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was for item H2i.

The inter-item correlations ranged between .637 and .773. The inter-item correlation matrix indicated that all items correlated moderately with each other. The inter-item correlation matrix showed that item H2 showed the highest correlations ranging from .657 to .773 and item H3i showed the lowest correlations ranging from .637 to .657. Although item H3i consistently correlated below the mean inter-item correlation (.689) with the remaining items it did not correlate substantially lower.

In the Item-Total Statistics section of Table 4.38, the corrected item-total correlations ranging from .687 to .790 were all satisfactory since all the values were greater than .3. Item H3i obtained the lowest value compared to the other items. The squared multiple correlations ranging from .473 to .643 were satisfactory. The squared multiple correlation of item H3i was, again, lower than the values of the other items. Although item H3i fell it the lower end of both the corrected item-total and squared multiple correlations it did not clearly show itself as an outlier in either distribution. Furthermore, the results indicated that the reliability coefficient would increase slightly (from the current $\alpha = .869$ to $\alpha = .872$) if item H3i was deleted. This indicates that H3i (*"The lecturer asks feedback from the class about his/her lecture styles"*) might be problematic. However, H3i was not deleted since the current Cronbach alpha is substantial enough and since there are only three items in this subscale.

The basket of evidence from the results of the item analysis of the reflection subscale suggested that item H2i (*"The lecturer had the ability to change his/her lecture style mid lesson if he/she saw it was not working"*) was the strongest item in the subscale and item H3i was the weakest item in the subscale. None of the items were deleted.

Table 4.38
The reliability analysis output for the Reflection subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.869	.869	3

Item Statistics

	Mean	Std. Deviation	N
H1i	3.42965	1.308559	1720
H2i	3.37674	1.306419	1720
H3i	3.31802	1.337046	1720

Inter-Item Correlation Matrix

	H1i	H2i	H3i
H1i	1.000	.773	.637
H2i	.773	1.000	.657
H3i	.637	.657	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
H1i	6.69477	5.789	.774	.627	.793
H2i	6.74767	5.728	.790	.643	.778
H3i	6.80640	6.063	.687	.473	.872

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.375	3.318	3.430	.112	1.034	.003	3
Item Variances	1.736	1.707	1.788	.081	1.047	.002	3
Inter-Item Correlations	.689	.637	.773	.137	1.215	.004	3

4.4.8.1.2 Dimensionality analysis: Reflection

The full three-item *reflection* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the reflection subscale of the Lifelong Learning Trainer-Instructor Capacity scale, should all reflect the unidimensional *reflection* latent dimension of the multidimensional *lifelong learning trainer-instructor capacity* construct.

The correlation matrix, for the *reflection* subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .720 (> .6) was obtained and the chi-square statistic associated with Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.38 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.39. Item H3i (*"The lecturer asked for feedback from the class about his/her lecture styles"*) had the lowest factor loading ($\lambda_{i1} = .736$) and item H2i (*"The lecturer had the ability to change his/her lecture style mid lesson if he/she saw it was not working"*) had the highest factor loading ($\lambda_{i1} = .892$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Item H3i's factor loading vindicated the decision to retain this item in the scale.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *reflection* subscale, was thus corroborated.

Table 4.39

Factor matrix for the Reflection subscale

	Factor
	1
H2i	.892
H1i	.866
H3i	.736

4.4.8.2 Psychometric evaluation of the continuous learning and sharing of knowledge subscale

Continuous learning and sharing of knowledge is the second and last subscale in the *lifelong learning trainer-instructor capacity* scale and it consists of three items.

4.4.8.2.1 Item analysis: Continuous Learning and Sharing of Knowledge

The full results from the item analysis for the *continuous learning and sharing of knowledge* subscale are depicted in Table 4.40.

A satisfactory (above .80) Cronbach's alpha of .853 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.40. This indicates that approximately 85% of the variance in the items is systematic or true score variance and only 15% is random error variance.

In the Item Statistics section of Table 4.40, item means ranged from 3.320 to 3.734 on a five-point Likert scale and the item standard deviations ranged from 1.14 to 1.25. This indicates that most individual students supported the neither agree or disagree to agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items in the subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *continuous learning and sharing of knowledge* dimension (Theron, 2017). The highest mean was for item H4ii. Item H4ii's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item H6ii.

The inter-item correlations ranged between .604 and .706. The inter-item correlation matrix indicated that all items correlated moderately with each other. The inter-item correlation matrix showed that item H5ii showed the highest correlations ranging from .670 to .706 and item H6ii showed the lowest correlations ranging from .604 to .670. None of the items consistently correlated below the mean inter-item correlation (.660) with the remaining items.

In the Item-Total Statistics section of Table 4.40, the corrected item-total correlations ranging from .689 to .769 were all satisfactory since all the values were greater than .3. Item H6ii obtained the lowest value compared to the other items. The squared multiple correlations ranging from .483 to .592 were satisfactory. The squared multiple correlation of item H6ii was, again, slightly lower than the values of the other items. Item H6ii could, however, not be described as an outlier towards the lower end of the correct item-total and squared multiple correlation distributions. Item H6ii could therefore not be flagged as an item that responds to a substantially different source of systematic variance than the remaining items in the subscale. Furthermore, the results revealed that none of the items would increase the current Cronbach alpha if deleted.

The basket of evidence from the results of the item analysis of the *continuous learning and sharing of knowledge* subscale suggested that item H5ii (*"The lecturer conducted research, on a specific topic or question asked by a student when he/she did not have the knowledge or answer, and got back to us"*) was the strongest item in the subscale and item H6ii (*"The lecturer continuously went on short courses and workshops and other learning, training and development programmes"*) was the weakest item in the subscale. None of the items were deleted.

Table 4.40

The reliability analysis output for the Continuous Learning and Sharing of Knowledge subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.853	.854	3

Item Statistics

	Mean	Std. Deviation	N
H4ii	3.73430	1.250381	1720
H5ii	3.62558	1.216733	1720
H6ii	3.31977	1.138498	1720

Inter-Item Correlation Matrix

	H4ii	H5ii	H6ii
H4ii	1.000	.706	.604
H5ii	.706	1.000	.670
H6ii	.604	.670	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
H4ii	6.94535	4.632	.719	.530	.801
H5ii	7.05407	4.581	.769	.592	.751
H6ii	7.35988	5.193	.689	.483	.828

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.560	3.320	3.734	.415	1.125	.046	3
Item Variances	1.447	1.296	1.563	.267	1.206	.019	3
Inter-Item Correlations	.660	.604	.706	.102	1.168	.002	3

4.4.8.2.2 Dimensionality analysis: Continuous Learning and Sharing of Knowledge

The full three-item *continuous learning and sharing of knowledge* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *continuous learning and sharing of knowledge* subscale of the Lifelong Learning Trainer-Instructor Capacity scale, should all reflect the unidimensional *continuous learning and sharing of knowledge* latent dimension of the multidimensional *lifelong learning trainer-instructor capacity* latent variable.

The correlation matrix, for the continuous learning and sharing of knowledge subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .721 (> .6) was obtained and the Bartlett's Test produced a statistically significant ($p < .05$) chi-square test statistic which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.32 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.41. Item H6ii (*"The lecturer continuously went on short courses and workshops and other learning, training and development programmes"*) had the lowest factor loading ($\lambda_{i1} = .758$) and item H5ii (*"The lecturer conducted research, on a specific topic or question asked by a student when he/she did not have the knowledge or answer, and got back to us"*) had the highest factor loading ($\lambda_{i1} = .883$). The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *continuous learning and sharing of knowledge* subscale, was thus corroborated.

Table 4.41

Factor matrix for the Continuous Learning and Sharing of Knowledge subscale

	Factor
	1
H5ii	.883
H4ii	.799
H6ii	.758

4.4.8.3 Reliability of the complete lifelong learning trainer-instructor capacity scale

The Cronbach alpha values for the two subscales for the lifelong learning trainer-instructor capacity scale were:

- Reflection: *r = .869*
- Continuous learning and sharing of knowledge: *r = .853*

In order to calculate the reliability of the *lifelong learning trainer-instructor capacity* scale as a whole, the reliability coefficient for the unweighted total scores have to be calculated. This unweighted total score was calculated according to the following formula (Nunnally, 1978; p. 248):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti} S^2{}_i}{S^2{}_t}]$$

Calculating a single Cronbach alpha across all the items for the lifelong learning trainer-instructor capacity as a whole would have provided an underestimation of the reliability of the total scores per subscale as they correlate amongst themselves. The unweighted total score reliability for the complete *lifelong learning trainer-instructor capacity* scale was calculated as:

$$rtot = 1 - \left[\frac{[\sum_{i=1}^{5} S^2 i - \sum_{i=1}^{5} rttiS^2 i]}{S^2 t}\right]$$

$$= 1 - [\frac{22.438 - 19.13971}{39.818}]$$

$$= .922135$$

4.4.8.4 Confirmatory factor analysis of the complete *lifelong learning trainer-instructor capacity* scale

Confirmatory factor analysis was conducted on the multidimensional *lifelong learning trainer-instructor capacity* scale as a whole. This was done in order to determine the degree to which the lifelong learning trainer-instructor capacity measurement model as a whole is consistent with the empirical data. The measurement model, in which the two lifelong learning trainer-instructor capacity dimensions were represented by their individual item indicators, was fitted.

All (6) of the indicator variables failed the test of univariate normality ($p < .05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected (χ^2 = 515.395; $p < .05$). In an attempt to rectify the lack of multivariate normality, the data was first normalised. The normalisation procedure partially succeeded in rectifying the multivariate normality problem. All (6) of the indicator variables, again, failed the test of univariate normality ($p < .05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that deviates less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected (χ^2 = 275.822; $p < .05$). The normalised data set thus was analysed with robust maximum likelihood estimation.

The lifelong learning trainer-instructor capacity measurement model produced a Satorra-Bentler scaled chi-square of 13.354 with 8 degrees of freedom. The hypothesis of exact model fit did not have to be rejected ($p > .05$). A Root Mean Square Error of Approximation (RMSEA) of .0197 with a 90% confidence interval of (.0 - .0377) was obtained. Furthermore, the null hypothesis of close also did not have to be rejected ($p > .05$). The lifelong learning trainer-instructor capacity measurement model showed very good fit, both exactly and closely.

The $\mathbf{\Lambda^X}$ indicated that all six of the slope coefficients that describe the regression of the individual items on the latent variables (i.e., the two dimensions) were statistically significant ($p < .05$). All the indicator variables loaded significantly on the latent variables that they were designed to reflect.

Additionally, it was required to examine the squared multiple correlations (R^2) of the indicators in order to determine the validity of the indicators (i.e., individual items). Large R^2 values (> .25) reveal valid indicators since this indicates that a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variable it was designed to reflect (Van der Westhuizen, 2015). All six of the indicators (> .25) provided valid explanations of the underlying latent variables they were designed to reflect. The CFA findings, taken in conjunction with the item analysis and exploratory factor analysis findings, justified the use of all six items in the calculation of composite indicators to operationalise the *lifelong learning trainer-instructor capacity* latent variable in the structural model.

4.4.9 PSYCHOMETRIC EVALUATION OF THE TRAINER-INSTRUCTOR EXPERT SCALE

The, two-subscale *trainer-instructor expert* scale consists of a total of six items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. *Trainer-instructor expert* was conceptualised as a two-dimensional construct comprising *content knowledge* and *practical knowledge* as dimensions. Each subscale will be analysed separately.

4.4.9.1 Psychometric evaluation of the *content knowledge* subscale

Content knowledge is the first subscale in the *trainer-instructor expert* scale and it consists of three items.

4.4.9.1.1 Item analysis: Content Knowledge

The full results from the item analysis for the *content knowledge* subscale are depicted in Table 4.42.

A satisfactory (above .80) Cronbach's alpha of .856 was obtained for the three-item subscale, as shown in the Reliability Statistics section of Table 4.42. This indicates that approximately 85% of the variance in the items is systematic or true score variance and only 15% is random error variance.

In the Item Statistics section of Table 4.42, item means ranged from 4.16 to 4.26 on a five-point Likert scale and the item standard deviations ranged from 1.023 to 1.062. This indicates that most individual students supported the agree and strongly agree (higher mean) categories. Although the items' means were generally high they cannot as yet be described as extreme means. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *content knowledge* dimension (Theron, 2017). The highest mean was for item I1i. Item I1i's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was, again, for item I1i.

The inter-item correlations ranged between .606 and .768. The inter-item correlation matrix indicated that all items correlated moderately with each other. The inter-item correlation matrix showed that item I1i showed the highest correlations ranging from .625 to .768 and item I3i showed the lowest correlations ranging from .606 to .625. Although item I3i consistently correlated below the mean inter-item correlation (.666) with the remaining items the correlations were not sufficiently below par to raise concerns.

In the Item-Total Statistics section of Table 4.42, the corrected item-total correlations ranging from .654 to .776 were all satisfactory since all the values were greater than .3. Item I3i obtained the lowest value compared to the other items. The squared multiple correlations ranging from .429 to .616 were satisfactory. The squared multiple correlation of item I3i was, again, slightly lower than the values of the other items. Item I3i showed itself somewhat of an outlier in the squared multiple correlation although somewhat less so in the corrected item-total correlation distribution. Furthermore, the results indicated that the reliability coefficient would increase slightly (from the current $\alpha = .856$ to $\alpha = .869$). if item I3i was deleted. This indicates that I3i (*"The lecturer has been teaching his/her subject for many years and therefore knows the text book and course work articles thoroughly"*) might be problematic. However, I3i was not deleted since the current Cronbach alpha is substantial enough and since there are only three items in this subscale.

The basket of evidence from the results of the item analysis of the content knowledge subscale suggested that item I1i (*"The lecturer had the ability to discuss his/her subject with the class in detail"*) was the strongest item in the subscale and item I3i was the weakest item in the subscale. None of the items were deleted.

Table 4.42
The reliability analysis output for the Content Knowledge subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.856	.857	3

Item Statistics

	Mean	Std. Deviation	N
I1i	4.26105	1.023798	1720
I2i	4.17849	1.027319	1720
I3i	4.16105	1.062445	1720

Inter-Item Correlation Matrix

	I1i	I2i	I3i
I1i	1.000	.768	.625
I2i	.768	1.000	.606
I3i	.625	.606	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I1i	8.33953	3.507	.776	.630	.754
I2i	8.42209	3.537	.760	.616	.769
I3i	8.43953	3.719	.654	.429	.869

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.200	4.161	4.261	.100	1.024	.003	3
Item Variances	1.077	1.048	1.129	.081	1.077	.002	3
Inter-Item Correlations	.666	.606	.768	.162	1.268	.006	3

4.4.9.1.2 Dimensionality analysis: Content Knowledge

The full three-item *content knowledge* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *content knowledge* subscale of the Trainer-Instructor Expert scale, should all reflect the unidimensional *content knowledge* latent dimension of the two-dimensional *trainer-instructor expert* latent variable.

The correlation matrix, for the content knowledge subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .708 (> .6) was obtained and the chi-square statistic associated with Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.34 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.43. Item I3i (*"The lecturer has been teaching his/her subject for many years and therefore knows the textbook and course work articles thoroughly"*) had the lowest factor loading ($\lambda_{i1} = .702$) and item I1i (*"The lecturer had the ability to discuss his/her subject with the class in detail"*) had the highest factor loading ($\lambda_{i1} = .889$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Item I3i's factor loading vindicated the decision to retain this item.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *content knowledge* subscale, was thus corroborated.

Table 4.43
Factor matrix for the Content Knowledge subscale

	Factor
	1
I1i	.889
I2i	.864
I3i	.702

4.4.9.2 Psychometric evaluation of the *practical knowledge* subscale

Practical knowledge is the second and last subscale in the *trainer-instructor expert* scale and it consists of three items.

4.4.9.2.1 Item analysis: Practical Knowledge

The full results from the item analysis for the *practical knowledge* subscale are depicted in Table 4.44.

A satisfactory (above .80) Cronbach's alpha of .878 was obtained for the four-item subscale, as shown in the Reliability Statistics section of Table 4.44. This indicates that approximately 88% of the variance in the items is systematic or true score variance and only 12% is random error variance.

In the Item Statistics section of Table 4.44, item means ranged from 3.91 to 4.065 on a five-point Likert scale and the item standard deviations ranged from 1.10 to 1.33. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in the subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *practical knowledge* dimension (Theron, 2017). The highest mean was for item I5ii. Item I5ii's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was for item I4ii.

The inter-item correlations shown in the Inter-item Correlation matrix section of Table 4.44 ranged between .659 and .792. The inter-item correlation matrix indicated that all items correlated moderately with each other. The inter-item correlation matrix showed that item I6ii showed the highest correlations ranging from .678 to .792 and item I4ii showed the lowest correlations ranging from .659 to .678. Although item I4ii consistently correlated below the mean inter-item correlation with the remaining items of the subscale the correlations were not sufficiently below par to raise concerns.

In the Item-Total Statistics section of Table 4.44, the corrected item-total correlations ranging from .707 to .808 were all satisfactory since all the values were greater than .3. Item I4ii obtained the lowest value compared to the other items. The squared multiple correlations ranging from .500 to .670 were satisfactory. The squared multiple correlation of item I4ii was, again, lower than the values of the other items. Item I4ii showed itself as somewhat of an outlier in the squared multiple correlation distribution albeit somewhat less so in the corrected item-total distribution. These findings, taken in conjunction with the inter-item correlation results, suggest that item I4ii responded to a somewhat lesser degree to the source of systematic variance underpinning the other two items of the subscale. Furthermore, item I4ii also showed that it was slightly out of step with the remaining items of the subscale in that the Item-Total Statistics section of Table 4.44 indicated that the reliability coefficient would increase slightly (from the current α = .878 to α = .879). if item I4ii was deleted. This indicates that I4ii (*"The lecturer had the ability to manage and adapt to changes in technology utilised in the classroom"*) was to some degree problematic. However, I4ii was not deleted since the current Cronbach alpha is substantial enough since the magnitude of the change between the Cronbach alphas were not substantial enough to warrant the deletion of this item, and since there are only three items in this subscale.

The basket of evidence from the results of the item analysis of the practical knowledge subscale suggested that item I6ii (*"The lecturer's teaching style or ability to present and explain the subject or course work was effective for enhancing learning"*) was the strongest item in the subscale and item I4ii was the weakest item in the subscale. None of the items were deleted.

Table 4.44

The reliability analysis output for the Practical Knowledge subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.880	3

Item Statistics			
	Mean	Std. Deviation	N
I4ii	4.04942	1.105489	1720
I5ii	4.06453	1.153651	1720
I6ii	3.91919	1.331536	1720

Inter-Item Correlation Matrix			
	I4ii	I5ii	I6ii
I4ii	1.000	.659	.678
I5ii	.659	1.000	.792
I6ii	.678	.792	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I4ii	7.98372	5.538	.707	.500	.879
I5ii	7.96860	4.990	.799	.655	.800
I6ii	8.11395	4.235	.808	.670	.794

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.011	3.919	4.065	.145	1.037	.006	3
Item Variances	1.442	1.222	1.773	.551	1.451	.085	3
Inter-Item Correlations	.710	.659	.792	.133	1.202	.004	3

4.4.9.2.2 Dimensionality analysis: Practical Knowledge

The full three-item *practical knowledge* subscale was factor analysed since none of the items were removed during the preceding reliability analysis. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the three items, written for the *practical knowledge* subscale of the Trainer-Instructor Expert scale, should all reflect the unidimensional *practical knowledge* latent dimension of the two-dimensional *trainer-instructor expert* latent variable.

The correlation matrix, for the *practical knowledge* subscale, showed that all correlations were larger than .3 and that all the correlations were statistically significant ($p < .05$). Furthermore, a KMO of .724 (> .6) was obtained and the chi-square statistic calculated in terms of Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. This presented strong enough evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (2.42 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that all the items loaded onto one factor satisfactorily since all factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.45. Item I4ii (*"The lecturer had the ability to manage and adapt to changes in technology utilised in the classroom"*) had the lowest factor loading ($\lambda_{i1} = .751$) and item I6ii (*"The lecturer's teaching style or ability to present and explain the subject or course work was effective for enhancing learning"*) had the highest factor loading ($\lambda_{i1} = .901$). This is consistent with the item analysis conclusion. The findings, thus, indicated that all items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor. Item I4ii's factor loading vindicated the decision to retain this item in the subscale.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *practical knowledge* subscale, was thus corroborated.

Table 4.45

Factor matrix for the Practical Knowledge subscale

	Factor
	1
I6ii	.901
I5ii	.878
I4ii	.751

4.4.9.3 Reliability of the complete trainer-instructor expert scale

The Cronbach alpha values for the two subscales of the trainer-instructor expert scale were:

- Content knowledge: $r = .856$
- Practical knowledge: $r = .878$

In order to calculate the reliability of the total scores on the *trainer-instructor expert* scale as a whole, the reliability coefficient for the unweighted total scores have to be calculated. This unweighted total score was calculated according to the following formula (Nunnally, 1978, p. 248):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti} S^2{}_i}{S^2{}_t}]$$

Calculating a single Cronbach alpha across all the items for the trainer-instructor expert as a whole would have provided an underestimation of the reliability of the total scores per subscale as they correlate amongst themselves. The unweighted total score reliability for the complete *trainer-instructor expert* scale was calculated as:

$$r\text{tot} = 1 - \left[\frac{[\sum_{i=1}^{5} S^2 i - \sum_{i=1}^{5} rttiS^2 i]}{S^2 t} \right]$$

$$= 1 - [\frac{17.967 - 15.77503}{32.197}]$$

$$= .926775$$

4.4.9.4 Confirmatory factor analysis of the complete trainer-instructor expert scale

Confirmatory factor analysis was conducted on the multidimensional *trainer-instructor expert* scale as a whole. This was done in order to determine the degree to which the trainer-instructor expert measurement model as a whole is consistent with the empirical data. The measurement model, in which the two trainer-instructor expert dimensions were represented by their individual item indicators, was fitted.

All (6) of the indicator variables failed the test of univariate normality ($p < .05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected (χ^2 = 3226.673; $p < .05$). In an attempt to rectify the lack of multivariate normality, the data was first normalised.

The results indicated that the normalisation procedure partially succeeded in rectifying the multivariate normality problem. All (6) of the indicator variables, again, failed the test of univariate normality ($p < .05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that deviates less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected (χ^2 = 920.433; $p < .05$).

As a result, robust maximum likelihood estimation was selected for the evaluation of the trainer-instructor expert measurement model. The normalised data set was utilised in the subsequent (robust maximum likelihood estimation) analyses.

The trainer-instructor expert measurement model produced a Satorra-Bentler scaled chi-square of 19.457 with 8 degrees of freedom. The hypothesis of exact model fit had to be rejected ($p < .05$). A Root Mean Square Error of Approximation (RMSEA) of .0289 with a confidence interval of (.0126 - 0.0454) was obtained. Furthermore, the null hypothesis of close also did not have to be rejected ($p > .05$). The trainer-instructor expert measurement model showed good fit, closely. As a result, bifactor model analysis was not conducted on the trainer-instructor expert scale.

The $\mathbf{\Lambda^X}$ indicated that all six of the slope coefficients that describe the regression of the individual items on the latent variables (i.e., the two dimensions) were statistically significant ($p < .05$). All the indicator variables loaded significantly on the latent variables that they were designed to reflect.

Additionally, it was required to examine the squared multiple correlations (R^2) of the indicators in order to determine the validity of the indicators (i.e., individual items). Large R^2 values (> .25) reveal valid indicators since this indicates that a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variable it was designed to reflect (Van der Westhuizen, 2015).

All six of the indicators (> .25) provided valid explanations of the underlying latent variables they were designed to reflect.

4.4.10 PSYCHOMETRIC EVALUATION OF THE TRAINER-INSTRUCTOR EMOTIONAL INTELLIGENCE SCALE

The, three-subscale *trainer-instructor emotional intelligence* scale consists of a total of six items measured on a five-point Likert scale, response categories ranging from *strongly disagree* to *strongly agree*, and an optional sixth response category of *unable to rate*. Each subscale will be analysed separately. T*rainer-instructor emotional intelligence* was conceptualised as a multidimensional construct comprising the latent dimensions of *own emotions*, *other's emotions* and *using emotions*.

4.4.10.1 Psychometric evaluation of the *own emotions* subscale

Own emotions was the first subscale in the *trainer-instructor emotional intelligence* scale and it consists of two items.

4.4.10.1.1 Item analysis: Own Emotions

The full results from the item analysis of the *own emotions* subscale are depicted in Table 4.46.

A satisfactory (above .80) Cronbach's alpha of .843 was obtained for the two-item subscale, as shown in the Reliability Statistics section of Table 4.46. This indicates that approximately 84% of the variance in the items is systematic or true score variance and only 16% is random error variance.

In the Item Statistics section of Table 4.46, item means were 4.14 and 4.17 on a five-point Likert scale. The item standard deviations were 1.04 and 1.10. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items present in subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *own emotions* dimension (Theron, 2017). The highest mean was for item J2i. Item J2i's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was for item J1i.

The inter-item correlation was a moderately high .730. In the Item-Total Statistics section of Table 4.46, the corrected item-total correlation was .730 and satisfactory. The squared multiple correlation was .533 and satisfactory. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017).

The basket of evidence from the results of the item analysis of the own emotions subscale suggested that none of the items had to be deleted.

Table 4.46

The reliability analysis output for the Own Emotions subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.843	.844	2

Item Statistics			
	Mean	Std. Deviation	N
J1i	4.13547	1.042839	1720
J2i	4.17035	1.102403	1720

Inter-Item Correlation Matrix		
	J1i	J2i
J1i	1.000	.730
J2i	.730	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
J1i	4.17035	1.215	.730	.533	.
J2i	4.13547	1.088	.730	.533	.

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.153	4.135	4.170	.035	1.008	.001	2
Item Variances	1.151	1.088	1.215	.128	1.117	.008	2
Inter-Item Correlations	.730	.730	.730	.000	1.000	.000	2

4.4.10.1.2 Dimensionality analysis: Own Emotions

Both of the items for the *own emotions* subscale were factor analysed. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the two items, written for the *own emotions* subscale of the Trainer-Instructor Emotional Intelligence scale, should all reflect the unidimensional *own emotions* latent dimension of the multidimensional *trainer-instructor emotional intelligence* latent variable.

The correlation matrix, for the own emotions subscale, showed that the correlation was larger than .3 and statistically significant ($p < .05$). Furthermore, a KMO of .500 (< .6) was obtained but the chi-square statistic calculated in terms of Bartlett's Test was nonetheless statistically significant ($p < .05$)

which allowed for the identity matrix null hypothesis to be rejected. The low KMO value (< .6) indicates that the factor analysability of the data was to some degree questionable.

Conducting factor analysis on this data set, consisting of only two items, was to some degree questionable irrespective of the factor analysability statistics. However, for the sake of subjecting the subscale to some form of analysis and obtaining some statistical commentary on the psychometric integrity of the items, it was decided to conduct factor analysis on the own emotions subscale[109].

One factor was extracted since only one factor obtained an eigenvalue greater than one (1.73 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that the two items loaded onto one factor satisfactorily since both factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.47. The findings, thus, indicated that the two items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *own emotions* subscale, was thus corroborated.

Table 4.47

Factor matrix for the Own Emotions subscale

	Factor
	1
J2i	.854
J1i	.854

4.4.10.2 Psychometric evaluation of the *other's emotions* subscale

Other's emotions is the second subscale in the *trainer-instructor emotional intelligence* scale and it consists of two items.

4.4.10.2.1 Item analysis: Other's Emotions

The full results from the item analysis of the *other's emotions* subscale are depicted in Table 4.48.

[109] It is acknowledged that the same concern also applied to the item analysis performed on the subscale.

A satisfactory (above .80) Cronbach's alpha of .872 was obtained for the two-item subscale, as shown in the Reliability Statistics section of Table 4.48. This indicates that approximately 87% of the variance in the items is systematic or true score variance and only 13% is random error variance.

In the Item Statistics section of Table 4.48 item means were 3.68 and 3.90 on a five-point Likert scale. The item standard deviations were 1.16 and 1.22. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there are no insensitive items in the subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *other's emotions* dimension (Theron, 2017). The highest mean was for item J3ii. Item J32i's mean was not sufficiently extreme to significantly curtail the variance of the distribution. The lowest standard deviation was also for item J3ii.

The inter-item correlation was moderately high .774. In the Item-Total Statistics section of Table 4.48, the corrected item-total correlation was .774 and satisfactory. The squared multiple correlation was .599 and satisfactory. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017).

The basket of evidence from the results of the item analysis of the other's emotions subscale suggested that none of the items had to be deleted.

Table 4.48

The reliability analysis output for the Other's Emotions subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.872	.873	2

Item Statistics

	Mean	Std. Deviation	N
J3ii	3.89942	1.159125	1720
J4ii	3.68372	1.224138	1720

Inter-Item Correlation Matrix

	J3ii	J4ii
J3ii	1.000	.774
J4ii	.774	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
J3ii	3.68372	1.499	.774	.599	.
J4ii	3.89942	1.344	.774	.599	.

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.792	3.684	3.899	.216	1.059	.023	2
Item Variances	1.421	1.344	1.499	.155	1.115	.012	2
Inter-Item Correlations	.774	.774	.774	.000	1.000	.000	2

4.4.10.2.2 Dimensionality analysis: Other's Emotions

Both of the items for the *other's emotions* subscale were factor analysed. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the two items, written for the *other's emotions* subscale of the Trainer-Instructor Emotional Intelligence scale, should all reflect the unidimensional *other's emotions* latent dimension of the multidimensional *trainer-instructor emotional intelligence* latent variable.

The correlation matrix, for the other's emotions subscale, showed that the correlation was larger than .3 and statistically significant ($p < .05$). Furthermore, a KMO of .500 (> .6) was obtained but the test statistic associated with Bartlett's Test was statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. The low KMO value (< .6) indicates that the factor analysability of the data is questionable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (1.77 > 1). The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix revealed that the two items loaded onto one factor satisfactorily since both factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.49. The findings, thus, indicated that the two items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *other's emotions* subscale, was thus corroborated.

Table 4.49

Factor matrix for the Other's Emotions subscale

	Factor
	1
J4ii	.879
J3ii	.879

4.4.10.3 Psychometric evaluation of the *using emotions* subscale

Using emotions was the third and last subscale in the *trainer-instructor emotional intelligence* scale and it consisted of two items.

4.4.10.3.1 Item analysis: Using Emotions

The full results from the item analysis of the *using emotions* subscale are depicted in Table 4.50.

A highly satisfactory (above .80) Cronbach's alpha of .925 was obtained for the two-item subscale, as shown in the Reliability Statistics section of Table 4.50. This indicates that approximately 92% of the variance in the items is systematic or true score variance and only 8% is random error variance.

In the Item Statistics section of Table 4.50, item means were 3.55 and 3.68 on a five-point Likert scale. The item standard deviations were 1.23 and 1.25. This indicates that most individual students supported the agree (higher mean) category. An absence of extreme means and a lack of small standard deviations indicate that there were no insensitive items present in the subscale that failed to discriminate between relatively small differences in test-takers' standing on the latent *using emotions* dimension (Theron, 2017). The highest mean was for item J6iii. Item J6iii's mean was not sufficiently extreme enough to significantly curtail the variance of the distribution. The lowest standard deviation was also for item J6iii.

The inter-item correlation was a high .861. In the Item-Total Statistics section of Table 4.50, the corrected item-total correlation was .861 and satisfactory. The squared multiple correlation was .741 and satisfactory. Good or satisfactory items share a reasonable proportion of variance with the other items since they are supposed to measure the same underlying factor (Theron, 2017).

The basket of evidence from the results of the item analysis of the using emotions subscale suggested that none of the items had to be deleted.

Table 4.50

The reliability analysis output for the Using Emotions subscale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.925	.925	2

Item Statistics			
	Mean	Std. Deviation	N
J5iii	3.55000	1.249945	1720
J6iii	3.67616	1.227147	1720

Inter-Item Correlation Matrix		
	J5iii	J6iii
J5iii	1.000	.861
J6iii	.861	1.000

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
J5iii	3.67616	1.506	.861	.741	.
J6iii	3.55000	1.562	.861	.741	.

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.613	3.550	3.676	.126	1.036	.008	2
Item Variances	1.534	1.506	1.562	.056	1.038	.002	2
Inter-Item Correlations	.861	.861	.861	.000	1.000	.000	2

4.4.10.3.2 Dimensionality analysis: Using Emotions

Both of the items for the *using emotions* subscale were factor analysed. The design intention of the Composite Trainer-Instructor Research Questionnaire was that the two items, written for the *using emotions* subscale of the Trainer-Instructor Emotional Intelligence scale, should all reflect the unidimensional *using emotions* latent dimension of the multidimensional *trainer-instructor emotional intelligence* latent variable.

The correlation matrix, for the using emotions subscale, showed that the correlation was larger than .3 and statistically significant ($p < .05$). Furthermore, a KMO of .500 (< .6) was obtained but the test statistic associated with Bartlett's Test was nonetheless statistically significant ($p < .05$) which allowed for the identity matrix null hypothesis to be rejected. The low KMO value (< .6) indicates that the factor analysability of the data is questionable.

One factor was extracted since only one factor obtained an eigenvalue greater than one (1.86 > 1). The scree plot also suggested that a single factor should be extracted. The factor matrix revealed that the two items loaded onto one factor satisfactorily since both factor loadings were larger than .50 ($\lambda_{i1} > .50$), as shown in the resultant factor structure in Table 4.51. The findings, thus, indicated that the two items can be considered satisfactory regarding the proportion of item variance that can be explained by the single factor.

Furthermore, zero (0%) of the nonredundant residual correlations obtained absolute values greater larger than .05. This suggests that the factor solution provides a sound explanation for the observed inter-item correlation matrix. The unidimensionality assumption, for the *using emotions* subscale, was thus corroborated.

Table 4.51

Factor matrix for the Using Emotions subscale

	Factor
	1
J6iii	.927
J5iii	.927

4.4.10.4 Reliability of the complete trainer-instructor emotional intelligence scale

The Cronbach alpha values for the three subscales for the trainer-instructor emotional intelligence scale were:

- Own emotions: *r = .843*
- Other's emotions: *r = .872*
- Using emotions: *r = .925*

In order to calculate the reliability of the total score on the *trainer-instructor emotional intelligence* scale as a whole, the reliability coefficient for the unweighted total scores have to be calculated. This unweighted total score was calculated according to the following formula (Nunnally, 1978, p. 248):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti} S^2{}_i}{S^2{}_t}]$$

Calculating a single Cronbach alpha across all the items for the trainer-instructor emotional intelligence as a whole would have provided an underestimation of the reliability of the total scores per subscale as they correlate amongst themselves. The unweighted total score reliability for the complete *trainer-instructor emotional intelligence* scale was calculated as:

$$\text{rtot} = 1 - \left[\frac{[\sum_{i=1}^{5} S^2 i - \sum_{i=1}^{5} rttiS^2 i]}{S^2 t}\right]$$

$$= 1 - [\frac{14.730 - 13.1472}{35.848}]$$

$$= .964572$$

4.4.10.5 Confirmatory factor analysis of the complete *trainer-instructor emotional intelligence* scale

Confirmatory factor analysis was conducted on the multidimensional *trainer-instructor emotional intelligence* scale as a whole. This was done in order to determine the degree to which the trainer-instructor emotional intelligence measurement model as a whole is consistent with the empirical data. The measurement model, in which each of the three trainer-instructor emotional intelligence dimensions were represented by their individual item indicators, was fitted.

All (6) of the indicator variables failed the test of univariate normality ($p < .05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected (χ^2 = 1843.726; $p < .05$). In an attempt to rectify the lack of multivariate normality, the data was first normalised.

The results indicated that the normalisation procedure partially succeeded in rectifying the multivariate normality problem. All (6) of the indicator variables, again, failed the test of univariate normality ($p < .05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that deviates less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected (χ^2 = 618.049; $p < .05$).

As a result, robust maximum likelihood estimation was selected for the evaluation of the trainer-instructor emotional intelligence measurement model. The normalised data set was utilised in the subsequent (robust maximum likelihood estimation) analyses.

The trainer-instructor emotional intelligence measurement model produced a Satorra-Bentler scaled chi-square of 111.178 with 6 degrees of freedom. The hypothesis of exact model fit had to be rejected ($p < .05$). A Root Mean Square Error of Approximation (RMSEA) of 0.101 with a confidence interval of (.0850 - .118) was obtained. Furthermore, the null hypothesis of close also had to be rejected ($p < .05$). The trainer-instructor emotional intelligence measurement model does not fit exactly or closely.

Due to poor model fit, and rather than attempting to free more paths based on the modification indices, a bifactor model was conducted. This decision was rooted in the large number of statistically significant modification index values that were obtained for the off-diagonal measurement error covariances in the theta-delta matrix.

4.4.10.6 Bifactor model for the complete trainer-instructor emotional intelligence scale

The goodness of fit statistics for the bifactor model for trainer-instructor emotional intelligence are depicted in Table 4.52 and the bifactor model for the trainer-instructor emotional intelligence scale is depicted in Figure 4.4.

Table 4.52

The Goodness of fit statistics for the trainer-instructor emotional intelligence measurement bifactor model

Goodness of Fit Statistics
Degrees of Freedom = 2
Normal Theory Weighted Least Squares Chi-Square = 10.431 (P = .00543)
Satorra-Bentler Scaled Chi-Square = 7.612 (P = .0222)
Chi-Square Corrected for Non-Normality = 8.818 (P = .0122)
Estimated Non-centrality Parameter (NCP) = 5.612
90 Percent Confidence Interval for NCP = (.583 ; 18.121)
Minimum Fit Function Value = .000126
Population Discrepancy Function Value (F0) = .00326
90 Percent Confidence Interval for F0 = (.000339 ; .0105)
Root Mean Square Error of Approximation (RMSEA) = .0404
90 Percent Confidence Interval for RMSEA = (.0130 ; .0726)
P-Value for Test of Close Fit (RMSEA < .05) = .638
Expected Cross-Validation Index (ECVI) = .0265
90 Percent Confidence Interval for ECVI = (.0236 ; .0338)
ECVI for Saturated Model = .0244
ECVI for Independence Model = 6.972
Chi-Square for Independence Model with 15 Degrees of Freedom = 11972.390
Independence AIC = 11984.390
Model AIC = 45.612
Saturated AIC = 42.000
Independence CAIC = 12023.091
Model CAIC = 168.164
Saturated CAIC = 177.452
Normed Fit Index (NFI) = .999
Non-Normed Fit Index (NNFI) = .996
Parsimony Normed Fit Index (PNFI) = .133
Comparative Fit Index (CFI) = 1.00
Incremental Fit Index (IFI) = 1.00
Relative Fit Index (RFI) = .995
Critical N (CN) = 2081.052
Root Mean Square Residual (RMR) = .00424
Standardized RMR = .00321
Goodness of Fit Index (GFI) = 1.00
Adjusted Goodness of Fit Index (AGFI) = 1.00
Parsimony Goodness of Fit Index (PGFI) = .0952

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (7.612; $p < .05$). The exact fit null hypothesis (H_0: $\Sigma = \Sigma(\theta)$) is therefore rejected ($p <. 05$) (Hooper et al., 2008; Vieira, 2011). The RMSEA value of .0404 indicated a good model fit in the sample. The close fit null hypothesis should not be rejected ($p > .05$). The probability of observing the sample RMSEA estimate under the close fit null hypothesis was sufficiently large not to reject the close fit null hypothesis. It is, therefore, permissible to hold the position that the trainer-instructor emotional intelligence measurement model, showed close fit in the parameter given the very good fit in the sample.

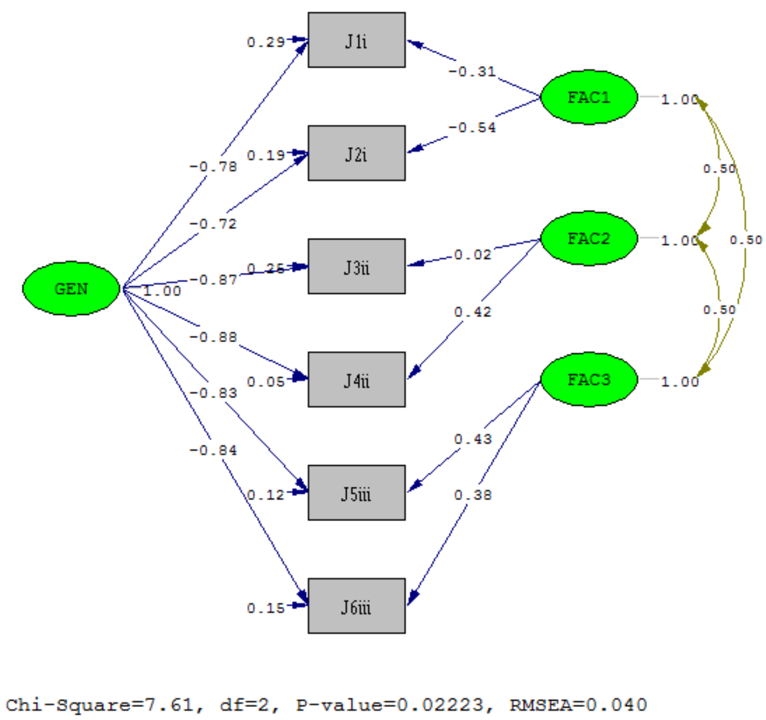

Figure 4.4. **Bifactor model for the trainer-instructor emotional intelligence scale**

The unstandardised Λ^X indicated that most of the slope coefficients that describe the regression of the individual items on the latent variables (i.e., trainer-instructor emotional intelligence general factor and multidimensional subscales/ three specific group factors[110]) were statistically significant ($p < .05$).

Items J1i and J2i appear to not load statistically significantly on the own emotions factor (i.e., the narrow, specific factor), with a z-values of -1.286 (< 1.96) and -1.200 (< .1.96) respectively. Additionally, items J1i and J2i did not make the previous cut-off value of 1.6449 either (Diamantopoulos& Siguaw, 2000). Items J1i and J2i did load statistically significantly onto the general factor (i.e., transformational trainer-instructor leadership), with a z-value of -5.894 and -4.031 respectively. Items J1i and J2i will not be deleted since there are only 2 items in this subscale and since they both reflect the general factor they were designed to reflect.

Item J3ii appears to not load statistically significantly on the other' emotions factor (i.e., the specific group factor), with a z-values of .060 (<1.96). Additionally, item J3ii does not make the previous cut-off value of 1.6449 either (Diamantopoulos& Siguaw, 2000). Item J3i did load statistically significantly onto the general factor (i.e., transformational trainer-instructor leadership), with a z-value of -10.708. Item J3ii will not be deleted since there are only 2 items in this subscale and since it reflects the general factor it was designed to reflect.

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[110] *Trainer-instructor emotional intelligence* contains three dimensions, namely *own emotions*, *other's emotions*, and *using emotions*.

The squared multiple correlations (R^2) of the items varied between .706 and .951 with 5 of the six values larger than .80 All items therefore provided valid descriptions of the underlying latent variables (both of the general factor and the three specific group factors).

In conclusion, the bifactor trainer-instructor emotional intelligence measurement model showed that the variance in the indicators (i.e., individual items) was influenced by the general factor (i.e., trainer-instructor emotional intelligence) and, in the case of half the items, also by the group sources of variance (of the three specific group factors).

4.4.11 SUMMARY OF THE PSYCHOMETRIC EVALUATION OF THE MEASUREMENT INSTRUMENTS

The original[111] Composite Trainer-Instructor Research Questionnaire consisted of 10 sections or scales. These 10 sections represent the 10 latent variables namely, *learning motivation*, *inspiring professional vision*, *learning climate*, *structure in the learning material*, *transformational trainer-instructor leadership*, *facilitating clarity and understanding*, *providing formative feedback*, *lifelong learning trainer-instructor capacity*, *trainer-instructor expert*, and *trainer-instructor emotional intelligence*, that comprise the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model (see Figure 3.1.). It was this original Composite Trainer-Instructor Research Questionnaire, consisting of 10 scales and a total of 85 questions (i.e., items), that was distributed and completed online by the research participants.

This original Composite Trainer-Instructor Research Questionnaire's data was subsequently subjected to psychometric evaluation, including reliability analysis (i.e., item analysis) and dimensionality analysis (i.e., exploratory factor analysis) on the theorised unidimensional scales and subscales as well as confirmatory factor analysis (including bifactor analysis on some subscales) on the theorised multidimensionality analysis.

The item analyses revealed all 10 of the scales achieved acceptable reliability since all obtained Cronbach alpha's exceeding the desired threshold of .80. The Cronbach alpha's (i.e., reliability) of the subscales ranged from .843 (*Own Emotions*) to .925 (*Using Emotions*). Five items were flagged as problematic based on a basket of item statistics, including a consistent pattern of below average inter-item correlations, outlier item-total and squared multiple correlations and an increase in the internal consistency reliability if the item would be deleted. The following specific items were flagged:

[111] Original in the sense that the questionnaire, directly after theorising and before being subjected to psychometric evaluation, was distributed to the research participants (i.e., sample).

- Item E4ii (*intellectual stimulation* subscale) if deleted, it would increase the Cronbach alpha from the current α = .900 to α = .927;
- Item revG7 (*providing formative feedback* subscale) if deleted, it would increase the Cronbach alpha from the current α = .889 to α = .919;
- Item H3i (*reflection* subscale) if deleted, it would increase the Cronbach alpha from the current α = .869 to α = .872;
- Item I3i (*content knowledge* subscale) proved to be a poor item since, if deleted, it would increase the Cronbach alpha (from the current α = .856 to α = .869);
- Item I4ii (*practical knowledge* subscale) if deleted, it would increase the Cronbach alpha from the current α = .878 to α = .879.

However, during item analysis, none of these poor items were deleted. Consequently, all 85 of the original and individual items were subjected to exploratory factor analysis.

Regarding dimensionality analyses, nine of the ten scales and subscales passed the unidimensionality assumption as they were originally hypothesised. Only the *psychological safety and fairness* subscale resulted in two factors being extracted. However, after fitting a second-order measurement model in which the two extracted *psychological safety and fairness* factors loaded on the second-order *psychological safety and fairness factor it was determined that the indirect effect of the second-order factor on* all six of the items was statistically significant ($p < .05$). In the case of the scales and subscales where the unidimensionality assumption was supported the magnitude of the factor loadings (> .50) warranted the inclusion of all the items in the calculation of composite indicators to operationalise the relevant latent variables in the structural model.

Item revG7 (Providing Formative Feedback subscale) again proved to be a poor item since it did not load onto the *providing formative feedback* factor ($\lambda i1 < .50$). It was, therefore, decided to delete revG7 and rerun item analysis and exploratory factor analysis, both were void of any further problematic items. As a result of dimensionality analysis, only one of the original 85 individual items were deleted. Therefore, a total of 84 individual items were subjected to confirmatory factor analyses.

Confirmatory factor analysis was conducted on the five multidimensional subscales. *The lifelong learning trainer-instructor capacity* first-order measurement model showed excellent fit (both exactly and closely). The *trainer-instructor expert* first-order measurement model showed good fit (closely). However, the other three first-order measurement models, namely the *learning climate* measurement model, the *transformational trainer-instructor leadership* measurement model, and the *trainer-instructor emotional intelligence* measurement model, did not fit exactly or closely. As a result, these three first-order measurement models were extended into bifactor models by allowing all scale items to also load on a broad, general, factor in addition to one of a number of specific, narrow, factor. All three bifactor models showed good (close) fit. In all five measurement models, the magnitude and statistical significance of the factor loadings justified the use of all the items in the calculation of composite indicators to operationalise the multidimensional latent variables in the structural model. No further items were deleted based on the results of the confirmatory factor analysis.

In conclusion, and after consulting a basket of evidence on all items, only one (revG7) of the 85 individual items included in the Composite Trainer-Instructor Research Questionnaire was deleted across the 10 scales.

A summary of the psychometric evaluation of the measurement instruments can be found in Table 4.53 below.

Table 4.53
Summary of the item analysis, exploratory factor analysis and confirmatory factor analysis results

Scale/Subscale	**Reliability**	**Unidimensionality**	**Items deleted**	**Strongest Item(s)**	**Weakest Item(s)**	**Final # of items**
Learning Motivation	.863	Confirmed	None	A4	A2	6
Inspiring Professional Vision	.940	Confirmed	Nome	B7	B5	8
Learning climate		Bifactor model showed close fit				24
- Teacher Emotional support	.908	Confirmed	None	C4i	C3i	4
- Teacher academic support	.918	Confirmed	None	C8ii	C5ii	4
- Psychological safety and fairness	.848	Factor fission	None	C13ii	C9ii/C10ii	6
- Interest and Involvement	.872	Confirmed	None	C18iv	C16iv	5
- Autonomy	.901	Confirmed	None	C21v	C23v	5
Structure in the Learning Material	.931	Confirmed	None	D1/D2	D3	4
Transformational Trainer-Instructor Leadership		Bifactor model showed close fit				12
- Individualised consideration	.906	Confirmed	None	E1i	E3i	3
- Intellectual stimulation	.900	Confirmed	None	E6ii	E4ii	3
- Idealised influence or charisma	.876	Confirmed	None	E7iii	E9iii	3
- Inspirational motivation	.900	Confirmed	None	E10iv	E11iv	3
Facilitating Clarity and Understanding	.935	Confirmed	None	F1	F5	6
Providing Formative Feedback	.919	Confirmed	revG7	G2	G4	6
Lifelong Learning Trainer-Instructor Capacity		Measurement model showed exact fit				6
- Reflection	.869	Confirmed	None	H2i	H3i	3
- Continuous learning and sharing of knowledge	.853	Confirmed	None	H5ii	H6ii	3
Trainer-Instructor Expert		Measurement model showed close fit				6
- Content knowledge	.856	Confirmed	None	I1i	I3i	3
- Practical knowledge	.878	Confirmed	None	I6ii	I4ii	3
Trainer-Instructor Emotional Intelligence		Bifactor model showed close fit				6
- Own emotions	.843	Confirmed	None	-	-	2
- Other's emotions	.872	Confirmed	None	-	-	2
- Using emotions	.925	Confirmed	None	-	-	2

Note: Sample size 1720

4.5 ITEM PARCELLING

The motivation for the decision to use item parcelling and the item parcelling procedure was described in section 3.8.4.1. Only the items that remained in the scales and subscales, after item and dimensionality analyses were conducted, were utilised during the creating of item parcels (all items but for revG7). These item parcels (instead of individual items) served as indicator variables to reflect the latent variables during the fit of the trainer-instructor performance measurement and structural models. Two parcels were created for each of the unidimensional latent subscales. In terms of the multidimensional subscales the mean of each of the dimensions' items were utilised to create item parcels. Thus, the multidimensional subscales will each have item parcels equivalent to the number of dimensions comprising the multidimensional subscale.

4.6 EVALUATION OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL

The overarching research initiating question that needs to be answered in the current study is the question *why is there variance in the performance of affirmative development trainer-instructors?* Hypothesis 1, the overarching substantive research hypothesis, answers the research initiating question and posits that the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model (depicted in Figure 3.2) provides a valid description of the psychological mechanism that regulates trainer-instructor performance.

To empirically test the overarching substantive research hypothesis (as well as the path-specific substantial hypotheses) the latent variables comprising the competency (or structural) model was operationalised in terms of composite indicator variables. The measurement model demonstrates how each latent variable is hypothesised to be measured by the composite indicator it is earmarked to measure (i.e., how each latent variable is operationalised) (Vieira, 2011). The measurement model thus depicts the structural relationships that have been hypothesised to exist between the observed variables and the latent variables. Confirmatory factor analysis was conducted on the Wessels-Van der Westhuizen trainer-instructor performance measurement model as a whole. This was done in order to test the measurement hypothesis by determining the degree to which the Wessels-Van der Westhuizen trainer-instructor performance measurement model as a whole is consistent with the empirical analysed data. The measurement model, in which each of the latent variables were represented by their item parcel indicators, was fitted.

4.6.1 UNIVARIATE AND MULTIVARIATE NORMALITY

As in the case of confirmatory factor analysis on the multidimensions scales, prior to conducting any analysis on the fit of the Wessels-Van der Westhuizen trainer-instructor performance measurement model it was necessary to assess a number of critical assumptions, typically associated with multivariate statistics and structural equation modelling, to see if these assumptions were met (Tabachnick & Fidell, as cited in Van der Westhuizen, 2015).

4.6.1.1 Results before normalisation

The first critical assumption is that of multivariate normality. The item parcels (i.e., indicators) were thus firstly evaluated in terms of their univariate and multivariate normality. All (30) of the indicator variables failed the test of univariate normality ($p < .05$). Furthermore, the null hypothesis that the data follows a multivariate normal distribution also had to be rejected ($\chi^2 = 25229.598$; $p < .05$). See Tables 4.54 and 4.55 for full details.

Table 4.54
Test of univariate normality before normalisation

	Skewness		Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
LM_1	-19.064	.000	19.752	.000	753.587	.000
LM_2	-19.908	.000	31.789	.000	1406.853	.000
IPV_1	-12.648	.000	.644	.519	160.390	.000
IPV_2	-12.278	.000	.523	.601	151.025	.000
LC_1	-15.228	.000	2.918	.004	240.416	.000
LC_2	-16.537	.000	7.191	.000	325.190	.000
LC_3	-11.452	.000	3.704	.000	144.870	.000
LC_4	-13.306	.000	8.090	.000	242.489	.000
LC_5	-13.137	.000	4.622	.000	193.953	.000
SLM_1	-15.756	.000	3.499	.000	260.510	.000
SLM_2	-15.904	.000	4.737	.000	275.392	.000
TL_1	-13.000	.000	-.311	.756	169.105	.000
TL_2	-13.953	.000	-.700	.484	195.185	.000
TL_3	-15.944	.000	7.601	.000	312.002	.000
TL_4	-13.727	.000	.529	.597	188.708	.000
FCU_1	-16.036	.000	3.404	.001	268.755	.000
FCU_2	-16.268	.000	4.123	.000	281.655	.000
PFFB_1	-14.360	.000	3.107	.002	215.850	.000
PFFB_2	-12.786	.000	2.038	.042	167.640	.000
LLLC_1	-8.688	.000	-5.783	.000	108.919	.000
LLLC_2	-11.467	.000	-.927	.354	132.359	.000
EXP_1	-18.043	.000	13.478	.000	507.191	.000
EXP_2	-15.822	.000	3.533	.000	262.828	.000
EI_1	-18.192	.000	13.367	.000	509.634	.000
EI_2	-13.839	.000	.910	.363	192.341	.000
EI_3	-11.174	.000	-3.313	.001	135.836	.000
RES_1	17.093	.000	37.290	.000	1682.705	.000
RES_2	17.466	.000	41.357	.000	2015.453	.000
RES_3	13.369	.000	16.020	.000	435.359	.000
RES_4	14.225	.000	19.769	.000	593.168	.000

Note: LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *trainer-instructor transformational leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

Table 4.55

Test of multivariate normality before normalisation

Skewness			**Kurtosis**			**Skewness and Kurtosis**	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
133.613	145.907	.000	1424.730	62.775	.000	25229.598	.000

Since the default estimation technique used by LISREL 8.8 when fitting measurement (and structural) models to continuous data (maximum likelihood estimation) assumes multivariate normality and since the inappropriate use of maximum likelihood estimation can result biased fit statistics and standard error estimates (Mels, as cited in Van der Westhuizen, 2015), it was decided to attempt to normalise the variables through PRELIS.

4.6.1.2 Results after normalisation

The results indicated that the normalisation procedure partially succeeded in rectifying the uni- and multivariate normality problem. Most of the indicator variables (26), again, failed the test of univariate normality ($p < .05$). The (4) indicators of the interaction effect did not fail the test of univariate normality ($p > .05$). Furthermore, the results indicated that, although the normalisation procedure resulted in a distribution that digresses less from a multivariate normal distribution than before normalisation, the null hypothesis that the data follows a multivariate normal distribution still had to be rejected ($\chi^2 = 10175.093$; $p < .05$). See Tables 4.56 and 4.57 for full details. The data, therefore, does not follow a multivariate normal distribution.

Table 4.56

Test of univariate normality after normalisation

	Skewness		Kurtosis		Skewness and Kurtosis	
Variable	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
LM_1	-5.617	.000	-5.018	.000	56.735	.000
LM_2	-4.949	.000	-4.556	.000	45.253	.000
IPV_1	-1.745	.081	-3.599	.000	15.994	.000
IPV_2	-1.680	.093	-3.363	.001	14.134	.001
LC_1	-3.181	.001	-4.649	.000	31.728	.000
LC_2	-6.420	.000	-5.598	.000	72.558	.000
LC_3	-2.497	.013	-3.277	.001	16.971	.000
LC_4	-2.159	.031	-3.037	.002	13.885	.001
LC_5	-2.143	.032	-3.350	.001	15.818	.000
SLM_1	-5.058	.000	-6.047	.000	62.155	.000
SLM_2	-5.366	.000	-6.066	.000	65.594	.000
TL_1	-2.573	.010	-4.954	.000	31.157	.000
TL_2	-3.611	.000	-5.325	.000	41.391	.000
TL_3	-4.198	.000	-5.153	.000	44.173	.000
TL_4	-3.415	.001	-5.333	.000	40.096	.000
FCU_1	-5.464	.000	-5.714	.000	62.505	.000
FCU_2	-5.790	.000	-5.609	.000	64.986	.000
PFFB_1	-3.063	.002	-4.945	.000	33.836	.000
PFFB_2	-2.550	.011	-4.006	.000	22.550	.000
LLLC_1	-.730	.465	-4.693	.000	22.559	.000
LLLC_2	-1.110	.267	-3.796	.000	15.643	.000
EXP_1	-7.155	.000	-5.428	.000	80.658	.000
EXP_2	-5.812	.000	-5.800	.000	67.426	.000
EI_1	-7.970	.000	-5.900	.000	98.337	.000
EI_2	-3.866	.000	-5.829	.000	48.925	.000
EI_3	-3.072	.002	-6.359	.000	49.870	.000
RES_1	-.196	.845	-.100	.921	.048	.976
RES_2	-.199	.843	-.172	.864	.069	.966
RES_3	-.322	.747	-.179	.858	.136	.934
RES_4	-.343	.732	-.201	.841	.158	.924

Table 4.57

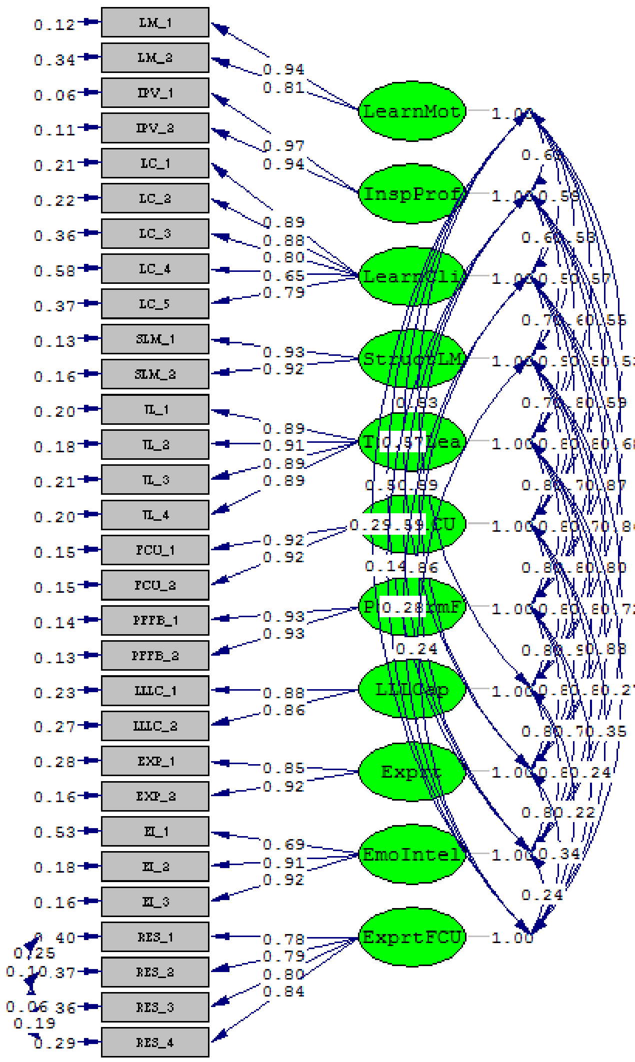
Test of multivariate normality after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	P-Value	Value	Z-Score	P-Value	Chi-Square	P-Value
71.486	90.337	.000	1168.920	44.882	.000	10175.093	.000

The decrease in the chi-square statistic (χ^2) showed that the normalisation procedure succeeded in reducing the deviation of the observed composite indicator distribution from the theoretical multivariate normal distribution. As a result, robust maximum likelihood estimation was selected for the evaluation of the Wessels-Van der Westhuizen trainer-instructor performance measurement model. This estimation technique is the recommended for fitting measurement models of continuous data not satisfying the multivariate normality assumption (Mels, as cited in Van der Westhuizen, 2015). The normalised data set was utilised in the subsequent (robust maximum likelihood estimation) analyses.

4.6.2 ASSESSING THE OVERALL GOODNESS OF FIT OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL

The fit of the estimated Wessels-Van der Westhuizen trainer-instructor performance measurement model and the credibility of the measurement model parameter estimates are discussed in the follow sections. The results of the measurement model analysis will be discussed by (a) firstly evaluating the overall model fit, based on an array of model fit indices as reported by LISREL; (b) secondly by assessing the standardised residuals; (c) thirdly by examining the modification indices calculated for Λ^X and Θ^δ; and (d) lastly by interpreting the measurement model parameter estimates[112]. The fitted Wessels-Van der Westhuizen trainer-instructor performance measurement model is visually represented in Figure 4.5 below.



Chi-Square=2516.58, df=346, P-value=0.00000, RMSEA=0.060

Figure 4.5. **Representation of the fitted Wessels-Van der Westhuizen trainer-instructor performance measurement model (completely standardised solution)**

[112] The evaluation of the standardised variance and covariance residuals, as well as the discussion of the modification indices, are aimed at, along with the discussion of the fit statistic, the evaluation of the model fit.

Table 4.58 depicts the full array of fit statistics calculated by LISREL8.8 to assess the absolute and comparative fit of the Wessels-Van der Westhuizen trainer-instructor performance measurement model.

Table 4.58

The Goodness of fit statistics for the Wessels-Van der Westhuizen trainer-instructor performance measurement model

Goodness of Fit Statistics
Degrees of Freedom = 346
Minimum Fit Function Chi-Square = 2763.386 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 2939.454 (P = 0.0)
Satorra-Bentler Scaled Chi-Square = 2516.577 (P = .0)
Chi-Square Corrected for Non-Normality = 2012.544 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2170.577
90 Percent Confidence Interval for NCP = (2014.975 ; 2333.592)
Minimum Fit Function Value = 1.608
Population Discrepancy Function Value (F0) = 1.263
90 Percent Confidence Interval for F0 = (1.172 ; 1.358)
Root Mean Square Error of Approximation (RMSEA) = .0604
90 Percent Confidence Interval for RMSEA = (.0582 ; .0626)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 1.602
90 Percent Confidence Interval for ECVI = (1.512 ; 1.697)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 2754.577
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3522.136
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .989
Non-Normed Fit Index (NNFI) = .988
Parsimony Normed Fit Index (PNFI) = .786
Comparative Fit Index (CFI) = .990
Incremental Fit Index (IFI) = .990
Relative Fit Index (RFI) = .986
Critical N (CN) = 281.143
Root Mean Square Residual (RMR) = .0244
Standardized RMR = .0267
Goodness of Fit Index (GFI) = .898
Adjusted Goodness of Fit Index (AGFI) = .862
Parsimony Goodness of Fit Index (PGFI) = .668

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (2516.577; $p < .05$) which denotes a significant test statistic. A significant χ^2 denotes that the model does not fit exactly in the parameter. The exact fit null hypothesis (H_{01a}: RMSEA = 0) is therefore rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011). What this implies is that the Wessels-Van der Westhuizen trainer-instructor performance measurement model was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone. In other words, the differences in the two matrices (observed covariance matrix and reproduced or fitted matrix) is not due to sampling error only, but due to real differences between the two matrices in the population. Due to the chi-square statistic's (χ^2) sensitivity to sample size and due to the fact that the exact fit null hypothesis represents a rather idealistic stance, it is rather unlikely that that exact fit null hypothesis would have been rejected in the current study (Hooper et al., 2008; Vieira, 2011). Failure to reject the null hypothesis of exact model fit was, thus, not surprising.

In terms of the sensitivity of the chi-square statistic, the chi-square can be meaningfully interpreted if the degrees of freedom is also taken into account (Vieira, 2011). Therefore, treating the chi-square statistic as a descriptive badness of fit measure is done by expressing the Satorra-Bentler χ^2 estimate in terms of the degrees of freedom (χ^2/df = 7.27[113]) (Spangenberg & Theron, 2005). According to Vieira (2001), ratios of 2-1 or 3-1 (χ^2/df) should be considered as cut-off rations, but according to Kelloway (1998), cut-off ratios between 2 and 5 indicate a good fit. The ratio (7.27) for the Wessels-Van der Westhuizen trainer-instructor performance measurement model did not pass the Kelloway (1998) cut-off for a measurement model demonstrating good fit or the cut-off according to Vieira (2011) for good model fit.

Furthermore, it is recommended that the degree of lack of fit of the model, should be assessed by consulting the estimated non-centrality parameter, (Diamantopoulos & Siguaw, 2000). This means that the χ^2 test statistic would follow a non-central χ^2 distribution with non-centrality parameter (NCP), λ. The estimated λ, or the estimated non-centrality parameter (NCP), value (2170.577) assesses the degree of model fit and reveals the estimated discrepancy between the observed covariance (Σ) and estimated population covariance ($\Sigma(\theta)$) matrices. An estimate of λ is attained by subtracting the degrees of freedom (df) from the chi-square statistic (χ^2). The larger the λ, the farther apart the real alternative hypothesis is from the null hypothesis. The NCP can be interpreted as a weighted sum of squares of discrepancies between the parameters of the fitted model and the parameters of a model that would perfectly reproduce Σ (Browne & Cudeck, 1993). The 90 percent confidence interval for NCP has been calculated as 2014.975 - 2333.592. The large value obtained for the estimated λ indicated a higher level of discrepancy between the observed covariance (Σ) and the estimated population covariance ($\Sigma(\theta)$) at a 10% significant level.

The Wessels-Van der Westhuizen trainer-instructor performance measurement model was fitted by minimising the fit function that compares the observed covariance matrix (S) to the reproduced covariance matrix (Σ) in the sample which is derived from the model parameter estimates

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[113] Satorra-Bentler Scaled Chi-Square (2516.577) / Degrees of Freedom (346).

(Spangenberg & Theron, 2005). An indication that the model fit was achieved in this case, was depicted by the extent to which the minimum fit function value (1.608) comes somewhat close to zero. An estimate value of 1.263 was obtained for F0 with 90 percent confidence Interval for F0 (1.172; 1.358). A perfect fit would have been achieved if F0 was equal to zero (0). A zero would indicate that the observed population covariance matrix would have been the same as the estimated population covariance matrix ($\Sigma_0 = \Sigma_0$.) (Spangenberg and Theron, 2005).

The Root Mean Square Error of Approximation (RMSEA) provides an indication of "…how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available" (Diamantopoulos & Siguaw, 2000, p. 85). RMSEA is interpreted in the following manner, sample values smaller than .05 are indicative of very good fit in the sample, values ranging between .05 and .08 indicate reasonable fit, values ranging between .08 and .10 indicate mediocre fit, and values greater than .10 indicate a poor fit in the sample (Diamantopoulos & Siguaw, 2000; Steiger, as cited in Kelloway, 1998, Vieira, 2011). The RMSEA value of .0604, thus, indicated a reasonable model fit in the sample. The 90 percent confidence interval for RMSEA shown in Table 4.58 (.0582; .0626) indicated that the fit of the model could be regarded as only reasonable since the lower bound of the 90 percent confidence interval values fell above the critical cut-off value of .05 but the upper bound fell below .08 (Spangenberg & Theron, 2005). According to Kenny (2015), the lower value of the 90 percent confidence interval should ideally include or be close to zero, but no worse than .05, and the upper value should not be very large or larger than .08. This reasonable fit RMSEA is, however, not surprising since it is sensitive to the number of estimated parameters in the model (Hooper et al., 2008). Stated differently, the RMSEA favours parsimony given that it will select the model with the lesser number of parameters (Hooper et al., 2008). Furthermore, currently RMSEA cut-off values close to .06 have become acceptable as good fit (Hooper et al., 2008; Hu & Bentler, 1999) and in some cases a lenient ceiling of .07 is imposed (Hooper et al., 2008). The close fit null hypothesis (H_{01b}: RMSEA $\leq$ .50), should be rejected ($p < .05$). The Wessels-Van der Westhuizen trainer-instructor performance measurement model, thus, showed only reasonable fit.

In evaluating the finding that both the exact and close fit null hypotheses had to be rejected the statistical power of these two hypothesis tests were considered. Software developed by Preacher and Coffman (2006) R was used to calculate the statistical power associated with the test of close fit under three effect size assumptions. The probability of rejection H_0: RMSEA = .05| H_a: RMSEA = .08 was 1. The statistical power remained unity even when the effect size assumed under H_a was lowered to .06. When lowers the parametric RMSEA value assumed under H_a further to .055 the statistical power still remained a high .9784. In Figure 4.6 the statistical power of the test of close fit is displayed as a function of sample size when assuming a significance level of .05 and an effect size of RMSEA =

.06. Although the current study, therefore, can reasonably safely rule out a parametric RMSEA value .05, a parametric RMSEA = .06 value indicating reasonable model fit can definitely not be ruled out. It would be an injudicious decision to reject the model because the close fit null hypothesis had been rejected.

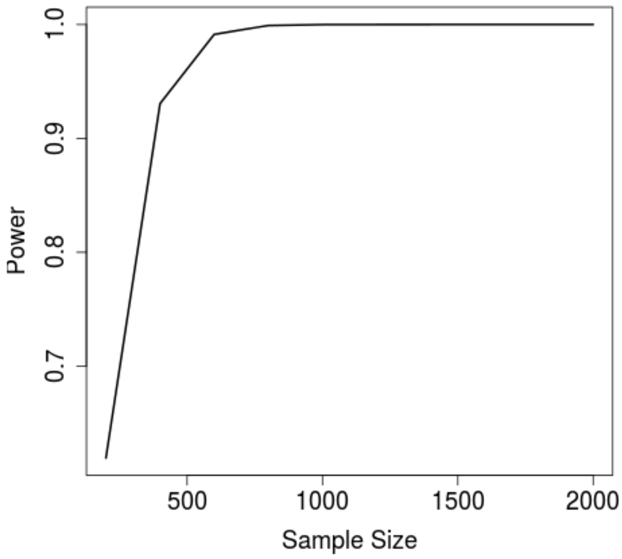

Figure 4.6. **Plotting statistical power of the test of close fit as a function of sample size (α = .05; H_a = .06)**

The expected cross-validation index (ECVI) focuses on the discrepancy between the reproduced covariance matrix (Σ^), derived from fitting the model on the analysed sample, and the expected covariance matrix that would be obtained in an unrelated sample of equal size, but from the same population (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The ECVI focuses on overall error and is consequently a valuable indicator of a model's overall fit (Diamantopoulos & Siguaw, 2000). To assess the ECVI of the measurement model, the model's ECVI must be compared to the independent model and the saturated model. The Wessels-Van der Westhuizen trainer-instructor performance measurement model's ECVI (1.602) was smaller than the ECVI for independence model (130.301) and larger than the ECVI for saturated model (0.541). A model more closely resembling the saturated model appears to have a better chance of being replicated in a cross-validation sample than the independence or fitted model (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005).

The Akaike information criterion (AIC) and consistent version of AIC (CAIC) is a comparative measure of fit and thus only meaningful when these statistics are estimated for two different models (Kenny, 2015; Van der Westhuizen, 2015). These, AIC and CAIC, statistics are commonly used when comparing non-nested or non-hierarchical models estimated on similar data and it indicates to the researcher which of the models is the most parsimonious or stringent (Hooper et al., 2008). The assessment of parsimonious fit recognises that model fit can always be improved by (a) adding more paths to the model and (b) estimating more parameters until perfect fit is achieved. Perfect fit is found in the form of a saturated or just-identified model with no degrees of freedom (Kelloway, 1998; Spangenberg & Theron, 2005). To assess the AIC and the CAIC of the measurement model, the model's AIC/CAIC must be compared to the independent model and the saturated model. The value for the Wessels-Van der Westhuizen trainer-instructor performance model AIC (2754.577) was smaller than the independence AIC (223987.101) and larger than the saturated AIC (930.000). This suggests that the fitted model provided a more parsimonious fit than the independent/null models (Kelloway, 1998; Spangenberg & Theron, 2005). The value for the Wessels-Van der Westhuizen trainer-instructor performance model CAIC (3522.136) was smaller than the independence AIC (224180.603) and smaller than the saturated AIC (3929.287). Therefore, a model more closely resembling the fitted model seems to have a better chance of being replicated in a cross-validation sample than the independence and the saturated models.

The various incremental fit indices, as reported by LISREL, are also presented in Table 4.58. The incremental fit indices include: (a) the normed fit index (NFI = .989), (b) the non-normed fit index (NNFI = .988), (c) the comparative fit index (CFI = .990), (d) the incremental fit index (IFI = .990) and (e) the relative fit index (RFI = .986). Cut-off criteria for all of the preceding incremental fit indices is a value above .90 for good model fit (Hu & Bentler, 1999; Kelloway, 1998; Spangenberg & Theron, 2005; Vieira, 2011) or above .95 for a more ambitious model fit (Hooper et al., 2008). All of the aforementioned indices exceeded both the critical value of .90 and the ambitious critical value of .95. This indicated very good comparative fit relative to the independence model.

The critical sample size statistic, or Hoelter's critical N, (CN) (Hoelter, 1983) denotes the size of the sample that would have made the obtained minimum fit function chi-square (χ^2) statistic just significant at the .05 (5%) significant level (Spangenberg & Theron, 2005). The estimated CN value (281.143) fell well above the recommended minimum value of 200 (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). This implies, according to Hoelter (1983), that the model offered a sufficient representation of the data. Bollen and Liang (1988), however, warn that the CN displays a systematic bias in favour of models fitted on larger samples. The CN statistic can also be interpreted as a crude measure of statistical power of the chi-square exact fit test (Bollen & Liang, 1988). A large CN value obtained for a large sample would in terms of this line of reasoning imply an adequate model. When, however, the exact fit null hypothesis is nonetheless rejected it points to high statistical power that allowed the detection of minor misspecification. This line of reasoning seems applicable in the current study. Bollen and Liang (1988) are critical of the use of CN as an indicator of statistical power.

The root mean square residual (RMR) and the standardised root mean square residual (SRMR) reflects the mean squared difference between the sample covariance matrix and the reproduced or hypothesised covariance matrix derived from the fitted measurement model (Hooper et al., 20118). The range of the RMR is calculated based upon the scales of each indicator variable (i.e., item parcel). This makes the index sensitive to the unit of measurement of the model variables and, as a result, it becomes difficult to interpret or determine what a low score is (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). This problem is resolved by the standardised RMR (SRMR) which makes it more meaningful to interpret (Hooper et al., 2008). The SRMR is an absolute measure of model fit. It is defined as the standardised difference between the observed correlation and the predicted correlation (Kenny, 2015). The RMR (.0244) and the SRMR (.0267) indicated good fit as values less than .05 suggests the model fits the data well (Kelloway, 1998; Spangenberg & Theron, 2005). In terms of SRMR, generally, values less than .08 are considered a good fit (Hu & Bentler, 1999; Kenny, 2015).

The goodness of fit index (GFI), the adjusted goodness of fit index (AGFI) and the parsimony goodness of fit index (PGFI) all show the success with which the reproduced sample covariance matrix recovered the observed sample covariance matrix (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The GFI was created to calculate the proportion of variance that is accounted for by the estimated population covariance and it determines how closely the model comes to replicating the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). The GFI and AGFI measures should be between zero and unity (i.e., 1) and have values exceeding .90 to indicate good fit to the data (Hooper et al., 2008; Kelloway, 1998; Spangenberg & Theron, 2005). Recommendations for GFI cut-off values are .90. When factor loadings and samples sizes are low or small, a cut-off value of .95 is required (Hooper et al., 2008). Related to the GFI is the adjusted goodness of fit statistic (AGFI). The AGFI is, in essence, the GFI, but adjusted for the degrees of freedom (Hooper et al., 2008; Vieira, 2011). These indices favour more parsimonious models, but they get penalised for model complexity (Hooper et al., 2008). Furthermore, GFI and AGFI tend to be affected by the size of the sample (Hooper et al., 2008; Kenny, 2015). Evaluating the fit of the model in terms of these two indices, both GFI (.898) and AGFI (.862) showed reasonably good model fit.

Having an almost saturated, complex model entails that the estimation process is dependent on the sample data. This results in a less meticulous theoretical model that paradoxically generates better fit indices. Thus, to overcome this problem two parsimony of fit indices, namely the Parsimony goodness of fit index (PGFI) and the Parsimonious normed fit index (PNFI), was developed (Hooper et al., 2008). The PGFI is, in essence, the GFI, but adjusted for the degrees of freedom. The PNFI also adjusts for degrees of freedom, however, it is based on the NFI (Hooper et al., 2008). The PGFI and the PNFI recognise that model fit can be improved by adding paths to the model and by estimating more parameters until perfect fit is achieved. Perfect fit being a saturated or just identified model with no degrees of freedom (Kelloway, 1998). The PGFI (.668) and the PNFI (.786) this shows model fit. Both of these indices have a range from 0 to 1 (where higher values indicate a more parsimonious fit). However, neither is likely to reach the .90 cut-off value as used for other indices and there is no recommendation for how high either index should be to indicate parsimonious fit (Hooper, 2008; Kelloway, 1998).

4.6.3 EXAMINATION OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL RESIDUALS

The number and distribution of large positive and negative standardised variance and covariance residuals were also considered in the evaluation of the fit of the measurement model. Firstly, the standardised residuals resulting from the covariance estimates originated from the estimated model parameters obtained for the modified Wessels-Van der Westhuizen trainer-instructor measurement model are shown in Table 4.59. Standardised residuals are z-scores that should interpreted as large if they exceed +2.58 or –2.58 (Diamantopoulos & Siguaw, 2000). Large positive residuals show that a model underestimates the covariance between two variables and negative residuals show that a model overestimates the covariance between variables (Van der Westhuizen, 2015).

Table 4.59 showed that the Wessels-Van der Westhuizen trainer-instructor performance measurement model's standardised residuals comprised of 23 negative and 33 positive residuals. The fact that only 56 extreme residuals, out of 450[114] (12.4%) were reported is again indicative of reasonably good model fit.

[114] Given that the structural model was operationalised via 30 composite indicator variables there are (30 x 31)/2 variances and covariances in the observed covariance matrix.

Table 4.59
Summary statistics for the standardised residuals

	Value
Summary Statistics for Standardized Residuals	
Smallest Standardized Residual =	-21.157
Median Standardized Residual =	.000
Largest Standardized Residual =	16.364
Largest Negative Standardized Residuals	
Residual for IPV_2 and LM_2	-3.991
Residual for LC_1 and LM_1	-12.688
Residual for LC_1 and LM_2	-2.686
Residual for LC_1 and IPV_2	-5.718
Residual for LC_2 and IPV_1	-10.694
Residual for LC_2 and IPV_2	-5.344
Residual for SLM_1 and LC_4	-3.735
Residual for SLM_2 and LC_4	-3.433
Residual for TL_1 and LM_1	-7.575
Residual for TL_1 and LC_4	-21.157
Residual for TL_3 and LM_1	-4.340
Residual for FCU_1 and LC_4	-9.036
Residual for FCU_2 and LC_4	-8.362
Residual for LLLC_1 and LM_1	-2.583
Residual for LLLC_1 and LC_4	-3.375
Residual for EXP_1 and LC_4	-3.262
Residual for EI_1 and IPV_1	-2.978
Residual for EI_1 and LC_4	-2.913
Residual for EI_1 and LLLC_1	-6.621
Residual for EI_2 and LM_1	-3.831
Residual for EI_2 and LC_4	-8.359
Residual for EI_3 and LC_4	-5.198
Residual for RES_2 and EXP_2	-3.621
Largest Positive Standardized Residuals	
Residual for LC_3 and IPV_1	2.719
Residual for LC_3 and IPV_2	4.320
Residual for LC_4 and LM_1	4.121
Residual for LC_4 and LM_2	5.713
Residual for LC_4 and IPV_1	3.764
Residual for LC_4 and IPV_2	4.054
Residual for LC_4 and LC_3	13.018
Residual for LC_5 and IPV_1	4.763
Residual for LC_5 and IPV_2	5.881
Residual for LC_5 and LC_4	16.173
Residual for SLM_2 and LM_1	3.631
Residual for TL_2 and LM_1	8.149
Residual for TL_2 and LM_2	3.856
Residual for TL_4 and IPV_2	16.364
Residual for LLLC_1 and LC_5	9.955
Residual for LLLC_2 and LM_1	2.863
Residual for LLLC_2 and IPV_2	4.607
Residual for LLLC_2 and LC_5	6.294
Residual for EXP_1 and LM_1	3.346
Residual for EI_1 and LC_1	4.774
Residual for EI_1 and LC_3	2.769
Residual for EI_1 and TL_3	6.067
Residual for EI_1 and FCU_1	3.734
Residual for EI_1 and FCU_2	5.257
Residual for EI_1 and EXP_1	6.844
Residual for EI_1 and EXP_2	6.823
Residual for EI_3 and IPV_2	7.819
Residual for RES_1 and EXP_1	4.028
Residual for RES_1 and EI_1	3.447
Residual for RES_2 and EXP_1	3.739
Residual for RES_3 and LC_4	3.394
Residual for RES_3 and EI_1	2.716
Residual for RES_4 and LC_4	3.555

Secondly, the stem-and-leaf plot for the Wessels-Van der Westhuizen trainer-instructor measurement model is depicted in Figure 4.7. A good model is characterised by a stem-and-leaf plot in which the residuals are distributed approximately evenly around zero.

The stem-and-leaf plot appears to be almost centrally distributed, but slightly negatively skewed. The estimated model parameters, therefore, tended to underestimate the observed covariance terms lightly more than they tended to overestimate them. This dovetails with the results in Table 4.58 and the earlier reported findings on the ECV and the AIC.

```
-20|2
 -18|
 -16|
 -14|
 -12|7
 -10|7
 - 8|044
 - 6|66
 - 4|73230
 - 2|87644309765554110
 - 0|9977777544322111100000999988888887777776665555444444333333222111110000000+92
   0|1111222333444444555556666667777778889999900011112222222245567788
   2|0112347789344667789
   4|0113688379
   6|13888
   8|1
  10|0
  12|0
  14|
  16|24
```

Figure 4.7. **Stem-and-leaf plot of standardised residuals**

Thirdly, the Q-plot for the Wessels-Van der Westhuizen trainer-instructor measurement model is depicted in Figure 4.8. The Q-plot shows that the data deviates from the 45- degree reference line. This is a negative reference on the fit of the model. The data points rotate away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only satisfactory model fit was achieved.

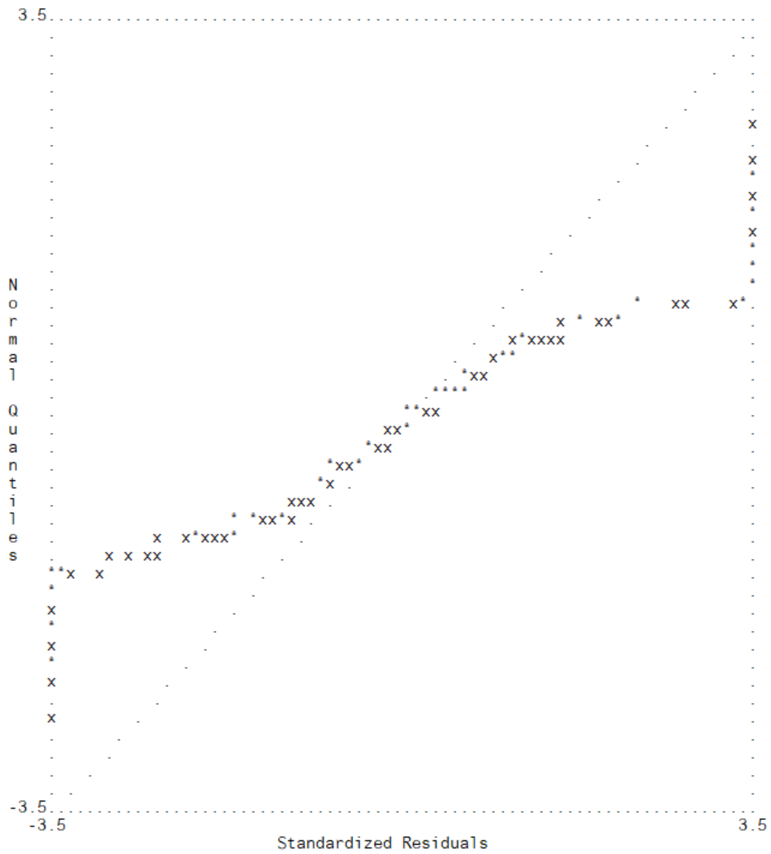

Figure 4.8. **Q-Plot of standardised residuals**

4.6.4 EXAMINATION OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL MODIFICATION INDICES

Examining modification indices of currently fixed parameters in a model can provide an additional way of evaluating the fit of the model by determining the extent to which adding one or more paths would significantly improve the fit of a model. The aim of examining modification indices is thus to assess the decrease that would occur in the χ^2 statistic if parameters, that are currently fixed, are set free and if the model is re-estimated.

Table 4.60

Modification indices for lambda matrix

	LearnMot	InspProf	LearnCli	StructLM	TransLea	FacilCU	ProFormF	LLLCap	Exprt	EmoIntel	ExprtFCU
LM_1	- -	**8.544**	**10.822**	.369	2.124	.015	.964	6.551	1.461	.202	**11.583**
LM_2	- -	**12.226**	2.367	.252	.214	.007	.527	1.172	.712	.092	**9.256**
IPV_1	**9.046**	- -	1.824	.109	2.060	.059	.297	5.840	.726	2.249	.204
IPV_2	**8.986**	- -	1.927	.106	2.214	.060	.302	6.617	.744	2.336	.196
LC_1	**17.928**	**10.443**	- -	1.533	5.388	5.604	1.005	1.321	1.305	**33.247**	.354
LC_2	.285	**18.930**	- -	**6.786**	.111	**16.102**	4.468	.237	**17.239**	.022	.404
LC_3	.212	5.198	- -	6.599	**13.649**	**22.455**	**19.943**	**19.434**	**33.735**	**8.895**	1.134
LC_4	**37.355**	**25.443**	- -	**36.714**	- -	- -	- -	- -	- -	- -	**13.100**
LC_5	.633	**30.043**	- -	.911	.001	**12.326**	**22.137**	**17.729**	4.336	**9.227**	3.715
SLM_1	.688	.072	3.186	- -	2.859	.126	.487	2.490	.546	3.885	3.287
SLM_2	.676	.070	2.990	- -	2.614	.121	.459	2.280	.515	3.640	3.271
TL_1	**14.611**	**20.417**	1.059	**7.258**	- -	3.303	1.030	.473	**11.128**	5.825	2.866
TL_2	**23.609**	4.052	.110	**10.307**	- -	6.224	.028	1.407	**12.340**	6.228	3.693
TL_3	5.130	**14.634**	.032	4.233	- -	.084	**8.268**	**12.304**	.601	.003	2.755
TL_4	.690	**34.978**	.226	1.196	- -	.435	1.917	5.602	.023	.205	3.921
FCU_1	5.056	.674	6.381	**9.096**	6.471	- -	.804	1.481	.106	1.085	1.308
FCU_2	5.439	.735	**9.969**	**12.992**	**10.504**	- -	1.216	2.388	.176	1.668	1.296
PFFB_1	.078	.523	1.939	1.446	1.012	3.621	- -	.353	.917	.519	2.132
PFFB_2	.080	.552	2.136	1.572	1.125	4.371	- -	.400	1.075	.536	2.103
LLLC_1	3.767	1.686	.081	**8.525**	.579	.966	.084	- -	.904	4.133	.164
LLLC_2	3.795	1.743	.093	**9.934**	.711	1.150	.102	- -	1.101	5.237	.164
EXP_1	3.303	.392	.418	.137	.327	.606	1.520	6.578	- -	**8.316**	**18.469**
EXP_2	3.240	.369	.135	.067	.097	.132	.671	2.392	- -	3.062	**22.588**
EI_1	2.637	**7.343**	6.369	.224	4.710	**16.091**	1.115	2.723	**19.749**	- -	**14.870**
EI_2	**8.932**	**11.109**	2.993	**8.533**	3.505	4.502	**10.303**	**27.273**	**19.780**	- -	.430
EI_3	4.127	**20.899**	.295	6.199	.710	.059	6.064	**27.905**	4.729	- -	**8.059**
RES_1	3.645	.459	1.143	2.018	1.280	2.957	.206	1.715	2.681	3.278	- -
RES_2	**7.075**	.000	.502	.506	.417	2.017	.019	1.312	2.310	2.596	- -
RES_3	1.317	3.878	.865	4.686	.912	1.297	.366	1.115	1.042	.184	- -
RES_4	.179	1.673	.392	2.326	.286	.881	.101	.900	.964	.083	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, FacilCU refers to *facilitating clarity and understanding*, ProFormF refers to *providing formative feedback*, LLLCap refers to *lifelong learning trainer-instructor capacity*, Exprt refers to *trainer-instructor expert*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *transformational trainer-instructor leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

Table 4.61

Modification indices for theta-delta matrix

	LM_1	LM_2	IPV_1	IPV_2	LC_1	LC_2	LC_3	LC_4	LC_5	SLM_1	SLM_2	TL_1	TL_2	TL_3	TL_4	FCU_1	FCU_2	PFFB_1
LM_1	- -																	
LM_2	- -	- -																
IPV_1	2.194	.660	- -															
IPV_2	.514	3.062	- -	- -														
LC_1	.413	2.239	.365	.436	- -													
LC_2	.017	2.838	.351	5.373	**57.909**	- -												
LC_3	.703	.374	.006	3.266	.098	**22.375**	- -											
LC_4	.222	**14.674**	1.620	.476	**124.622**	**46.023**	**216.868**	- -										
LC_5	5.162	2.903	.399	**10.210**	**125.002**	**11.262**	**28.629**	**424.488**	- -									
SLM_1	.996	.038	.213	.006	6.263	.009	1.361	1.776	1.610	- -								
SLM_2	1.014	.033	.050	.034	4.117	.088	1.425	.117	.897	- -	- -							
TL_1	3.040	.778	.144	7.669	**128.742**	.148	**10.303**	**24.033**	4.418	.180	.373	- -						
TL_2	5.584	.270	3.096	3.099	**31.566**	.562	1.249	**10.594**	**8.455**	.618	.301	2.097	- -					
TL_3	.516	.001	5.637	1.643	**8.114**	4.010	**28.795**	**10.661**	**12.605**	.136	2.706	1.199	**7.016**	- -				
TL_4	.201	4.190	.003	**11.408**	**7.022**	2.780	**8.572**	.062	.962	.008	.523	5.089	.539	.631	- -			
FCU_1	2.755	.001	.000	.168	.239	.001	.272	2.113	1.583	.038	**11.866**	1.254	2.225	1.869	.006	- -		
FCU_2	5.398	.651	2.223	3.873	1.524	**11.549**	.331	**11.081**	1.834	1.593	4.013	.071	**9.463**	4.504	2.644	- -	- -	
PFFB_1	.000	.133	.516	.332	**7.162**	.002	3.315	.023	3.183	.018	.207	.192	.560	.572	.281	**17.988**	1.433	- -
PFFB_2	.756	.470	1.305	1.038	.025	.427	.027	.361	6.219	3.366	2.529	3.611	.449	2.327	.750	3.233	1.512	- -
LLLC_1	.848	.015	**17.236**	**13.383**	.472	2.190	5.520	4.836	**9.898**	6.239	.208	3.549	.601	**9.957**	3.670	1.568	.976	.007
LLLC_2	2.020	.168	2.462	.993	5.597	.539	.627	**10.743**	1.302	.804	5.210	.883	1.451	3.762	.009	5.210	4.050	.085
EXP_1	5.773	2.281	.384	.919	.010	**11.052**	.130	1.661	**21.529**	.253	.122	**8.292**	**8.308**	**11.360**	1.511	.208	1.772	1.174
EXP_2	.145	.478	.109	.350	.749	2.850	**7.045**	1.637	3.016	.022	.085	**9.953**	1.974	1.450	.921	1.298	3.616	.390
EI_1	2.681	.433	.459	.984	3.852	.019	**8.726**	3.345	**7.972**	.404	1.563	1.380	.087	**49.709**	**13.255**	.680	**8.246**	.052
EI_2	2.729	.842	.148	.005	**32.544**	2.945	.846	3.881	3.595	.347	1.512	**10.861**	**17.522**	**16.506**	.359	1.508	.058	1.380
EI_3	1.371	1.098	.324	.323	.218	.324	.134	.207	.039	.585	.590	2.215	1.079	**36.324**	6.364	.045	5.148	.491
RES_1	**14.654**	2.889	.282	1.746	.057	1.473	.192	1.919	3.881	1.497	.601	4.021	.005	.189	1.881	**34.090**	**27.306**	1.559
RES_2	**18.050**	3.631	.234	1.087	1.048	1.562	.396	**6.686**	**12.243**	.273	.495	2.245	1.238	2.315	3.515	**36.146**	**26.384**	.000
RES_3	.610	.469	2.380	.515	.096	.035	4.510	.133	5.243	1.683	.265	2.339	4.514	2.637	1.098	**7.165**	6.384	1.817
RES_4	5.447	4.893	.952	.139	1.647	1.371	1.571	**7.149**	**12.487**	2.149	.144	1.401	.956	4.376	1.272	6.007	6.597	.202

Note: LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *transformational trainer-instructor leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (*trainer-instructor expert* and *facilitating clarity and understanding*).

Table 4.62

Modification indices for theta-delta matrix (continued)

	PFFB_2	LLLC_1	LLLC_2	EXP_1	EXP_2	EI_1	EI_2	EI_3	RES_1	RES_2	RES_3	RES_4
PFFB_2	- -											
LLLC_1	.819	- -										
LLLC_2	1.330	- -	- -									
EXP_1	2.400	**63.558**	**50.213**	- -								
EXP_2	1.048	**8.483**	3.424	- -	- -							
EI_1	.118	**42.253**	.208	**20.703**	2.409	- -						
EI_2	.172	5.812	**19.137**	.778	6.048	**67.951**	- -					
EI_3	.100	**64.585**	2.660	**10.722**	**9.641**	**105.282**	- -	- -				
RES_1	5.844	.829	1.948	**10.817**	2.609	3.362	1.205	.348	- -			
RES_2	1.531	5.222	5.016	**19.380**	**26.791**	1.124	.283	.236	- -	- -		
RES_3	3.957	.046	.055	3.919	3.569	1.037	.034	.176	- -	- -	- -	
RES_4	1.256	3.772	1.133	**14.576**	**11.571**	1.138	.036	.022	- -	- -	- -	- -

Modification indices with values larger than 6.64 (Theron, 2017) identify currently fixed parameters that would enhance the fit of a model significantly (p < .01) if set free (Diamantopoulos & Siguaw, 2000). Modification indices calculated for the Λ^x (see Table 4.60) and θ_δ (see Table 4.61 and 4.62) matrices were examined.

According to Table 4.60, there were 63 modification indices larger than 6.64. In general, it would appear that it was mostly the item parcels from the learning climate subscale that loaded onto other latent variables. The item parcels for the trainer-instructor expert subscale would appear to be the next group that loaded onto other latent variables. Further, the parameter with the highest modification index value (37.355) was between *learning motivation* and LC_4 (a learning climate item parcel). The small percentage of large modification index values for Λ^X (21%)[115] commented reasonably favourably on the fit of the Wessels-Van der Westhuizen trainer-instructor measurement model.

According to Table 4.61 and Table 4.62, there were 80 modification indices larger than 6.64. Further, the parameter with the highest modification index value (424.488) was between LC_4 and LC_5 (both learning climate item parcels). Again, this reasonably small percentage of large residuals calculated for Θ_δ (17.78%)[116] commented reasonably favourably on the fit of the Wessels-Van der Westhuizen trainer-instructor measurement model.

[115] Given 11 latent variables in the structural model that were operationalised by 30 composite indicator variable there are 330 elements in Λ^X of which 30 were freed to be estimated and the remaining 300 elements were fixed to 0. Table 4.60 indicates that 63 of these currently fixed parameter, if freed, will significantly (p < .01) improve the fit of the measurement model. It is acknowledged though that a sequential freeing of currently constrained elements in Λ^X, based on the current magnitude of the modification index values, will not necessarily all result in a significant (p < .01) improvement in model fit.

[116] Given 30 composite indicator variables there were 450 unique covariance terms in Θ_δ that were fix to zero. Eighty of these, if freed, would significantly (p < .01) improve the fit of the measurement model. It is acknowledged though that a sequential freeing of currently constrained elements in Θ_δ, based on the current magnitude of the modification index values, will not necessarily all result in a significant (p < .01) improvement in model fit.

4.6.5 INTEGRATIVE VERDICT ON MEASUREMENT MODEL FIT

Both the exact and close fit null hypotheses were rejected. The basket of fit statistics produced by LISREL 8.8 nonetheless indicated that reasonable model fit may be concluded. The number and distribution of the large standardised variance and covariance residuals corroborated this conclusion. The number of the large modification indices calculated for $\mathbf{\Lambda^X}$ and $\mathbf{\Theta_\delta}$ also substantiated the conclusion of reasonable measurement model fit. This measurement model parameter estimates were therefore considered sufficiently credible to warrant their interpretation.

4.6.6 INTERPRETING THE FREED THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL PARAMETER ESTIMATES

Since the Wessels-Van der Westhuizen trainer-instructor performance measurement model fitted reasonably the magnitude and the significance of the slope of the regression of the observed variables (i.e., item parcels) on their respective latent variables were examined in the unstandardised lambda-X matrix ($\mathbf{\Lambda^X}$). When an indicator is designed to provide a valid reflection of a specific latent variable, then the slope of the regression of X_j in the fitted measurement model firstly has to be statistically significant ($p < .05$) (Diamantopoulos & Siguaw, 2000). The unstandardised $\mathbf{\Lambda^X}$ (see Table 4.63) shows the slope of the regression of the unstandardised item parcels X_j on the unstandardised latent variables comprising the Wessels-Van der Westhuizen trainer-instructor structural model.

4.6.3.1 Lambda-X hypotheses

The $\mathbf{\Lambda^X}$ indicated that all (30) the slope coefficients that describe the regression of the item parcels on the latent variables were statistically significant ($p < .05$). All the indicator variables loaded statistically significant on the latent variables that they were designed to reflect. As a result, all 30 null hypotheses H_{0i}: $\lambda jk = 0$; $i = 2, 3, \ldots, 32$; $j = 1, 2, \ldots, 30$; $k = 1, 2, \ldots, 11$ was rejected in favour of H_{ai}: $\lambda_{jk} > 0$; $i = 2, 3, \ldots, 32$; $j = 1, 2, \ldots, 30$; $k = 1, 2, \ldots, 11$[117].

Table 4.63

Unstandardised lambda matrix

	LearnMot	InspProf	LearnCli	StructLM	TransLea	FacilCU
LM_1	.771 (.016) 48.547	- -	- -	- -	- -	- -
LM_2	.563 (.015) 38.469	- -	- -	- -	- -	- -
IPV_1	- -	.975 (.017)	- -	- -	- -	- -

[117] Since H_{ai}: $\lambda_{jk} > 0$; $i = 2, 3, \ldots, 32$; $j = 1, 2, \ldots, 30$; $k = 1, 2, \ldots, 11$ were formulated as directional alternative hypotheses H_{0i}: $\lambda_{jk} = 0$; $i = 2, 3, \ldots, 32$; $j = 1, 2, \ldots, 30$; $k = 1, 2, \ldots, 11$ was rejected in a one-tailed test when $z > |1.6449|$.

		59.043				
IPV_2	- -	.940 (.017) 55.147	- -	- -	- -	- -
LC_1	- -	- -	.929 (.018) 52.913	- -	- -	- -
LC_2	- -	- -	.856 (.016) 54.504	- -	- -	- -
LC_3	- -	- -	.592 (.014) 42.406	- -	- -	- -
LC_4	- -	- -	.501 (.018) 28.131	- -	- -	- -
LC_5	- -	- -	.706 (.017) 40.734	- -	- -	- -
SLM_1	- -	- -	- -	1.047 (.017) 60.114	- -	- -
SLM_2	- -	- -	- -	1.004 (.018) 56.429	- -	- -
TL_1	- -	- -	- -	- -	.982 (.018) 53.796	- -
TL_2	- -	- -	- -	- -	1.034 (.018) 56.786	- -
TL_3	- -	- -	- -	- -	.876 (.017) 53.058	- -
TL_4	- -	- -	- -	- -	.983 (.018) 55.148	- -
FCU_1	- -	- -	- -	- -	- -	.999 (.017) 58.043
FCU_2	- -	- -	- -	- -	- -	.981 (.017) 57.924

	ProFormF	**LLLCap**	**Exprt**	**EmoIntel**	**ExprtFCU**
PFFB_1	.967 (.017) 56.872	- -	- -	- -	- -
PFFB_2	.897 (.016) 55.272	- -	- -	- -	- -
LLLC_1	- -	1.028 (.021) 50.081	- -	- -	- -
LLLC_2	- -	.905 (.020) 45.763	- -	- -	- -
EXP_1	- -	- -	.778 (.016) 48.034	- -	- -
EXP_2	- -	- -	.986 (.017) 56.449	- -	- -
EI_1	- -	- -	- -	.686 (.021) 32.837	- -
EI_2	- -	- -	- -	1.017 (.018) 55.784	- -

EI_3	- -	- -	- -	1.095 (.019) 58.498	- -
RES_1	- -	- -	- -	- -	.813 (.032) 25.751
RES_2	- -	- -	- -	- -	.818 (.033) 24.520
RES_3	- -	- -	- -	- -	.899 (.039) 23.220
RES_4	- -	- -	- -	- -	.936 (.039) 24.181

Note: The first value in each cell in Table 4.63 is the unstandardised factor loading λij, the second value in brackets is the standard error and the third value is a z-score.

LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, FacilCU refers to *facilitating clarity and understanding*, ProFormF refers to *providing formative feedback*, LLLCap refers to *lifelong learning trainer-instructor capacity*, Exprt refers to *trainer-instructor expert*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *trainer-instructor transformational leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

However, relying only on unstandardised factor loadings and their associated z-values to assess the validity of the indicator variables may be problematic since it makes comparing the validity of different indicators measuring different constructs difficult (Diamantopoulos & Siguaw, 2000). In other words, unstandardised loadings retain scaling information of variables which can only be interpreted with reference to the scales of the specific variable in question. Unstandardised factor loadings cannot be compared across indicator variables, unless the indicator variables are expressed in the same metric. Therefore, in order to avoid this problem, the magnitudes of the completely standardised factor loadings were also be interpreted (Diamantopoulos & Siguaw, 2000). The completely standardised factor loadings (see Table 4.64) reflect the average change expressed in standard deviation units in an indicator variable (X_i), directly resulting from a one standard deviation change in an exogenous latent variable (ξ_j) to which it has been designed to reflect (Spangenberg & Theron, 2005). Factor loading estimates were considered to be acceptable if the completely standardised factor loading estimates exceeded .71 (Hair et al., 2006). Exceeding this criterion implies that at least 50% of the variance in the indicator variables can be explained by the latent variables they were designed to reflect.

Almost all (28 out of 30) of the loadings were greater than .71 except for the loading LC_4 (λ_{83}=.646) on *learning climate*; EI_1 (λ = .688) on *trainer-instructor emotional intelligence.*

Table 4.64

Completely standardised lambda matrix

	LearnMot	InspProf	LearnCli	StructLM	TransLea	FacilCU
LM_1	0.940	- -	- -	- -	- -	- -
LM_2	0.814	- -	- -	- -	- -	- -
IPV_1	- -	0.967	- -	- -	- -	- -
IPV_2	- -	0.943	- -	- -	- -	- -
LC_1	- -	- -	0.886	- -	- -	- -
LC_2	- -	- -	0.882	- -	- -	- -
LC_3	- -	- -	0.798	- -	- -	- -
LC_4	- -	- -	0.646	- -	- -	- -
LC_5	- -	- -	0.791	- -	- -	- -
SLM_1	- -	- -	- -	0.935	- -	- -
SLM_2	- -	- -	- -	0.918	- -	- -
TL_1	- -	- -	- -	- -	0.892	- -
TL_2	- -	- -	- -	- -	0.907	- -
TL_3	- -	- -	- -	- -	0.887	- -
TL_4	- -	- -	- -	- -	0.894	- -
FCU_1	- -	- -	- -	- -	- -	0.922
FCU_2	- -	- -	- -	- -	- -	0.920
PFFB_1	- -	- -	- -	- -	- -	- -
PFFB_2	- -	- -	- -	- -	- -	- -
LLLC_1	- -	- -	- -	- -	- -	- -
LLLC_2	- -	- -	- -	- -	- -	- -
EXP_1	- -	- -	- -	- -	- -	- -
EXP_2	- -	- -	- -	- -	- -	- -
EI_1	- -	- -	- -	- -	- -	- -
EI_2	- -	- -	- -	- -	- -	- -
EI_3	- -	- -	- -	- -	- -	- -
RES_1	- -	- -	- -	- -	- -	- -
RES_2	- -	- -	- -	- -	- -	- -
RES_3	- -	- -	- -	- -	- -	- -
RES_4	- -	- -	- -	- -	- -	- -

	ProFormF	LLLCap	Exprt	EmoIntel	ExprtFCU
LM_1	- -	- -	- -	- -	- -
LM_2	- -	- -	- -	- -	- -
IPV_1	- -	- -	- -	- -	- -
IPV_2	- -	- -	- -	- -	- -
LC_1	- -	- -	- -	- -	- -
LC_2	- -	- -	- -	- -	- -
LC_3	- -	- -	- -	- -	- -
LC_4	- -	- -	- -	- -	- -
LC_5	- -	- -	- -	- -	- -
SLM_1	- -	- -	- -	- -	- -
SLM_2	- -	- -	- -	- -	- -
TL_1	- -	- -	- -	- -	- -
TL_2	- -	- -	- -	- -	- -
TL_3	- -	- -	- -	- -	- -
TL_4	- -	- -	- -	- -	- -
FCU_1	- -	- -	- -	- -	- -
FCU_2	- -	- -	- -	- -	- -
PFFB_1	0.925	- -	- -	- -	- -
PFFB_2	0.933	- -	- -	- -	- -
LLLC_1	- -	0.877	- -	- -	- -
LLLC_2	- -	0.856	- -	- -	- -
EXP_1	- -	- -	0.851	- -	- -
EXP_2	- -	- -	0.915	- -	- -
EI_1	- -	- -	- -	0.688	- -
EI_2	- -	- -	- -	0.906	- -
EI_3	- -	- -	- -	0.916	- -
RES_1	- -	- -	- -	- -	0.777
RES_2	- -	- -	- -	- -	0.791
RES_3	- -	- -	- -	- -	0.801
RES_4	- -	- -	- -	- -	0.842

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, FacilCU refers to *facilitating clarity and understanding*, ProFormF refers to *providing formative feedback*, LLLCap refers to *lifelong learning trainer-instructor capacity*, Exprt refers to *trainer-instructor expert*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.
LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *transformational trainer-instructor leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

Additionally, the squared multiple correlations (R^2) of the indicators were examined in order to determine the validity of the indicators (i.e., item parcels). Large R^2 values (> .50) reveal valid indicators since this indicates that a satisfactory proportion of variance in each indicator variable is explained by the underlying latent variable it was designed to reflect (Van der Westhuizen, 2015). Table 4.65 shows that almost all (28 out of 30) indicators (> .50) provide valid explanations of the underlying latent variables they were designed to reflect. Only in the case of LC_4 (.418) and EI_1 (.473) the latent variables that these indicators were meant to represent explained less than 50% of the variance in these two indicators. This reflects negatively on the validities of these two indicators or item parcels as it implies that majority of the variance in these indicators can be attributed to systematic and random measurement error. Generally, however, the proportions of variance explained in the indicator variables by the latent variables they were designated to reflect were satisfactory.

Table 4.65

Squared multiple correlations for item parcels

LM_1	**LM_2**	**IPV_1**	**IPV_2**	**LC_1**	**LC_2**
.884	.663	.935	.890	.786	.778
LC_3	**LC_4**	**LC_5**	**SLM_1**	**SLM_2**	**TL_1**
.637	.418	.626	.874	.843	.795
TL_2	**TL_3**	**TL_4**	**FCU_1**	**FCU_2**	**PFFB_1**
.823	.787	.799	.850	.846	.856
PFFB_2	**LLLC_1**	**LLLC_2**	**EXP_1**	**EXP_2**	**EI_1**
.870	.769	.733	.724	.838	.473
EI_2	**EI_3**	**RES_1**	**RES_2**	**RES_3**	**RES_4**
.821	.840	.603	.626	.641	.710

LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *transformational trainer-instructor leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

4.6.3.2 Theta-delta hypotheses

The unstandardised measurement error variances (i.e., unstandardised theta-delta matrix) for the item parcels are reflected in Table 4.66. The unstandardised theta-delta matrix indicates that indicators are statistically significantly plagued by measurement error when the indicators convey absolute z-values greater than 1.6449[118]. The unstandardised theta-delta matrix indicates for the Wessels-Van der Westhuizen trainer-instructor performance measurement model showed that all (30) indicators (i.e., item parcels) were statistically significantly plagued by measurement error (z-values > 1.6449). Therefore, all the theta-delta variance null hypotheses H_{0i}: $\theta_{\delta jj} = 0$; i =33, 34,..., 63; j=1, 2.....30 weres rejected in favour of H_{ai}: $\theta_{\delta jj} > 0$; i =33, 34,..., 63; j=1, 2.....30.

Table 4.66

Unstandardised theta-delta matrix

	LM_1	LM_2	IPV_1	IPV_2	LC_1	LC_2
LM_1	.078 (.014) 5.431					
LM_2	- -	.161 (.010) 15.593				
IPV_1	- -	- -	.066 (.011) 6.142			
IPV_2	- -	- -	- -	.110 (.010) 10.662		
LC_1	- -	- -	- -	- -	.235 (.011) 21.198	
LC_2	- -	- -	- -	- -	- -	.210 (.010) 21.907

	LC_3	LC_4	LC_5	SLM_1	SLM_2	TL_1
LC_3	.200 (.008) 23.942					
LC_4	- -	.350 (.014) 25.803				
LC_5	- -	- -	.297 (.013) 23.647			
SLM_1	- -	- -	- -	.158 (.012) 13.050		
SLM_2	- -	- -	- -	- -	.188 (.014) 13.806	
TL_1	- -	- -	- -	- -	- -	.249 (.012) 21.375

[118] The alternative hypotheses H_{ai}: $\theta_{\delta jj} > 0$; i =33, 34,..., 63; j =1, 2.....30 were formulated as directional hypotheses and therefore when testing H_{0i}: $\theta_{\delta jj} = 0$; i =33, 34,..., 63; j =1, 2.....30 one-tailed tests were performed.

	TL_2	TL_3	TL_4	FCU_1	FCU_2	PFFB_1
TL_2	.230 (.011) 21.423					
TL_3	- -	.207 (.010) 20.024				
TL_4	- -	- -	.243 (.011) 22.673			
FCU_1	- -	- -	- -	.176 (.011) 16.458		
FCU_2	- -	- -	- -	- -	.175 (.011) 16.605	
PFFB_1	- -	- -	- -	- -	- -	.157 (.010) 15.326

	PFFB_2	LLLC_1	LLLC_2	EXP_1	EXP_2	EI_1
PFFB_2	.120 (.009) 13.580					
LLLC_1	- -	.317 (.017) 18.236				
LLLC_2	- -	- -	.298 (.016) 18.162			
EXP_1	- -	- -	- -	.231 (.011) 20.847		
EXP_2	- -	- -	- -	- -	.188 (.014) 13.796	
EI_1	- -	- -	- -	- -	- -	.525 (.019) 27.821

	EI_2	EI_3	RES_1	RES_2	RES_3	RES_4
EI_2	.226 (.013) 16.996					
EI_3	- -	.229 (.015) 15.402				
RES_1	- -	- -	.435 (.052) 8.360			
RES_2	- -	- -	.273 (.042) 6.440	400 (.053) 7.496		
RES_3	- -	- -	.112 (.030) 3.808	- -	.453 (.069) 6.529	
RES_4	- -	- -	- -	.069 (.030) 2.291	.241 (.058) 4.198	.358 (.069) 5.195

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, FacilCU refers to *facilitating clarity and understanding*, ProFormF refers to *providing formative feedback*, LLLCap refers to *lifelong learning trainer-instructor capacity*, Exprt refers to *trainer-instructor expert*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.
LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *trainer-instructor transformational leadership*, FCU_1

and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*).

Table 4.66 also indicates that all the covariances between the measurement error associates with the four indicator that were used to operationalise the latent interaction effect were statistically significant ($p < .05$). H_{0i}: $\theta_{\delta jp} = 0$; i =64, 65,..., 67; j=1, 2.....30; p=1, 2, …, 30; $j \neq p$ were therefore all rejected in favour of H_{ai}: $\theta_{\delta jp} > 0$; i =64, 65,..., 67; j=1, 2.....30; p=1, 2, …, 30; $j \neq p$.

The completely standardised measurement error variances (i.e., completely standardised theta-delta matrix) is reflected in Table 4.67. This theta-delta matrix reveals percentage of variance in the indicator variable (i.e., item parcel) ascribed to systematic and random measurement error that cannot be explained by the latent variable the indicator variable was designed to reflect. Table 4.67 shows the converse of the squared multiple correlations (R^2) of the indicators as it was shown in Table 4.65. Again LC_4 and EI_1 were flagged as problematic indicators of their respective latent variables given that more variance is explained by measurement error than what is explained by the latent variable these indicators were designed to reflect. Table 4.67 also shows the correlations between the measurement error terms of the indicator variables used to operationalise the latent interaction effect. The measurement error terms of those indicator variables, involved in an interaction effect and that have the same original indicator variable involved in the product term, were allowed to correlate (Little et al., 2006). Table 4.67 depicts that these, interaction effect indicator error-term correlations were generally quite low.

Table 4.67
Completely standardised theta-delta matrix

	LM_1	LM_2	IPV_1	IPV_2	LC_1	LC_2
LM_1	.116					
LM_2	- -	.337				
IPV_1	- -	- -	.065			
IPV_2	- -	- -	- -	.110		
LC_1	- -	- -	- -	- -	.214	
LC_2	- -	- -	- -	- -	- -	.222

	LC_3	LC_4	LC_5	SLM_1	SLM_2	TL_1
LC_3	.363					
LC_4	- -	.582				
LC_5	- -	- -	.374			
SLM_1	- -	- -	- -	.126		
SLM_2	- -	- -	- -	- -	.157	
TL_1	- -	- -	- -	- -	- -	.205

	TL_2	TL_3	TL_4	FCU_1	FCU_2	PFFB_1
TL_2	.177					
TL_3	- -	.213				
TL_4	- -	- -	.201			
FCU_1	- -	- -	- -	.150		
FCU_2	- -	- -	- -	- -	.154	
PFFB_1	- -	- -	- -	- -	- -	.144

	PFFB_2	LLLC_1	LLLC_2	EXP_1	EXP_2	EI_1
PFFB_2	.130					
LLLC_1	- -	.231				
LLLC_2	- -	- -	.267			
EXP_1	- -	- -	- -	.276		
EXP_2	- -	- -	- -	- -	.162	
EI_1	- -	- -	- -	- -	- -	.527

	EI_2	EI_3	RES_1	RES_2	RES_3	RES_4
EI_2	.179					
EI_3	- -	.160				
RES_1	- -	- -	.397			
RES_2	- -	- -	.252	.374		
RES_3	- -	- -	.096	- -	.359	
RES_4	- -	- -	- -	.060	.194	.290

LM_1 and LM_2 refers to the two item parcels operationalising the *learning motivation* latent variable, IPV_1 and IPV_2 refers to the two item parcels operationalising *inspirational professional vision*, LC_1, LC_2, LC_3, LC_4 and LC_5 refers to the five item parcels operationalising *learning climate*, SLM_1 and SLM_2 refers to the two item parcels operationalising *structure in the learning material*, TL_1, TL_2, TL_3 and TL_4 refers to the four item parcels operationalising *trainer-instructor transformational leadership*, FCU_1 and FCU_2 refers to the two item parcels operationalising *facilitating clarity and understanding*, PFFB_1 and PFFB_2 refers to the two item parcels operationalising *providing formative feedback*, LLLC_1 and LLLC_2 refers to the two item parcels operationalising *lifelong learning trainer-instructor capacity*, EXP_1 and EXP_2 refers to the two item parcels operationalising *trainer-instructor expert*, EI_1, EI_2 and EI_3 refers to the three item parcels operationalising *trainer-instructor emotional intelligence*, and RES_1, RES_2, RES_3 and RES_4 refers to the four item parcels operationalising the interaction effect (between *trainer-instructor expert* and *facilitating clarity and understanding*)

4.6.7 DISCRIMINANT VALIDITY

The 11 latent variables comprising the Wessels-Van der Westhuizen trainer-instructor performance structural model were expected to correlate. The 11 latent variables were conceptualised as 11 qualitatively distinct, although related[119], latent variables they should, still, not correlate excessively high with each other.

According to Table 4.68, the latent variable inter-correlations depicted in a phi matrix, showed that all the inter-latent variables are statistically significant ($p < .05$). Therefore, the phi null hypotheses H_{0i}: $\phi_{kq} = 0$; i=68, 69, …, 122; k=1, 2, …, 11; q=1, 2, …,11; $k \neq q$ could be rejected in favour of the H_{ai}: $\phi_{kq} > 0$; i=68, 69, …, 122; k=1, 2, …, 11; q=1, 2, …, 11; $k \neq q$.

Correlations are seen as excessively high if they exceed a value of .90. Only two of the correlations in the phi matrix exceeded this cut-off, firstly the correlation between *learning climate* and *transformation trainer-instructor leadership*, with a value of .958. This is, however, not surprising since the dimensions in the *transformational trainer-instructor leadership* latent variable are comprised of the latent variables Van der Westhuizen (2015) hypothesised (and found support for) to influence the dimensions of the *learning climate*. Secondly, the correlation between *facilitating clarity and understanding* and *trainer-instructor expert*, with a value of .907. It could be argued that this correction is also not to surprising since part of the ability to clearly and precisely explain concepts in order to promote clarity (i.e., *facilitating clarity and understanding*) is to have the expert

[119] The 11 latent variables were expected to be related in the sense that they were hypothesised to form part of a psychological mechanism that regulate the impact of the trainer-instructor on the learning potential of post-school learners. As such they were causally (directly and/or indirectly) linked to each other.

content and practical knowledge (i.e., trainer-instructor expert) to do so. Furthermore, 19 of the 55 inter-latent variable correlations exceeded .800 but fell below .899. The fact that there are few excessively high correlations between the latent variables does not, however, provide convincing evidence of discriminant validity. It could be possible that latent variables correlate unity in the population whilst correlating less than unity in the sample purely due to sampling error.

To examine this possibility the 95% confidence interval for ϕ_{ij} was calculated using an Excel macro developed by Scientific Software International (Mels, 2010) in all cases where the sample estimate of ϕ_{ij} exceeded .80. Discriminant validity is threatened if the interval includes unity. The 21 95% confidence intervals are shown in Table 4.69. None of them included unity. This commented favourably on the discriminant validity with which the 11 latent variables were operationalised.

The average variance extracted (AVE) was also calculated for the 4 contentious latent variables involved in the correlations exceeding .90. These are indicated in Table 4.70. AVE reflects the average proportion of variance in the indicator variables that is accounted for by the latent variable that the indicator variables were designated to represent (Diamantopoulos and Sigauw, 2000). Farrell (2010) requires that:

- The AVE for each of the latent variables involved in ϕ_{jp} should exceed .50; and
- The AVE for each of the latent variables involved in ϕ_{jp} should exceed ϕ^2_{jp}.

Farrell's (2010) requirements are rooted in the argument that the latent variable should account for more variance in the indicators that represent them than measurement error. Secondly, the argument is that latent variables should account for more variance in the indicator variables that represent them than they account for in each other. Table 4.70 indicates that all four AVE values met Farrell's (2010) first requirement. Table 4.70, read in conjunction with Table 4.68, however, indicates that three of the four AVE values failed his second requirement. *Facilitating clarity and understanding* is the only latent variable that accounts for more variance in its indicators than it accounts for in the latent variable that it correlates high with (*subject matter expert*; ϕ^2_{96}=.823 < AVEFCU=.848). This is acknowledged as a methodological shortcoming.

Table 4.68

Unstandardised phi matrix for the measurement model

	LearnMot	InspProf	LearnCli	StructLM	TransLea	FacilCU	ProFormF	LLLCap	Exprt	EmoIntel	ExprtFCU
LearnMot	1.000										
InspProf	.627 (.020) 31.589	1.000									
LearnCli	.589 (.022) 26.615	.648 (.018) 36.174	1.000								
StructLM	.527 (.023) 23.109	.571 (.020) 28.913	.765 (.013) 57.104	1.000							
TransLea	.567 (.023) 24.443	.659 (.017) 37.685	**.958** (.006) 166.188	.774 (.013) 59.736	1.000						
FacilCU	.552 (.023) 23.711	.581 (.019) 30.301	**.873** (.009) 97.672	**.836** (.011) 78.132	**.886** (.008) 112.264	1.000					
ProFormF	.532 (.023) 23.282	.587 (.019) 30.482	**.839** (.010) 81.787	.737 (.014) 51.632	**.854** (.009) 90.479	**.833** (.011) 77.749	1.000				
LLLCap	.535 (.024) 22.406	.675 (.018) 36.823	**.867** (.010) 83.981	.745 (.015) 50.322	**.894** (.009) 96.094	**.837** (.011) 73.262	**.829** (.013) 66.277	1.000			
Exprt	.574 (.023) 24.557	.594 (.020) 29.509	**.859** (.011) 79.782	.795 (.013) 60.254	**.877** (.010) 90.089	**.907** (.009) 95.934	**.826** (.012) 69.410	**.881** (.011) 81.746	1.000		
EmoIntel	.496 (.024) 20.390	.588 (.020) 29.494	**.861** (.010) 86.578	.724 (.015) 48.388	**.883** (.009) 96.257	**.835** (.011) 77.047	.793 (.013) 62.320	**.866** (.011) 76.129	**.833** (.012) 69.080	1.000	
ExprtFCU	.286 (.032) 8.876	.144 (.032) 4.461	.279 (.037) 7.491	.237 (.036) 6.509	.268 (.038) 6.987	.347 (.043) 8.108	.241 (.038) 6.371	.217 (.039) 5.632	.343 (.044) 7.801	.244 (.037) 6.683	1.000

Table 4.69

95% confidence interval calculated for the ϕ_{ij} estimates in Table 4.68 exceeding .80

ESTIMATE	STANDARD ERROR ESTIMATE	LOWER LIMIT OF 95% CONFIDENCE INTERVAL	UPPER LIMIT OF 95% CONFIDENCE INTERVAL	PHI
.958	.006	.944	.968	$\phi_{5,3}$
.873	.009	.854	.890	$\phi_{6,3}$
.839	.010	.818	.858	$\phi_{7,3}$
.867	.010	.846	.885	$\phi_{8,3}$
.859	.011	.836	.879	$\phi_{9,3}$
.861	.010	.840	.879	$\phi_{10,3}$
.836	.011	.813	.856	$\phi_{6,4}$
.886	.008	.869	.901	$\phi_{6,5}$
.854	.009	.835	.871	$\phi_{7,5}$
.894	.009	.875	.910	$\phi_{8,5}$
.877	.010	.856	.895	$\phi_{9,5}$
.883	.009	.864	.899	$\phi_{10,5}$
.833	.011	.810	.853	$\phi_{7,6}$
.837	.011	.814	.857	$\phi_{8,6}$
.907	.009	.888	.923	$\phi_{9,6}$
.835	.011	.812	.855	$\phi_{10,6}$
.829	.013	.802	.853	$\phi_{8,7}$
.826	.012	.801	.848	$\phi_{9,7}$
.881	.011	.858	.901	$\phi_{9,8}$
.866	.011	.843	.886	$\phi_{10,8}$
.833	.012	.808	.855	$\phi_{10,9}$

Table 4.70

Average variance extracted calculated for the ϕ_{ij} estimates in Table 4.68 exceeding .90

	TransLea	**LearnCli**	**Exprt**	**FacilCU**
λ_1	.892	.886	.851	.922
λ_2	.907	.882	.915	.920
λ_3	.887	.798		
λ_4	.894	.646		
λ_5		.791		
$\theta_{\delta 1}$	.205	.214	.276	.150
$\theta_{\delta 2}$	.177	.222	.162	.154
$\theta_{\delta 3}$	.213	.363		
$\theta_{\delta 4}$	.210	.582		
$\theta_{\delta 5}$		.374		
AVE	.799217722	.64883994	.7809371	.84803678

4.6.8 SUMMARY OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL FIT AND PARAMETER ESTIMATES

Robust maximum likelihood estimation, on the normalised data set, was utilised for fitting the Wessels-Van der Westhuizen trainer-instructor performance measurement model. The results of the overall fit assessment resulted in both the exact fit null hypotheses (H_{01a}: RMSEA = 0) and close fit null hypotheses (H_{01b}: RMSEA $\leq$ .50) being rejected. However, the RMSEA value of .0604 showed reasonably good fit in terms of the, more recent, acceptable critical cut-off value of .06 (Hooper et al., 2008; Hu & Bentler, 1999). Furthermore, the rest of the fit statistics produced by LISREL 8.8 also suggested at least reasonable fit in the sample. Inspection of the standardised variance and covariance residuals and the modification indices calculated for Λ^X and Θ_δ corroborated this conclusion. In addition, a power analysis performed via the Preacher and Coffman (2006) software indicated extreme high statistical power even if parametric RMSEA values of .06 and .055 are assumed. This strengthened the current study's position that reasonable fit in the parameter is a reasonable position to hold. As a result, it was concluded that the Wessels-Van der Westhuizen trainer-instructor performance measurement model parameter estimates may be regarded as valid and thus that their interpretation was warranted.

Interpretation of the measurement model parameter estimates indicated that:

- All the factor loading estimates λ_{ij} were statistically significant ($p < .05$) and all the lambda null hypotheses could, therefore, be rejected;
- Only two of the 30 completely standardised factor loading estimates fell below the .71 cut-off (the λ=.646 for LC_4 and λ=.688 for EI_1);
- All the measurement error variance estimates $\Theta_{\delta ii}$ were statistically significant ($p < .05$) and all the theta-delta null hypotheses could, therefore, be rejected;
- Only two of the 30 completely standardised measurement error variance estimates fell above the .50 cut-off (θ_δ=.582 for LC_4 and θ_δ=.527 for EI_1);
- Only two R^2 values for the composite indicators fell below the critical cut-off value of .50 (R^2 = .418 for LC_4 and R^2 = .473 for EI_1);
- All the inter-latent variable correlations ϕ_{jp} were statistically significant ($p < .05$) and all the phi null hypotheses could, therefore, be rejected;
- All but two of the inter-latent variable correlations exceeded .90 (ϕ_{53} = .958 and ϕ_{96} = .907)
- None of the 95% confidence intervals calculated for $\phi_{jp} > .80$ included unity.

The results were interpreted to mean that the operationalisation of the 11 latent variables comprising the trainer-instructor performance structural model through the 30 composite indicator variables generally succeeded. The specific composite indicator variables (i.e., item parcels) generally successfully reflected the specific latent variables that they were designed to reflect.

There was some concern, however, about the success with which LC_4 represented the *learning climate* latent variable (completely standardised lambda λ=.646; squared multiple correlation R^2 = .418) and the success with which EI_1 represented the *trainer-instructor emotional intelligence* latent variable (completely standardised lambda λ=.686; squared multiple correlation R^2 = .473). There was also some concern about the success with which the Wessels-Van der Westhuizen Trainer-instructor

Performance Questionnaire succeeded in discriminating between *transformational trainer-instructor leadership* and *learning climate* and between *subject matter expert* and *facilitating clarity and understanding*.

There appears to be sufficient evidence to conclude that the operationalisation of the latent variables in the reduced Wessels-Van der Westhuizen trainer-instructor performance measurement model was adequately successful. Therefore, further analysis of the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model was allowed with the aim of investigating the relationship between the latent variables.

4.7 EVALUATION OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE STRUCTURAL MODEL

The Wessels-Van der Westhuizen trainer-instructor performance structural model hypothesised specific relationships between specific latent variables (Vieira, 2011) in an attempt to explain how the trainer-instructor impacts on the learning potential of post-school learners. When examining and evaluating the structural part of the comprehensive LISREL model the focus was on these substantive relationships of interest (i.e., the hypothesised structural linkages between the various endogenous and exogenous latent variables in the structural model). The aim was to determine whether the theoretical relationships defined in the research are supported by the data (Diamantopoulos & Siguaw, 2000). The structural model on its own could, however, not be empirically evaluated. The comprehensive LISREL model, comprising the measurement and the structural model, had to be empirically confronted with data.

4.7.1 EXAMINING THE FIT OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL A)

LISREL 8.8 was used to evaluate the fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model. Robust maximum likelihood estimation method was used to produce the estimates.

4.7.1.1 Assessing the overall goodness of fit for the comprehensive LISREL model (Model A)

An acceptable final solution of parameter estimates for the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model (Model A) was obtained after 27 iterations.

Table 4.71 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model A).

Table 4.71

Goodness of fit statistics for the comprehensive trainer-instructor performance LISREL model (Model A)

Goodness of Fit Statistics
Degrees of Freedom = 384
Minimum Fit Function Chi-Square = 3801.728 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 4194.497 (P = .0)
Satorra-Bentler Scaled Chi-Square = 3604.739 (P = .0)
Chi-Square Corrected for Non-Normality = 2664.050 (P = .0)
Estimated Non-centrality Parameter (NCP) = 3220.739
90 Percent Confidence Interval for NCP = (3032.161 ; 3416.662)
Minimum Fit Function Value = 2.212
Population Discrepancy Function Value (F0) = 1.874
90 Percent Confidence Interval for F0 = (1.764 ; 1.988)
Root Mean Square Error of Approximation (RMSEA) = .0699
90 Percent Confidence Interval for RMSEA = (.0678 ; .0719)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 2.191
90 Percent Confidence Interval for ECVI = (2.082 ; 2.305)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3766.739
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 4289.195
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .984
Non-Normed Fit Index (NNFI) = .984
Parsimony Normed Fit Index (PNFI) = .869
Comparative Fit Index (CFI) = .986
Incremental Fit Index (IFI) = .986
Relative Fit Index (RFI) = .982
Critical N (CN) = 216.258
Root Mean Square Residual (RMR) = .0373
Standardized RMR = .0381
Goodness of Fit Index (GFI) = .860
Adjusted Goodness of Fit Index (AGFI) = .831
Parsimony Goodness of Fit Index (PGFI) = .710

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (3604.739; $p < .05$). The exact fit null hypothesis (H_{0123a}: RMSEA = 0) is therefore rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011). The comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model

A) was not able to reproduce the observed covariance matrix to a degree of accuracy that could be explained in terms of sampling error alone.

The RMSEA value of .0699 indicated a reasonable model fit in the sample. The the close fit null hypothesis (H_{0123b}: RMSEA $\leq$ .50) had to be rejected ($p < .05$). The probability of obtaining a sample RMSEA value of .0699 if the parametric RMSEA value had been .05 is sufficiently small to warrant the the position that although the comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model A), shows reasonable fit in the sample, it does not show close fit in the parameter.

In evaluating the finding that both the exact and close fit null hypotheses had to be rejected the statistical power of the close fit null hypothesis test was again considered. Software developed by Preacher and Coffman (2006) in R was used to calculate the statistical power associated with the test of close fit under three effect size assumptions. The probability of rejection H_0: RMSEA=.05| H_a: RMSEA=.08) was 1. The probability of rejection H_0: RMSEA=.05| H_a: RMSEA=.06) was also 1. When lowering the parametric RMSEA value assumed under H_a further to .055 the statistical power still remained a high .9867. In Figure 4.9 the statistical power of the test of close fit is displayed as a function of sample size when assuming a significance level of .05 and an effect size of RMSEA=.06.

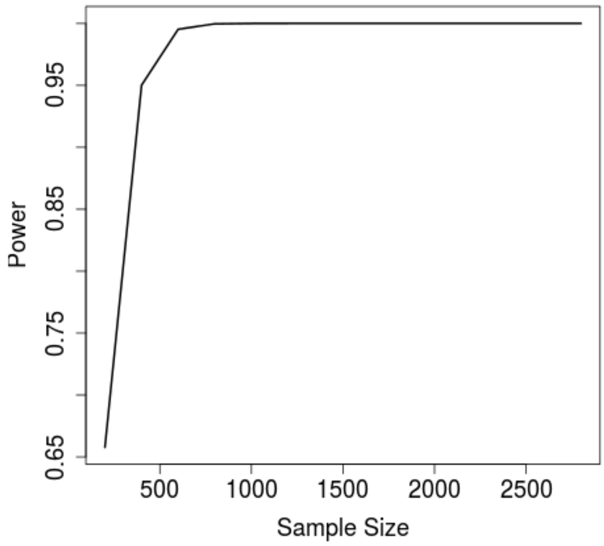

***Figure 4.9.* Statistical power of the test of close fit of the comprehensive LISREL model (Model A) assuming a parametric RMSEA of .06.**

Although the current study, therefore, can reasonably safely rule out a parametric RMSEA value .05, a parametric RMSEA value indication reasonable model fit (i.e., RMSEA.06) can definitely not be ruled out. The remaining fit statistics also indicate reasonable model fit in the sample. It would, therefore, be an injudicious decision to reject the comprehensive LISREL model because the close fit null hypothesis had been rejected.

In considering the question whether structural model parameter estimates warranted interpretation the measurement model fit (RMSEA=.0604) in comparison to the fit of the comprehensive LISREL model (RMSEA=.0699) was also considered. The RMSEA only deteriorated by .0095 by imposing the structural model constraints on the measurement model which allowed all latent variables to be correlated. This small decrease comments favourably on the validity of the structural model parameter estimates[120].

The foregoing line of reasoning meant that the interpretation of the structural model parameter estimates was warranted. Interpretation of the structural model parameter estimates obtained for Model A was nonetheless not undertaken in a somewhat optimistic attempt to achieve close fit. It is acknowledged that this was a somewhat contentious methodological decision. It could be argued that these data-driven alterations should have been presented and discussed as data-driven suggestions for future research. As a result, the modification indices calculated by LISREL were inspected to investigate if any of the currently fixed paths should be freed in an attempt to improve the fit of the model.

4.7.1.2 Adjustments to the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model A)

According to Theron (2017), modification indices with values greater than 6.64 indicated that the current fixed parameters would improve the fit of the model significantly ($p < .01$) if freed. The full array of beta and gamma modification indices for the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model A) are depicted in Table 4.72 and 4.73 respectively.

Table 4.72

Modification indices for beta matrix (Model A)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	- -	- -	- -	- -	- -
InspProf	6.044	- -	- -	19.811	- -	18.181	- -	.086
LearnCli	11.713	- -	- -	9.196	- -	10.893	4.168	17.252
StructLM	16.171	19.795	2.481	- -	1.631	0.924	- -	- -
TransLea	1.111	11.696	.693	20.282	- -	15.675	.977	40.337
ProFormF	.386	2.874	40.315	28.841	27.936	- -	- -	60.568
Exprt	18.183	.000	15.002	7.250	5.090	4.663	- -	19.724
FacilCU	9.903	4.795	**64.484**	4.804	59.576	- -	24.693	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

[120] This line of reasoning is based on the fact that the structural model is nested within the measurement model. The danger is that a well-fitting measurement model can result in a reasonably well-fitting comprehensive LISREL model while masking a poor fitting structural model (Vandenberg & Grelle, 2009).

Table 4.73

Modification indices for gamma matrix (Model A)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	37.744
InspProf	- -	.087	3.438
LearnCli	1.140	1.430	3.361
StructLM	.037	.035	- -
TransLea	- -	- -	.616
ProFormF	2.133	7.007	.479
Exprt	- -	.275	40.817
FacilCU	37.024	**49.985**	44.592

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Inspection of Table 4.72 (beta) and Table 4.73 (gamma), the parameter with the highest modification index value (64.484) was β_{83} representing the path from *learning climate* to *facilitating clarity and understanding.* The critical question, however, was whether the proposed direct causal path makes sense practically and theoretically. If it does not, this path should not be considered as a possible modification to Model A.

The classroom, with its unique atmosphere or climate, has an important influence on the interpersonal and educational development of a student (Pierce, 1994). It can be argued that the classroom or *learning climate* then also influences a trainees' understanding of the learning content in terms of educational development. Classroom learning climate had been conceptualised as a multidimensional construct comprising the dimensions of *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *interest and involvement*, and *autonomy*. More specifically therefore, if a classroom learning climate is characterised by a high standing on these dimensions it probably developed due to the trainer-instructor historically having demonstrated emotional and academic support to help the trainees master the learning material, allowed students autonomy, treated students fairly, created a safe learning environment, allowed students involvement (Joe, Hiver, & Al-Hoorie, 2017; Patrick et al., 2007). Climate, like culture, is the residue of historical trainer-instructor behaviour. *Facilitating clarity and understanding* is a trainer-instructor competency. Achieving competence on this competency requires conditions that make students are receptive to the trainer-instructors attempts to *facilitating clarity and understanding.* In terms of *psychological safety and fairness*, a classroom climate can facilitate learning, through ensuring structure, well developed lesson plans, providing security, being caring and providing a non-threatening atmosphere (Blanton, as cited in Van der Westhuizen, 2015; Chory-Assad, 2002; Patrick et al., 2011; Pierce, 1994; Urdan & Schoenfelder, 2006). Thus, *psychological safety and fairness* leads to the trainer-instructor being more organised in how he/she presents his/her class and more readily allowing students to ask questions which leads to further explaining the learning content more clearly (i.e., facilitating clarity and understanding). Creating involvement and interest in the learning climate can lead to the trainer-instructor now communicating more clearly in a non-verbal way, by expressing enthusiasm for example (i.e., facilitating clarity and understanding). When there is a collaborative relationship between the lecturer and the adult learner it fosters motivation and the development of autonomy in adult learners (Botha & Coetzee, 2016). The path from *learning climate* to *facilitating clarity and understanding* thus made theoretical sense.

Besides the theoretical support for the addition of this path, the direction of the completely standardised expected change (positive) was in the appropriate direction and the magnitude of the completely standardised expected change[121] (.180) was also substantial enough, albeit small, to warrant the addition of this path. Therefore, the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model was expanded into Model B to now include an additional path from *learning climate* to *facilitating clarity and understanding*.

Additionally, in order to improve the fit of the current comprehensive reduced Wessels-van der Westhuizen trainer-instructor performance LISREL model (Model A), the removal of existing path(s) that are not statistically significant were considered. For this purpose, the unstandardised beta matrix (see Table 4.74) and the unstandardised gamma matrix (see Table.4.75) were consulted.

Table 4.74

Unstandardised beta matrix (Model A)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.419 (.030) 14.170	.130 (.051) 2.539	- -	- -	.197 (.047) 4.241	- -	- -
InspProf	- -	- -	- -	- -	.669 (.023) 29.309	- -	- -	- -
LearnCli	- -	.007 (.019) .367	- -	- -	.958 (.020) 47.582	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.342 (.043) 7.949	.536 (.042) 12.801
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	- -	- -	- -	- -	.960 (.022) 43.614	- -
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	- -	- -	- -	.921 (.017) 55.400	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

[121] The completely standardised expected change is the expected completely standardised value of the beta or gamma estimates. In other words, the completely standardised expected change shows the (expected) mean change in eta_i (expressed in standard deviation units) associated with 1 standard deviation increase in eta_j or ksi_j.

Table 4.75

Unstandardised gamma matrix (Model A)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.037 (.017) -2.192
TransLea	.840 (.045) 18.664	.128 0.044) 2.904	- -
ProFormF	- -	- -	- -
Exprt	.975 (.022) 43.672	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Analysis of the beta matrix (see Table 4.74) indicated that all, apart from one, of the paths were statistically significant ($p < .05$) with absolute z-values greater than 1.6449. The path from *inspiring profession vision* to *learning climate* was not statistically significant ($p > .05$) with a z-value of .367 (< .1.6449).

Analysis of the gamma matrix (see Table 4.75) indicated the all of the paths were statistically significant ($p > .05$) with absolute z-values greater than 1.6449. However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was not positive, as was theorised. This path was statistically significant ($p < .05$) but with a negative z-value - 2.192 (< .1.664).

After considering the results of the unstandardised beta matrix (see Table 4.74) and the unstandardised gamma matrix (see Table 4.75) it was decided to not delete these two paths since, (a) deleting these two paths would alter the overall structural model and the established structural relations, (b) the modification indices were calculated for a structural model containing these two paths, and (c) these the inclusion of these two paths are based on theoretical support found in literature[122].

Consequently, the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model, now including an additional path from *learning climate* to *facilitating clarity and understanding* and with no paths removed, was fitted again as Model B.

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[122] The argument that lead to the hypothesis that the latent *trainer-instructor expert*facilitating clarity and understanding* interaction effect would positively influence *structure in the learning material* was based on the assumption that the subject matter expert would be better able to assist the learner in finding meaningful structure in the learning material. The negative value obtained for β_{43}, however, suggests that the novice is better able to assist learners in creating meaningful structure in learning material. This position resonates with Mazur's (2014) plea for greater peer involvement in ensuring more effective learning.

4.7.2 EXAMINING THE FIT OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL B)

4.7.2.1 Assessing the overall goodness of fit for the comprehensive LISREL model (Model B)

An acceptable final solution of parameter estimates for the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model B) was obtained after 21 iterations.

Table 4.76 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model B).

Table 4.76

Goodness of fit statistics for the comprehensive trainer-instructor performance LISREL model (Model B)

Goodness of Fit Statistics
Degrees of Freedom = 383
Minimum Fit Function Chi-Square = 3471.140 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 3828.554 (P = .0)
Satorra-Bentler Scaled Chi-Square = 3297.137 (P = .0)
Chi-Square Corrected for Non-Normality = 2548.662 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2914.137
90 Percent Confidence Interval for NCP = (2734.423 ; 3101.213)
Minimum Fit Function Value = 2.019
Population Discrepancy Function Value (F0) = 1.695
90 Percent Confidence Interval for F0 = (1.591 ; 1.804)
Root Mean Square Error of Approximation (RMSEA) = .0665
90 Percent Confidence Interval for RMSEA = (.0644 ; .0686)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 2.013
90 Percent Confidence Interval for ECVI = (1.909 ; 2.122)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3461.137
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3990.043
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .985
Non-Normed Fit Index (NNFI) = .985
Parsimony Normed Fit Index (PNFI) = .867
Comparative Fit Index (CFI) = .987
Incremental Fit Index (IFI) = .987
Relative Fit Index (RFI) = .983
Critical N (CN) = 235.775
Root Mean Square Residual (RMR) = .0352

Standardized RMR = .0369
Goodness of Fit Index (GFI) = .871
Adjusted Goodness of Fit Index (AGFI) = .843
Parsimony Goodness of Fit Index (PGFI) = .717

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (3297.137[123]; $p < .05$). The exact fit null hypothesis (H_{0123a}: RMSEA = 0[124]) is therefore, again, rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011).

The RMSEA value of .0665[125] indicated a reasonable model fit in the sample. The the close fit null hypothesis (H_{0123b}: RMSEA $\leq .50$) again, had to be rejected ($p < .05$). Although the comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model B) showed reasonable fit in the sample, it did not show close fit in the parameter. The position that the comprehensive LISREL model fitted reasonably in the parameter was a tenable position though. Although the interpretation of the structural model parameter estimates were therefore warranted their interpretation was nonetheless further delayed in the hope that close fit could still be achieved. As a result, the modification indices calculated by LISREL were again inspected to investigate if any of the currently fixed paths should be freed in an attempt to improve the fit of the model.

4.7.2.2 Adjustments to the structural model (Model B)

According to Theron (2017), modification indices with values greater than 6.64 indicated that the current fixed parameters would improve the fit of the model significantly ($p < .05$) if freed. The full array of beta and gamma modification indices for the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model B) are depicted in Table 4.77 and 4.78 respectively.

Table 4.77
Modification indices for beta matrix (Model B)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	- -	- -	- -	- -	- -
InspProf	7.684	- -	- -	20.071	- -	4.906	- -	.348
LearnCli	8.824	- -	- -	.862	- -	4.973	5.955	5.981
StructLM	14.474	16.285	.042	- -	.044	.426	- -	- -
TransLea	2.171	11.489	.876	1.092	- -	32.314	1.262	9.180
ProFormF	.935	6.700	29.441	2.596	31.603	- -	- -	5.330
Exprt	24.438	.000	18.068	8.558	6.191	25.416	- -	33.247
FacilCU	3.377	0.256	- -	3.375	3.092	- -	**40.352**	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

[123] This presented a decrease from the previous Satorra-Bentler chi-square value of 3604.739. Moreover, the decrease in the Satorra-Bentler chi-square was statistically significant ($p < .05$) given a scaled difference test statistic of 170.9732129 (Satorra and Bentler, 2001).
[124] It is acknowledged that, strictly speaking, the exact fit null hypothesis being tested here is not the same as H_{0123a} due to the elaboration of the structural model.
[125] This was a decrease from the previous RMSEA value of .0699.

Table 4.78

Modification indices for gamma matrix (Model B)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	39.210
InspProf	- -	.330	3.810
LearnCli	1.742	2.756	13.333
StructLM	.245	.392	- -
TransLea	- -	- -	.354
ProFormF	4.749	13.110	1.175
Exprt	- -	.040	33.170
FacilCU	22.260	20.226	**48.183**

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

According to Table 4.77 (beta), the parameter with the highest modification index value (40.352) was β_{87} representing the path from *trainer-instructor expert* to *facilitating clarity and understanding.* According to Table 4.78 (gamma), the parameter with the highest modification index value (48.183) was γ_{83} representing the path from *trainer-instructor expert*facilitating clarity and understanding* to *facilitating clarity and understanding*. Although the gamma matrix produced that highest modification indices value this path does not make theoretical sense. *Facilitating clarity and understanding* cannot have a moderating effect on the relationship between *trainer-instructor expert* and *facilitating clarity and understanding*. As a result, it was considered to, rather, add the additional path from *trainer-instructor expert* to *facilitating clarity and understanding* in order to significantly improve the fit of the model. The critical question, however, is whether the proposed path makes sense practically and theoretically. If it does not, this path should not be considered as a possible modification.

A trainer-instructor expert is trainer-instructor that has an extensive knowledge base and deep understanding of the specific subject he/she teaches, and that has a vast knowledge and understanding of the learning and the teaching processes and which teaching methods are appropriate and ethically justifiable. Therefore, when a trainer-instructor has extensive knowledge of a specific subject that trainer-instructor will be able to better explain that subject or content (e.g., utilise illustrations and examples) in such a manner that is understandable to others or enhances others' understanding of the subject or content (i.e., facilitating clarity and understanding) (Krauss et al., 2008; Shulman, 1986). In other words, a trainer-instructor can create or present lectures that are easy to outline, that are well organised and explained well (i.e., facilitating clarity and understanding) when that trainer-instructor is an expert on the content and practical knowledge (i.e., trainer-instructor expert). The path from *trainer-instructor expert* to *facilitating clarity and understanding* thus makes theoretical sense.

Besides the theoretical support for the addition of this path, the magnitude of the completely standardised expected change (.162) is also substantial enough, albeit small, and the sign (i.e., positive) in the appropriate direction to support the addition of this path. Therefore, the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model, was extended to also include an additional path from *trainer-instructor expert* to *facilitating clarity and understanding*.

Additionally, in order to improve the fit of the current reduced Wessels-van der Westhuizen trainer-instructor performance structural model (Model B), the removal of existing path(s) that are not statistically significant were considered. For this purpose, the unstandardised beta matrix (see Table 4.79) and the unstandardised gamma matrix (see Table 4.80) were consulted.

Table 4.79

Unstandardised beta matrix (Model B)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.421 (.029) 14.277	.220 (.043) 5.082	- -	- -	.108 (.036) 3.016	- -	- -
InspProf	- -	- -	- -	- -	.669 (.023) 29.301	- -	- -	- -
LearnCli	- -	-.001 (.018) **-.051**	- -	- -	.970 (.020) 49.306	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.308 (.038) 8.110	.574 (.037) 15.467
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	- -	- -	- -	- -	.892 (.21) 42.610	
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.607 (.028) 21.919	- -	- -	.349 (.027) 13.018	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.80

Unstandardised gamma matrix (Model B)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.038 (.017) **-2.215**
TransLea	.790 (.044) 18.045	.179 (.043) 4.148	- -
ProFormF	- -	- -	- -
Exprt	.969 (.022) 43.702	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Analysis of the beta matrix (see Table 4.79) indicated that all, apart from one, of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. Specifically, the newly added path from learning climate to facilitating clarity and understanding was statistically significant ($p < .05$). The path from *inspiring profession vision* to *learning climate* was, again, not statistically significant ($p < .05$). Not only was this path again not statistically significant ($p < .05$) the z-value decreased and also became negative z-value -0.051 (< .1.6449).

Analysis of the gamma matrix (see Table 4.80) indicated the all of the paths were still statistically significant ($p > .05$) with z-values greater than 1.6449. However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was, again, not positive, as was theorised. This path was statistically significant ($p < .05$) with a negative z-value -2.215 (< .1.6449).

After considering the results of the unstandardised beta matrix (see Table 4.79) and the unstandardised gamma matrix (see Table 4.80) it was decided to, again, not delete these two paths since, (a) deleting these two paths would alter the overall structural model and the established structural relations, (b) the modification indices were calculated for a structural model containing these two paths, and (c) these the inclusion of these two paths are based on theoretical support found in literature.

Consequently, the comprehensive reduced Wessels-Van der Westhuizen trainer-instructor performance LISREL model, now including an additional path from *trainer-instructor expert* to *facilitating clarity and understanding* and with no paths removed, was fitted again as Model C.

4.7.3 EXAMINING THE FIT OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL C)

4.7.3.1 Assessing the overall goodness of fit for the comprehensive LISREL model (Model C)

An acceptable final solution of parameter estimates for the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model C) was obtained after 23 iterations.

Table 4.81 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model C).

Table 4.81

Goodness of fit statistics for the comprehensive trainer-instructor performance LISREL model (Model C)

Goodness of Fit Statistics
Degrees of Freedom = 382
Minimum Fit Function Chi-Square = 3270.697 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 3580.111 (P = .0)
Satorra-Bentler Scaled Chi-Square = 3083.734 (P = .0)
Chi-Square Corrected for Non-Normality = 2479.449 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2701.734
90 Percent Confidence Interval for NCP = (2528.430 ; 2882.419)
Minimum Fit Function Value = 1.903
Population Discrepancy Function Value (F0) = 1.572
90 Percent Confidence Interval for F0 = (1.471 ; 1.677)
Root Mean Square Error of Approximation (RMSEA) = .0641
90 Percent Confidence Interval for RMSEA = (.0621 ; .0663)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 1.890
90 Percent Confidence Interval for ECVI = (1.790 ; 1.996)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3249.734
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3785.091
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .986
Non-Normed Fit Index (NNFI) = .986
Parsimony Normed Fit Index (PNFI) = .866
Comparative Fit Index (CFI) = .988
Incremental Fit Index (IFI) = .988
Relative Fit Index (RFI) = .984
Critical N (CN) = 251.418
Root Mean Square Residual (RMR) = .0336
Standardized RMR = .0354
Goodness of Fit Index (GFI) = .878
Adjusted Goodness of Fit Index (AGFI) = .852
Parsimony Goodness of Fit Index (PGFI) = .721

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (3083.734[126]; $p < .05$). The exact fit null hypothesis (H_{0123a}: RMSEA = 0) was therefore, again, rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011).

The RMSEA value of .0641[127] indicated a reasonable model fit in the sample. The the close fit null hypothesis (H_{0123b}: RMSEA $\leq$ .50) again, had to be rejected ($p < .05$). Although the comprehensive

[126] This presented a decrease from the previous Satorra-Bentler chi-square value of 3297.137. Moreover, the decrease in the Satorra-Bentler chi-square was statistically significant ($p < .05$) given a scaled difference test statistic of 207.9125826 (Satorra and Bentler, 2001).

[127] This was a decrease from the previous RMSEA value of .0665.

Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model C), although it showed reasonable fit in the sample, the position that it fitted closely in the parameter was not a tenable position. The position that the model fitted reasonably in the parameter was found to be a tenable position. Although the interpretation of the parameter estimates were therefore warranted the interpretation of the structural model parameter estimates were postponed in the hope that close fit could still be achieved. As a result, the modification indices calculated by LISREL were inspected to investigate if any of the currently fixed paths should be freed in an attempt to improve the fit of the model.

4.7.3.2 Adjustments to the structural model (Model C)

According to Theron (2017), modification indices with values greater than 6.64 indicated that the current fixed parameters would improve the fit of the model significantly ($p < .05$) if freed.

The full array of beta and gamma modification indices for the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model C) are depicted in Table 4.82 and 4.83 respectively.

Table 4.82

Modification indices for beta matrix (Model C)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	- -	- -	- -	- -	- -
InspProf	5.224	- -	- -	20.524	- -	4.883	- -	.022
LearnCli	5.323	- -	- -	2.066	- -	11.334	3.575	1.688
StructLM	16.722	19.032	1.186	- -	.766	.301	- -	- -
TransLea	3.952	11.418	.506	4.679	- -	43.108	1.584	1.986
ProFormF	.515	10.062	**46.969**	1.945	39.622	- -	- -	3.750
Exprt	24.981	.061	11.817	.062	4.809	36.769	- -	2.753
FacilCU	1.144	2.623	- -	.702	.001	- -	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.83

Modification indices for gamma matrix (Model C)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	41.275
InspProf	- -	.014	3.589
LearnCli	.767	1.667	5.730
StructLM	.000	.107	- -
TransLea	- -	- -	.497
ProFormF	8.044	11.858	6.095
Exprt	- -	.019	**49.111**
FacilCU	.267	.403	26.278

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

According to Table 4.82 (beta), the parameter with the highest modification index value (46.969) was β_{63} representing the path from *learning climate* to *providing formative feedback.* According to Table

4.83 (gamma), the parameter with the highest modification index value (49.111) was γ_{73} representing the path from *trainer-instructor expert*facilitating clarity and understanding* to *trainer-instructor expert*. Although the gamma matrix produced that highest modification indices value this path does not make theoretical sense. As a result, it was considered to, rather, add the additional path from *learning climate* to *providing formative feedback* in order to significantly improve the fit of the model. The critical question, however, is whether the proposed path makes sense practically and theoretically. If it does not, this path should not be considered as a possible modification.

The classroom, with its unique atmosphere or climate, has an important influence on the interpersonal and educational development of a student (Pierce, 1994). It can be argued that the classroom or learning climate then also influence the way a trainer-instructor provides formative feedback or influence the way trainees perceive formative feedback. Trainer-instructor support (both emotional and academic) involves the trainer-instructor taking a personal interest in his/her trainees in terms of caring about their trainees wanting to help them (Fraser, 1987; Patrick et al., 2007; Trickett & Moos, 1973). A way of helping their trainees, in terms of facilitating learning, is to provide formative feedback (Blanco-Blanco, 2013; Mubuuke, 2012). Thus, providing formative feedback is influenced by a learning climate that contains teacher support. The psychological safety component (in psychosocial safety and fairness) pertains to the challenge of human change, which occurs during any learning, training and/or development programme (Rimm-Kaufman, 2016). It can be argued that one such challenge of human change could be receiving feedback since feedback requires the receiver to make adjustments and changes to their learning. Stated differently, when the classroom allows for psychological safety trainees will be more willing to change or will feel safe enough to change and develop. They will also be more willing to receive feedback. This, in turn, will make it easier for the trainer-instructor (through a psychological safe learning climate) to provide formative feedback. This same argument can be applied to interest and involvement. In that, when the trainer-instructor creates a learning climate that induces interest and involvement the trainee will be engaged or stimulated enough to be open to receiving feedback. Which, in turn, makes it easier for the trainer-instructor to provide formative feedback. This same argument can also be applied to autonomy. In that, when the trainer-instructor creates a learning climate that enhanced autonomy the trainee will feel empowered or motivated enough to take responsibility for their own learning and development which should make them open to receiving feedback. Which, in turn, makes it easier for the trainer-instructor to provide formative feedback. The fairness component (in psychological safety and fairness) denotes respect and equal treatment for all learner, in that the trainer-instructors does not display any form of bias against any individual or group of learners (Blanton, as cited in Van der Westhuizen, 2015). Additionally, formative feedback showing respect for diversity and individuality (in terms of the trainee's work rather than the trainee self) increased learning (Rust et al., 2003; Shute, 2008). Providing formative feedback, in this case, is thus influenced by learning climate that includes psychological safety and fairness. Providing formative feedback that makes trainees aware of the purpose for and the use of the information when receiving it will increase learning (Rust et al., 2003; Shute, 2008). Providing formative feedback, in this case, is thus influenced by learning climate that includes interest and involvement. The path from *learning climate* to *providing formative feedback* thus makes theoretical sense.

Besides the theoretical support for the addition of this path, the magnitude of the completely standardised expected change (.207) was also substantial enough, albeit slightly small, and the sign (i.e., positive) in the appropriate direction to support the addition of this path. Therefore, the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model, now including an additional path from *learning climate* to *providing formative feedback*, was fitted.

Additionally, in order to improve the fit of the current reduced comprehensive Wessels-van der Westhuizen trainer-instructor performance LISREL model (Model C), the removal of existing path(s) that are not statistically significant should be consulted. For this purpose, the unstandardised beta matrix (see Table 4.84) and the unstandardised gamma matrix (see Table 4.85) were consulted.

Table 4.84

Unstandardised beta matrix (Model C)

	LearnMot	**InspProf**	**LearnCli**	**StructLM**	**TransLea**	**ProFormF**	**Exprt**	**FacilCU**
LearnMot	- -	.423 (.029) 14.335	.220 (.042) 5.288	- -	- -	.107 (.034) 3.150	- -	- -
InspProf	- -	- -	- -	- -	.668 (.023) 29.289	- -	- -	- -
LearnCli	- -	.005 (.019) **.277**	- -	- -	.959 (.020) 47.382	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.309 (.070) 4.393	.562 (.070) 8.084
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	- -	- -	- -	- -	.886 (.021) 42.430	
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.214 (.043) 4.963	- -	- -	.015 (.044) **.329**	.727 (.071) 10.218	

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.85

Unstandardised gamma matrix (Model C)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.042 (.017) **-2.441**
TransLea	.822 (.046) 17.789	.144 (.045) 3.181	- -
ProFormF	- -	- -	- -
Exprt	.965 (.022) 43.751	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Analysis of the beta matrix (see Table 4.84) indicated the all, apart from two, of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. The newly added path from *subject matter expert* to *facilitating clarity and understanding* was statistically significant ($p < .05$). The path from *inspiring profession vision* to *learning climate* was, again, not statistically significant ($p > .05$). The other path that was not statistically significant anymore was the path from *providing formative feedback* to *facilitating clarity and understanding* (z-value .329 < 1.6449). The addition of *subject matter expert* as a determinant of *facilitating clarity and understanding* to the model, therefore, had the effect that *providing formative feedback* no longer explained unique variance in *facilitating clarity and understanding* not explained by *subject matter expert* or *learning climate*.

Analysis of the gamma matrix (see Table 4.85) indicated the all of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was, again, not positive, as was theorised. This path was statistically significant ($p < .05$) with a negative z-value -2.441 (< 1.6449).

After considering the results of the unstandardised beta matrix (see Table 4.84) and the unstandardised gamma matrix (see Table 4.85) it was decided to not delete these three paths since, (a) deleting these three paths would alter the overall structural model and the established structural relations, (b) the modification indices were calculated for a structural model containing these three paths, and (c) these the inclusion of these three paths are based on theoretical support found in literature.

Consequently, the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model, now including an additional path from *learning climate* to *providing formative feedback*, and with no paths removed, was fitted again as Model D.

4.7.4 EXAMINING THE FIT OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL D)

4.7.4.1 Assessing the overall goodness of fit for the comprehensive LISREL model (Model D)

An acceptable final solution of parameter estimates for the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model D) was obtained after 21 iterations.

Table 4.86 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model D).

Table 4.86
Goodness of fit statistics for the comprehensive trainer-instructor performance LISREL model (Model D)

Goodness of Fit Statistics
Degrees of Freedom = 381
Minimum Fit Function Chi-Square = 3132.593 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 3433.477 (P = .0)
Satorra-Bentler Scaled Chi-Square = 2952.524 (P = .0)
Chi-Square Corrected for Non-Normality = 2339.287 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2571.524
90 Percent Confidence Interval for NCP = (2402.270 ; 2748.168)
Minimum Fit Function Value = 1.822
Population Discrepancy Function Value (F0) = 1.496
90 Percent Confidence Interval for F0 = (1.397 ; 1.599)
Root Mean Square Error of Approximation (RMSEA) = .0627
90 Percent Confidence Interval for RMSEA = (.0606 ; .0648)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 1.815
90 Percent Confidence Interval for ECVI = (1.717 ; 1.918)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3120.524
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3662.331
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .987
Non-Normed Fit Index (NNFI) = .987
Parsimony Normed Fit Index (PNFI) = .864

Comparative Fit Index (CFI) = .988
Incremental Fit Index (IFI) = .988
Relative Fit Index (RFI) = .985

Critical N (CN) = 261.915

Root Mean Square Residual (RMR) = .0336
Standardized RMR = .0354
Goodness of Fit Index (GFI) = .882
Adjusted Goodness of Fit Index (AGFI) = .857
Parsimony Goodness of Fit Index (PGFI) = .723

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (2952.524[128]; $p < .05$). The exact fit null hypothesis (H_{0123a}: RMSEA = 0) is therefore, again, rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011).

The RMSEA value of .0627[129] indicated a reasonable model fit in the sample. The the close fit null hypothesis (H_{0123b}: RMSEA $\leq .50$), again, had to be rejected ($p < .05$). Although the comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model D) showed reasonable fit in the sample, it still did not show close fit in the parameter. The position that the model fitted reasonably in the parameter though seemed to be a tenable position to hold. Although interpretation of the structural model parameter estimates were warranted interpretation of the structural model parameter estimates were nonetheless yet again postponed in the hope of attaining a close fitting model. As a result, the modification indices calculated by LISREL were inspected to investigate if any of the currently fixed paths should be freed in an attempt to improve the fit of the model.

4.7.4.2 Adjustments to the structural model (Model D)

The full array of beta and gamma modification indices for the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model D) are depicted in Table 4.87 and 4.88 respectively.

Table 4.87
Modification indices for beta matrix (Model D)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	**65.086**	- -	- -	- -	- -
InspProf	13.717	- -	- -	19.808	- -	4.161	12.339	.173
LearnCli	2.823	- -	- -	.031	- -	5.375	1.163	.162
StructLM	18.810	24.163	5.192	- -	4.726	3.938	- -	- -
TransLea	4.573	11.987	.280	5.236	- -	.189	2.748	.611
ProFormF	1.418	1.999	- -	1.208	2.437	- -	- -	- -
Exprt	28.014	.107	5.537	1.664	4.148	2.959	- -	.613
FacilCU	1.229	1.205	- -	3.367	.219	- -	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF

[128] This presented a decrease from the previous Satorra-Bentler chi-square value of 3083.734. The decrease in the Satorra-Bentler chi-square was statistically significant ($p < .05$) given a scaled difference test statistic of 344.2973372 (Satorra and Bentler, 2001).
[129] This presented a decrease from the previous RMSEA value of .0641.

refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.88

Modification indices for gamma matrix (Model D)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	40.058
InspProf	- -	.000	3.428
LearnCli	.306	2.370	7.297
StructLM	1.672	.964	- -
TransLea	- -	- -	.191
ProFormF	3.851	5.346	2.596
Exprt	- -	.825	**55.275**
FacilCU	.024	2.585	26.963

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

According to Table 4.87 (beta), the parameter with the highest modification index value (65.086) was β_{14} for the path from *structure in the learning material* to *learning motivation.* According to Table 4.88 (gamma), the parameter with the highest modification index value (55.275) was, again, γ_{73} for the path from *trainer-instructor expert*facilitating clarity and understanding* to *trainer-instructor expert*. Thus, the modification indices suggested that the addition of a path from *structure in the learning material* and *learning motivation* improve the fit of the model since the highest value in the beta matrix (65.086) was higher than the highest value in the gamma matrix (55.275). The critical question, however, is whether the proposed path makes sense practically and theoretically. If it does not, this path should not be considered as a possible modification.

If the trainee him-/herself experiences the feeling that something is making sense, that they can put together different parts of information and combine new information with current information, deep learning occurs. In other words, if the trainees can create a meaningful structure within which the constituent parts of the learning material are meaningfully integrated (Van der Westhuizen, 2015) they will be able to learn more. It can be said that once they make sense of their work, once they find structure, they can more easily add new information and they can more easily compare all information. This will lead to trainees being more comfortable with learning which could also lead to being motivated to learn more. The path from *structure in the learning material* to *learning motivation* thus makes theoretical sense.

Besides the theoretical support for the addition of this path, the magnitude of the completely standardised expected change (.677) was also substantial enough and the sign (i.e., positive) in the appropriate direction to support the addition of this path. Therefore, the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model, now included an additional path from *structure in the learning material* to *learning motivation*.

Additionally, in order to improve the fit of the current reduced comprehensive Wessels-van der Westhuizen trainer-instructor performance LISREL model (Model D), the removal of existing path(s) that were not statistically significant were considered. For this purpose, the unstandardised beta matrix (see Table 4.89) and the unstandardised gamma matrix (see Table 4.90) were consulted.

Table 4.89

Unstandardised beta matrix (Model D)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.424 (.030) 14.282	.226 (.054) 4.212	- -	- -	.095 (.046) 2.055	- -	- -
InspProf	- -	- -	- -	- -	.668 (.023) 29.261	- -	- -	- -
LearnCli	- -	.009 (.019) **.465**	- -	- -	.960 (.020) 48.221	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.216 (.060) 3.623	.658 (.059) 11.173
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	.498 (.039) 12.882	- -	- -	- -	.413 (.039) 10.534	
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.345 (.038) 9.072	- -	- -	.101 (.035) 2.856	.530 (.040) 13.388	

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.90

Unstandardised gamma matrix (Model D)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.046 (.017) **-2.713**
TransLea	.731 (.045) 16.301	.231 (.044) 5.196	- -
ProFormF	- -	- -	- -
Exprt	.933 (.022) 42.631	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Analysis of the beta matrix (see Table 4.89) indicated the all, apart from one, of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. The newly added path from *learning climate* to *providing formative feedback* was statistically significant (p < .05). The path from *inspiring profession vision* to *learning climate* was, again, not statistically significant (p > .05).

Analysis of the gamma matrix (see Table 4.90) indicated the all of the paths were statistically significant (p < .05) with z-values greater than 1.6449. However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was, again, not positive, as was theorised. This path was statistically significant (p < .05) with a negative z-value -2.713 (< 1.6449).

After considering the results of the unstandardised beta matrix (see Table 4.89) and the unstandardised gamma matrix (see Table 4.90) it was decided to not delete these two paths since, (a) deleting these two paths would alter the overall structural model and the established structural relations, (b) the modification indices were calculated for a structural model containing these two paths, and (c) these the inclusion of these two paths are based on theoretical support found in literature.

Consequently, the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model, now including an additional path from *structure in the learning material* to *learning motivation,* and with no paths removed, was fitted again as Model E.

4.7.5 EXAMINING THE FIT OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL E)

4.7.5.1 Assessing the overall goodness of fit for the comprehensive LISREL model (Model E)

An acceptable final solution of parameter estimates for the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model E) was obtained after 21 iterations.

Table 4.91 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model E).

Table 4.91

Goodness of fit statistics for the comprehensive trainer-instructor performance LISREL model (Model E)

Degrees of Freedom = 380
Minimum Fit Function Chi-Square = 3120.947 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 3420.644 (P = .0)
Satorra-Bentler Scaled Chi-Square = 2939.542 (P = .0)

Chi-Square Corrected for Non-Normality = 2332.281 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2559.542
90 Percent Confidence Interval for NCP = (2390.677 ; 2735.794)

Minimum Fit Function Value = 1.816
Population Discrepancy Function Value (F0) = 1.489
90 Percent Confidence Interval for F0 = (1.391 ; 1.592)
Root Mean Square Error of Approximation (RMSEA) = .0626
90 Percent Confidence Interval for RMSEA = (.0605 ; .0647)
P-Value for Test of Close Fit (RMSEA < .05) = .000

Expected Cross-Validation Index (ECVI) = 1.809
90 Percent Confidence Interval for ECVI = (1.711 ; 1.911)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301

Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3109.542
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3657.799
Saturated CAIC = 3929.287

Normed Fit Index (NFI) = .987
Non-Normed Fit Index (NNFI) = .987
Parsimony Normed Fit Index (PNFI) = .862
Comparative Fit Index (CFI) = .989
Incremental Fit Index (IFI) = .989
Relative Fit Index (RFI) = .985

Critical N (CN) = 262.433

Root Mean Square Residual (RMR) = .0333
Standardized RMR = .0351
Goodness of Fit Index (GFI) = .883
Adjusted Goodness of Fit Index (AGFI) = .857
Parsimony Goodness of Fit Index (PGFI) = .721

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (2939.542[130]; $p < .05$). The exact fit null hypothesis (H_{0123a}: RMSEA = 0) is therefore, again, rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011).

The RMSEA value of .0626[131] indicated a reasonable model fit in the sample. The the close fit null hypothesis (H_{0123b}: RMSEA $\leq$ .50) again, had to be rejected ($p < .05$). Although the comprehensiveWessels-Van der Westhuizen trainer-instructor performance LISREL model (Model E) showed reasonable fit in the sample, the probability of obtaining such sample fit under the close fit null hypothesis was still too small to allow not rejecting the close fit null hypothesis in the parameter. The position that the model fitted reasonably in the parameter was, however, a tenable position to hold. Although this permitted the interpretation of the structural model parameter

[130] This presented a slight decrease from the previous Satorra-Bentler chi-square value of 2952.524. The decrease in the Satorra-Bentler chi-square was again statistically significant ($p < .05$) given a substantially more modest scaled difference test statistic of 14.74614076 (Satorra and Bentler, 2001).

[131] This was again a slight decrease from the previous RMSEA value of .0627.

estimates the estimates were nonetheless not interpreted but a further attempt was rather made to attain close fit. As a result, the modification indices calculated by LISREL were inspected to investigate if any of the currently fixed paths should be freed in an attempt to improve the fit of the model.

4.7.5.2 Adjustments to the structural model (Model E)

The full array of beta and gamma modification indices for the Wessels-Van der Westhuizen trainer-instructor performance structural model (Model E) are depicted in Table 4.92 and 4.93 respectively.

Table 4.92

Modification indices for beta matrix (Model E)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	- -	- -	- -	- -	- -
InspProf	17.655	- -	- -	19.187	- -	4.158	12.045	.124
LearnCli	4.633	- -	- -	.008	- -	5.467	1.007	.212
StructLM	7.279	23.466	4.755	- -	4.399	3.740	- -	- -
TransLea	1.426	11.915	.269	5.216	- -	.201	2.740	.636
ProFormF	.051	2.013	- -	1.186	2.405	- -	- -	- -
Exprt	18.393	.123	5.302	1.477	4.122	3.003	- -	.575
FacilCU	.186	1.276	- -	3.107	.232	- -	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.93

Modification indices for gamma matrix (Model E)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	39.238
InspProf	- -	.000	3.383
LearnCli	.278	2.389	6.780
StructLM	1.479	.841	- -
TransLea	- -	- -	.175
ProFormF	3.859	5.338	2.642
Exprt	- -	.845	55.462
FacilCU	.023	2.603	27.116

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

According to Table 4.92 (beta), the parameter with the highest modification index value (23.466) was β_{42} for the path from *inspiring professional vision* to *structure in the learning material.* According to Table 4.93 (gamma), the parameter with the highest modification index value (55.462) was, again γ_{73}, for the path from *trainer-instructor expert*facilitating clarity and understanding* to *facilitating clarity and understanding*. However, this path did not make theoretical sense. As a result, the parameter with the second highest value in the gamma matrix (γ_{13}; 39.238), a path between *trainer-instructor expert*facilitating clarity and understanding* and *learning motivation*, was considered to be added as an additional path. The critical question, however, is whether makes practical and theoretical sense to propose that *subject matter expert* should moderate the effect of *facilitating clarity and understanding* on *learning motivation*. If it does not, this path should not be considered as a possible modification.

Failing to achieve a goal is experienced as frustrating and demotivating. Failing to make sense of learning material should then inhibit *learning motivation*. Conversely, it could, therefore, be expected that when a trainer-instructor *facilitates clarity and understanding* this should enhance *learning motivation*. Table 4.92, however, indicates that adding such a path will not statistically significantly ($p < .01$) improve the fit of the model. Table 4.92 suggests that *facilitates clarity and understanding* this should enhance *learning motivation* provided that the trainer-instructor is a *subject matter expert*. When the trainer-instructor has expert content knowledge of a specific subject or field then that trainer-instructor will have many stories to tell and many examples to give. These stories and examples might inspire trainees to learn, to be like the people in the stories or to know as much as the trainer-instructor knows. Furthermore, this relationship can be enhanced (i.e., moderated) by the trainer-instructor's ability to clearly explain these stories and examples (i.e., facilitating clarity and understanding). The path from *trainer-instructor expert*facilitating clarity and understanding* and *learning motivation* thus makes theoretical sense.

Besides the theoretical support for the addition of this path the magnitude of the completely standardised expected change (.147) is also substantial enough, albeit small, and the sign (i.e., positive) in the appropriate direction to support the addition of this path. Therefore, the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model, now including an additional path from *trainer-instructor expert*facilitating clarity and understanding* to *learning motivation*, was fitted.

Additionally, in order to improve the fit of the current reduced comprehensive Wessels-van der Westhuizen trainer-instructor performance LISREL model (Model E), the removal of existing path(s) that are not statistically significant were consulted. For this purpose, the unstandardised beta matrix (see Table 4.94) and the unstandardised gamma matrix (see Table 4.95) were consulted.

Table 4.94

Unstandardised beta matrix (Model E)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.417 (.030) 14.078	.165 (.058) 2.858	.121 (.035) 3.422	- -	.060 (.046) **1.299**	- -	- -
InspProf	- -	- -	- -	- -	.668 (.023) 29.259	- -	- -	- -
LearnCli	- -	.009 (.019) **.473**	- -	- -	.960 (.020) 48.239	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.218 (.060) 3.657	.656 (.059) 11.122
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	.500 (.039) 12.932	- -	- -	- -	.412 (.039) 10.511	
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.343 (.038) 9.018	- -	- -	.101 (.035) 2.841	.532 (.040) 13.445	

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.95

Unstandardised gamma matrix (Model E)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.043 (.017) **-2.595**
TransLea	.730 (.045) 16.284	.232 (.044) 5.207	- -
ProFormF	- -	- -	- -
Exprt	.933 (.022) 42.627	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Analysis of the beta matrix (see Table 4.94) indicated the all, apart from two, of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. The newly added path from *structure in the learning material* to *learning motivation* was statistically significant ($p < .05$). The path from *inspiring profession vision* to *learning climate* was, again, not statistically significant ($p <$ .05). Additionally, the path from *providing formative feedback* to *learning motivation* was not statistically significant anymore z-value 1.299 (< 1.6449). The addition of *structure in the learning material* as a determinant of learning motivation to the model meant that the unique variance that *providing formative feedback* explained in *learning motivation*, that was not explained by *inspirational professional vision*, *learning climate* and *structure in the learning material* was no longer statistically significant ($p > .05$).

Analysis of the gamma matrix (see Table 4.95) indicated the all of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was, again, not positive, as was theorised. This path was statistically significant ($p < .05$) with a negative z-value -2.595 (< -1.6449).

After considering the results of the unstandardised beta matrix (see Table 4.94) and the unstandardised gamma matrix (see Table 4.94) it was decided to not delete these three paths since, (a) deleting these three paths would alter the overall structural model and the established structural relations, (b) the modification indices were calculated for a structural model containing these three paths, and (c) these the inclusion of these three paths are based on theoretical support found in literature.

Consequently, the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model, now including an additional path from *trainer-instructor expert*facilitating clarity and understanding* to *learning motivation*, and with no paths removed, was fitted again as Model F.

4.7.6 EXAMINING THE FIT OF THE FINAL COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL (MODEL F)

After fitting Model F it became apparent that the model fit only improved very slightly. Thus, an argument was put forth whether it would be feasible to continue freeing parameter estimates purely to improve the model fit incrementally. After examining the modification indices associated with Model F, it was discovered that only the freeing of the parameter with the third highest modification index value made theoretical sense and that such modification would only have a marginal effect on the model fit[132]. It was, therefore, decided not to attempt further elaboration on the already reasonably fitting model fit. As a result, Model F represented the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model.

[132] For a more detailed discussion of the medication indices for Model F consult section 4.7.6.4.

4.7.6.1 Assessing the overall goodness of fit for the final compressive LISREL model (Model F)

LISREL 8.8 was used to evaluate the fit of the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F). Robust maximum likelihood estimation method was used to produce the estimates. An acceptable final solution of parameter estimates for the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F) was obtained after 20 iterations.

Table 4.96 depicts the full array of fit statistics calculated by LISREL to assess the absolute and comparative fit of the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F). The completely standardised solution obtained for the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F) is depicted in Figure 4.10.

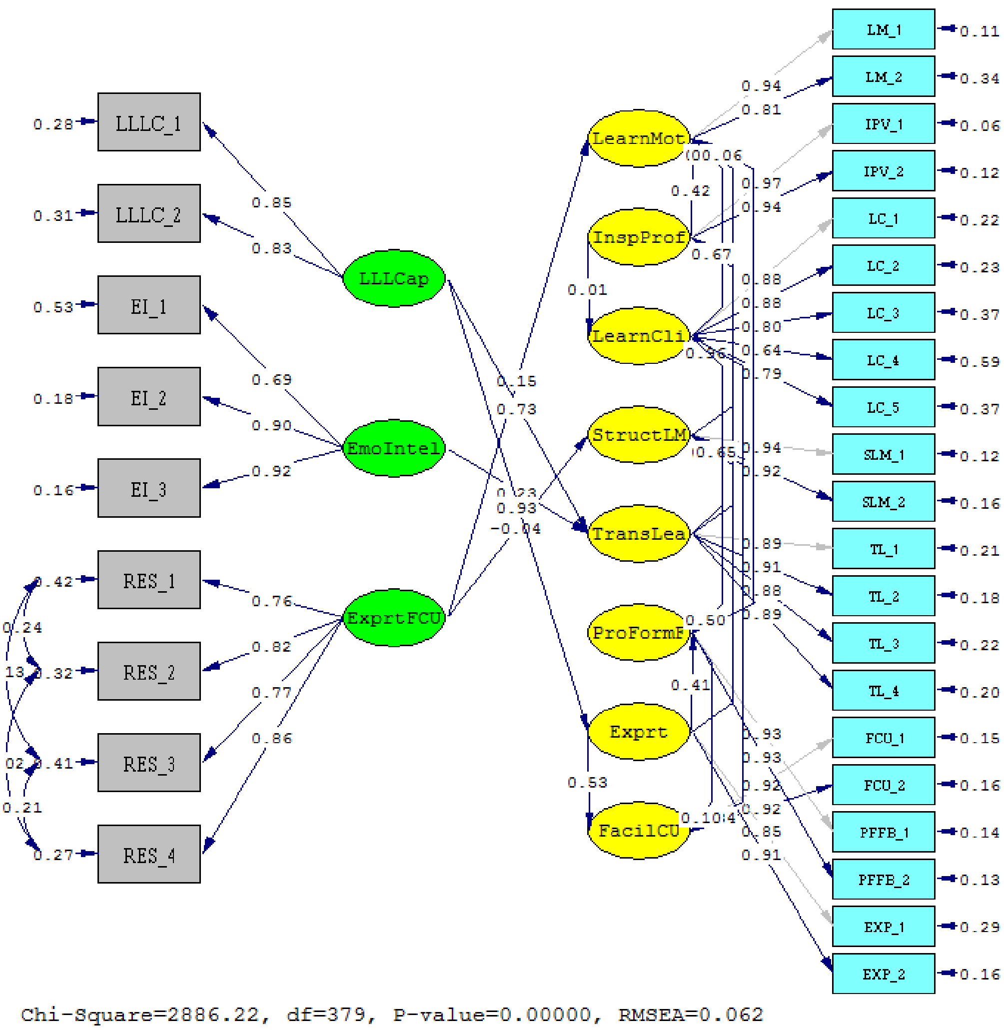

Figure 4.10. **Representation of the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (completely standardised solution) (Model F)**

Table 4.96

Goodness of fit statistics for the final comprehensive trainer-instructor performance LISREL model (Model F)

Goodness of Fit Statistics
Degrees of Freedom = 379
Minimum Fit Function Chi-Square = 3078.513 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 3354.624 (P = .0)
Satorra-Bentler Scaled Chi-Square = 2886.225 (P = .0)
Chi-Square Corrected for Non-Normality = 2320.257 (P = .0)
Estimated Non-centrality Parameter (NCP) = 2507.225
90 Percent Confidence Interval for NCP = (2340.031 ; 2681.813)
Minimum Fit Function Value = 1.791
Population Discrepancy Function Value (F0) = 1.459
90 Percent Confidence Interval for F0 = (1.361 ; 1.560)
Root Mean Square Error of Approximation (RMSEA) = .0620
90 Percent Confidence Interval for RMSEA = (.0599 ; .0642)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 1.779
90 Percent Confidence Interval for ECVI = (1.682 ; 1.881)
ECVI for Saturated Model = .541
ECVI for Independence Model = 130.301
Chi-Square for Independence Model with 435 Degrees of Freedom = 223927.101
Independence AIC = 223987.101
Model AIC = 3058.225
Saturated AIC = 930.000
Independence CAIC = 224180.603
Model CAIC = 3612.932
Saturated CAIC = 3929.287
Normed Fit Index (NFI) = .987
Non-Normed Fit Index (NNFI) = .987
Parsimony Normed Fit Index (PNFI) = .860
Comparative Fit Index (CFI) = .989
Incremental Fit Index (IFI) = .989
Relative Fit Index (RFI) = .985
Critical N (CN) = 266.622
Root Mean Square Residual (RMR) = .0320
Standardized RMR = .0328
Goodness of Fit Index (GFI) = .885
Adjusted Goodness of Fit Index (AGFI) = .859
Parsimony Goodness of Fit Index (PGFI) = .721

The Satorra-Bentler chi-square (χ^2), calculated in terms of the robust maximum likelihood estimation procedure, delivered a statistically significant value (2886.225[133]; $p < .05$). A significant χ^2 denoted that the model does not fit exactly in the parameter. The exact fit null hypothesis (H_{0123a}: RMSEA = 0) was therefore rejected ($p < .05$) (Hooper et al., 2008; Vieira, 2011). What this implies is that the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F) was not able to reproduce the observed covariance matrix to a degree of accuracy that

[133] This presented yet again a decrease from the previous Satorra-Bentler chi-square value of 2939.542. The decrease in the Satorra-Bentler chi-square was again statistically significant ($p < .05$) given a scaled difference test statistic of 39.16060538 (Satorra and Bentler, 2001).

could be explained in terms of sampling error alone. In other words, the differences in the two matrices (observed covariance matrix and reproduced or fitted matrix) is not due to sampling error, but due to real differences between the two matrices in the population.

The RMSEA value of .0620 indicated reasonably good model fit in the sample. The 90 percent confidence interval for RMSEA shown in Table 4.96 (.0599; .0642) indicated that the fit of the model could be regarded as reasonably good since the lower bound of the 90 percent confidence interval fell just marginally above the critical cut-off value of .05 (Spangenberg & Theron, 2005). Although the upper bound of the interval fell above .05 (Spangenberg & Theron, 2005) it did fall below the critical value of .08 denoting mediocre fit (Kenny, 2015). According to Kenny (2015), the lower value of the 90 percent confidence interval should ideally include or be close to zero, but no worse than .05, and the upper value should not be very large or larger than .08. The close fit null hypothesis (H_{0123b}: RMSEA $\leq$ .50), had to be rejected ($p < .05$). The final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F) did not show close fit in the parameter but it did show reasonably good fit in the sample. Moreover, the position that the model fitted reasonable in the parameter was regarded as a tenable position.

The expected cross-validation index (ECVI) focuses on the discrepancy between the reproduced covariance matrix (Σ^), derived from fitting the model on the analysed sample, and the expected covariance matrix that would be obtained in an unrelated sample of equal size, but from the same population (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The ECVI focuses on overall error and is consequently a valuable indicator of a model's overall fit (Diamantopoulos & Siguaw, 2000). To assess the ECVI of the comprehensive LISREL model, the model's ECVI must be compared to the independent model and the saturated model. The final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model's (Model F) ECVI (1.779) was smaller than the ECVI for independence model (130.301) and larger than the ECVI for saturated model (.541). A model more closely resembling the saturated model appears to have a better chance of being replicated in a cross-validation sample than the independence or fitted model (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005).

The Akaike information criterion (AIC) and consistent version of AIC (CAIC) is a comparative measure of fit and thus only meaningful when two different models are estimated (Kenny, 2015; Van der Westhuizen, 2015). These, AIC and CAIC, statistics are commonly used when comparing non-nested or non-hierarchical models estimated on similar data and it indicates to the researcher which of the models is the most parsimonious or stringent (Hooper et al., 2008). The assessment of parsimonious fit recognises that model fit can always be improved by (a) adding more paths to the model and (b) estimating more parameters until perfect fit is achieved. Perfect fit is found in the form of a saturated or just-identified model with no degrees of freedom (Kelloway, 1998; Spangenberg & Theron, 2005). To assess the AIC of the comprehensive LISRELmodel, the model's AIC was compared to the independent model and the saturated model. The value for the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model's (Model F) AIC (3058.225) was smaller than the independence AIC (223987.101) and larger than the saturated AIC (930.000). This again suggests that the fitted model provided a more parsimonious fit than the independent/null model, but not the saturated model (Kelloway, 1998; Spangenberg & Theron, 2005). To assess the CAIC of the measurement model, the model's CAIC was compared to the independent model and the saturated model. The values for the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model's (Model F) CAIC (3612.932) was smaller than the independence AIC (224180.603) and smaller than the saturated AIC (3929.287). Therefore, a model more closely resembling the fitted model seems to have a better chance of being replicated in a cross-validation sample than the independence and the saturated models.

The various incremental fit indices, as reported by LISREL, are also presented in Table 4.96. The incremental fit indices include: (a) the normed fit index[134] (NFI=.987), (b) the non-normed fit index[135] (NNFI=.987), (c) the comparative fit index[136] (CFI=.989), (d) the incremental fit index (IFI=.989) and (e) the relative fit index (RFI=.985). Cut-off criteria for all of the preceding incremental fit indices is a value above .90 for good model fit (Hu & Bentler, 1999; Kelloway, 1998; Spangenberg & Theron, 2005; Vieira, 2011) or above .95 for a more ambitious model fit (Hooper et al., 2008). All of the aforementioned indices exceeded both the critical value of .90 as well as the more ambitious critical value of .95. This indicated good comparative fit relative to the independence model.

The critical sample size statistic, or the Critical N, (CN) denotes the size of the sample that would have made the obtained minimum fit function chi-square (χ^2) statistic just significant at the .05 (5%) significant level (Spangenberg & Theron, 2005). The estimated CN value (266.622) fell well above the recommended minimum value of 200 (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). This implies that the model offered a sufficient representation of the data.

The root mean square residual (RMR) and the standardised root mean square residual (SRMR) reflects the mean squared difference between the sample covariance matrix and the reproduced or

[134] The normed Fit Index (NFI) assesses the model fit by comparing the χ^2 value of the model to the χ^2 of the null model. The null or independence model is the worst-case scenario (i.e., worst model fit) since it specifies that all measured variables are uncorrelated (Hooper et al., 2008).
[135] The non-normed fit index (NNFI) demonstrates how much better the model fits, compared to a bassline model (normally the null model) and adjusted for the degrees of freedom. It can sometimes yield values greater than one (Vieira, 2011).
[136] The comparative fit index (CFI) demonstrates how much better the model fits, compared to a bassline model (normally the null model) and adjusted for the degrees of freedom (Vieira, 2011).

hypothesised covariance matrix derived from the fitted comprehensive LISREL model (Hooper et al., 2008). The range of the RMR is calculated based upon the scales of each indicator variable (i.e., item parcel). This makes the index sensitive to the unit of measurement of the model variables and, as a result, it becomes difficult to interpret or determine what a low score is (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). This problem is resolved by the standardised RMR (SRMR) which makes it more meaningful to interpret (Hooper et al., 2008). The SRMR is an absolute measure of model fit. It is defined as the standardised difference between the observed correlation and the predicted correlation (Kenny, 2015). The RMR (.0320) and the SRMR (.0328) indicated good fit as values less than .05 suggests the model fits the data well (Kelloway, 1998; Spangenberg & Theron, 2005). In terms of SRMR, generally, values less than .08 are considered a good fit (Hu & Bentler, 1999; Kenny, 2015).

The goodness of fit index (GFI), the adjusted goodness of fit index (AGFI) and the parsimony goodness of fit index (PGFI) all show the success with which the reproduced sample covariance matrix recovered the observed sample covariance matrix (Diamantopoulos & Siguaw, 2000; Spangenberg & Theron, 2005). The GFI was created to calculate the proportion of variance that is accounted for by the estimated population covariance and it determines how closely the model comes to replicating the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). The GFI and AGFI measures should be between zero and unity (i.e., 1) and have values exceeding .90 to indicate good fit to the data (Hooper et al., 2008; Kelloway, 1998; Spangenberg & Theron, 2005). Recommendations for GFI cut-off values are .90. When factor loadings and samples sizes are low or small, a cut-off value of .95 is required (Hooper et al., 2008). Related to the GFI is the adjusted goodness of fit statistic (AGFI). The AGFI is, in essence, the GFI, but adjusted for the degrees of freedom (Hooper et al., 2008; Vieira, 2011). These indices favour more parsimonious models, but they get penalised for model complexity (Hooper et al., 2008). Furthermore, GFI and AGFI tend to be affected by the size of the sample (Hooper et al., 2008; Kenny, 2015). Evaluating the fit of the model in terms of these two indices, both GFI (.885) and AGFI (.859) showed good model fit.

Having an almost saturated, complex model entails that the estimation process is dependent on the sample data. This results in a less meticulous theoretical model that paradoxically generates better fit indices. Thus, to overcome this problem two parsimony of fit indices, namely the Parsimony goodness of fit index (PGFI) and the Parsimonious normed fit index (PNFI), was developed (Hooper et al., 2008). The PGFI is, in essence, the GFI, but adjusted for the degrees of freedom. The PNFI also adjusts for degrees of freedom, however, it is based on the NFI (Hooper et al., 2008). The PGFI and the PNFI recognise that model fit can be improved by adding paths to the model and by estimating more parameters until perfect fit is achieved. Perfect fit being a saturated or just identified model with no degrees of freedom (Kelloway, 1998). The PGFI (.721) and the PNFI (.860) this shows model fit. Both of these indices have a range from 0 to 1 (where higher values indicate a more parsimonious fit). However, neither is likely to reach the .90 cut-off value as used for other indices and there is no recommendation for how high either index should be to indicate parsimonious fit (Hooper, 2008; Kelloway, 1998).

4.7.6.2 Examination of the final comprehensive model residuals (Model F)

Firstly, the large positive and negative standardised residuals resulting from the variance and covariance estimates that originated from the estimated model parameters obtained for the final comprehensive Wessels-Van der Westhuizen trainer-instructor LISREL model (Model F) are shown in Table 4.97. Standardised residuals are z-scores that were interpreted as large if they exceeded +2.58 or –2.58 (Diamantopoulos & Siguaw, 2000). Large positive residuals show that the model underestimated the covariance between two variables and negative residuals show that a model overestimates the covariance between variables (Van der Westhuizen, 2015). According to Table 4.97, there were 55 variance and covariance terms in the observed sample variance-covariance matrix (11.83%) that were substantially underestimated and 22 terms in the observed sample covariance matrix (4.73%) that were substantially overestimated. This can be seen as a somewhat unfavourable comment on the fit of the comprehensive LISREL model. The fact that only 77 extreme residuals, out of 465 (16.56%), were reported is again indicative of reasonably good comprehensive LISREL model fit.

Table 4.97

Summary statistics for the standardised residuals (final comprehensive LISREL model - Model F)

	Values
Summary Statistics for Standardized Residuals	
Smallest Standardized Residual =	-25.488
Median Standardized Residual =	.000
Largest Standardized Residual =	16.232
Largest Negative Standardized Residuals	
Residual for IPV_2 and LM_2	-3.089
Residual for LC_1 and LM_1	-3.868
Residual for LC_1 and IPV_2	-4.674
Residual for LC_2 and IPV_1	-10.549
Residual for LC_2 and IPV_2	-4.785
Residual for SLM_2 and LC_3	-4.855
Residual for TL_1 and LM_1	-7.222
Residual for TL_1 and LC_4	-25.488
Residual for TL_3 and LM_1	-4.775
Residual for FCU_1 and LC_4	-8.453
Residual for FCU_2 and LC_4	-7.663
Residual for PFFB_1 and LC_4	-2.739
Residual for EXP_1 and LC_5	-8.959
Residual for LLLC_1 and LC_4	-3.780
Residual for EI_1 and IPV_1	-2.962
Residual for EI_1 and LLLC_1	-6.806

Residual for EI_2 and LM_1	-3.868
Residual for EI_2 and IPV_1	-5.051
Residual for EI_2 and LC_4	-6.716
Residual for EI_3 and LC_4	-4.354
Residual for RES_2 and LLLC_1	-3.520
Residual for RES_4 and LLLC_2	-2.735
Largest Positive Standardized Residuals	
Residual for LC_2 and LM_2	3.000
Residual for LC_3 and IPV_2	4.423
Residual for LC_4 and LM_1	4.589
Residual for LC_4 and LM_2	6.076
Residual for LC_4 and IPV_1	3.768
Residual for LC_4 and IPV_2	4.198
Residual for LC_4 and LC_3	13.135
Residual for LC_5 and LM_2	2.681
Residual for LC_5 and IPV_1	4.481
Residual for LC_5 and IPV_2	5.849
Residual for LC_5 and LC_4	16.232
Residual for LM_1 and LM_1	4.351
Residual for SLM_1 and IPV_1	4.044
Residual for SLM_1 and IPV_2	3.984
Residual for SLM_2 and LM_1	5.142
Residual for SLM_2 and IPV_1	4.283
Residual for SLM_2 and IPV_2	4.182
Residual for TL_2 and LM_1	3.863
Residual for TL_2 and LM_2	2.589
Residual for TL_4 and IPV_2	16.039
Residual for FCU_2 and LM_1	2.777
Residual for PFFB_1 and LM_1	2.974
Residual for EXP_1 and LM_1	4.413
Residual for EXP_2 and LM_1	2.633
Residual for LLLC_1 and IPV_1	4.840
Residual for LLLC_1 and IPV_2	6.429
Residual for LLLC_1 and LC_5	6.997
Residual for LLLC_2 and IPV_1	6.351
Residual for LLLC_2 and IPV_2	6.279
Residual for LLLC_2 and LC_5	3.566
Residual for EI_1 and LC_1	4.900
Residual for EI_1 and LC_3	3.017
Residual for EI_1 and TL_3	6.041
Residual for EI_1 and FCU_1	4.288
Residual for EI_1 and FCU_2	5.706
Residual for EI_1 and EXP_1	6.584
Residual for EI_1 and EXP_2	6.246
Residual for EI_3 and IPV_2	3.134
Residual for RES_1 and LC_4	2.695
Residual for RES_1 and SLM_1	2.919
Residual for RES_1 and FCU_1	3.951
Residual for RES_1 and FCU_2	2.840
Residual for RES_1 and EXP_1	5.814
Residual for RES_1 and EI_1	3.786
Residual for RES_2 and SLM_1	2.768
Residual for RES_2 and FCU_2	3.414
Residual for RES_2 and EXP_1	5.259
Residual for RES_3 and LC_4	4.035
Residual for RES_3 and FCU_1	3.587
Residual for RES_3 and FCU_2	2.622
Residual for RES_3 and EXP_2	2.906
Residual for RES_3 and EI_1	3.156
Residual for RES_4 and LC_4	3.932
Residual for RES_4 and FCU_2	3.575
Residual for RES_4 and EXP_2	2.592

Thirdly, the stem-and-leaf plot for the final Wessels-Van der Westhuizen trainer-instructor structural model (Model F) is depicted in Figure 4.11. A good fitting model is characterised by a stem-and-leaf plot in which the residuals are distributed approximately evenly around zero. The stem-and-leaf plot appears to be roughly centrally distributed, but somewhat negatively skewed. The estimated model parameters, therefore, tended to underestimate the observed covariance terms more than they tended to overestimate them. This dovetails with the ECVI and AIC findings reported earlier.

```
-24|5
 -22|
 -20|
 -18|
 -16|
 -14|
 -12|
 -10|5
 - 8|05
 - 6|7287
 - 4|198874
 - 2|998510775553322211100
 - 0|999888877765544333321110988888887777655555543332221100000000000000000000000+99
   0|1111122222223444445566666777788990000111112333344444555666666778888889999
   2|001111223334556666677888990001246668899
   4|00002233444568913788
   6|01234460
   8|
  10|
  12|1
  14|
  16|02
```

Figure 4.11. **Stem-and-leaf plot of standardised residuals (final comprehensive model - Model F)**

Thirdly, the Q-plot for the final comprehensive Wessels-Van der Westhuizen trainer-instructor LISREL model (Model F) is depicted in Figure 4.12. The Q-plot shows that the data deviated from the 45- degree reference line. This reflected negatively on the fit of the comprehensive model. The data points rotated away from the 45-degree reference line at the upper end in a positive direction and in the lower end in a negative direction. Thus, the model residuals results appear to suggest that only reasonably satisfactory comprehensive LISREL model fit was achieved.

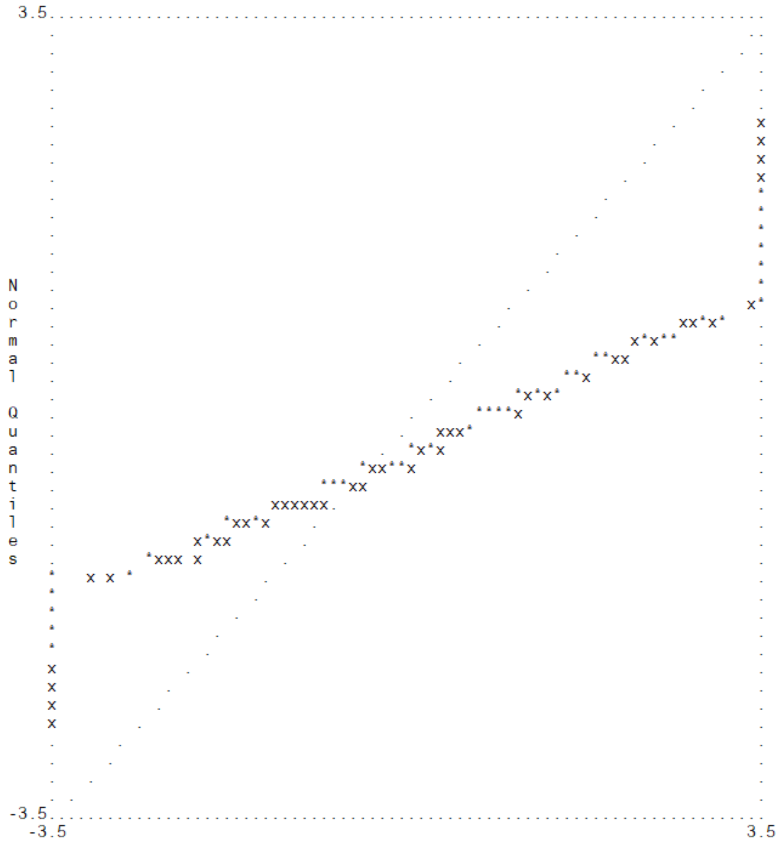

Figure 4.12. **Q-Plot of standardised residuals (final comprehensive model - Model F)**

4.7.6.3 Inferences on structural model fit

Integrating the aforementioned findings on the fit statistics and the number and distribution of large standardised residuals obtained for the comprehensive LISREL model suggested a reasonably fitting model. Previously a review of the corresponding findings on the fit statistics and the number and distribution of large standardised residuals for the measurement model suggested a reasonably fitting measurement model. In combination, these two findings seemingly necessarily imply a reasonably fitting structural model as well. This line of reasoning is rooted in the fact that the composite LISREL model is a composite of the measurement and structural models, that the measurement model is nested in the composite LISREL model[137], that the structural model is nested in the measurement model and that the fit of the composite LISREL model may be decomposed into two fit estimates for the measurement model and the structural model (Vandenberg & Grelle, 2009). This line of reasoning, however, ignores the fact that (Vandenberg & Grelle, 2009, p. 175):

> … it is often the case that the measurement component of latent variable models fits well and contributes a high proportion of the total degrees of freedom (i.e., the total number of

[137] Model A is nested in model B if model A specifies at least one additional parameter to be estimated that is not specified in B. Model A therefore has fewer restrictions (i.e. fixed parameters), freer to-be-estimated parameters and therefore fewer degrees of freedom.

restrictions imposed). In such cases, the result is often a well-fitting composite model that masks a poorly fitting structural component.

Because the measurement model contributes the majority of the degrees of freedom in the comprehensive LISREL model the danger exists that the comprehensive LISREL model may fit well solely because of excellent measurement model fit but despite poor structural model fit model.

To determine whether the relative contribution of the structural model to the fit of the comprehensive model (relative to the contribution of the measurement model), the scaled difference in Satorra-Bentler chi-square values obtained for the comprehensive and the measurement models was firstly calculated (Satorra & Bentler, 2001, p. 511) and the probability of observing this chi-square difference under the null hypothesis of no difference in fit in the parameter was subsequently determined using an Excel macro. The results are shown in Table 4.98.

Table 4.98

Decomposition of the fit of the composite LISREL model into measurement model and structural model fit.

Model	Satorra-Bentler chi-square	Normal theory chi-square	df	Scaled difference in S-B chi-square	p	F_0	RMSEA
Composite LISREL model	2886.225	3354.624	379			1.459	.062045179
Measurement model	2516.577	2939.454	346			1.263	.060417622
Structural model	369.648	415.17	33	376.7380951	5.98291E-60	0.196	.077067464

The RMSEA of the structural model was calculated by subtracting the population discrepancy function value (F_0) of the measurement model from the comprehensive model F_0, dividing the difference by the difference in the degrees of freedom of the two models and taking the square root (Steiger, n.d.). A significant Satorra-Bentler Scaled chi-square difference value (376.7380951; $p < .05$) indicating that the restrictions imposed by the structural model on the measurement model[138] to achieve the composite LISREL model statistically significantly reduced fit. The RMSEA value of .077067464 indicates reasonable model fit approaching mediocrity. In the current study, therefore, the findings of the reasonably well-fitting comprehensive LISREL model to some degree did mask only marginally reasonably fitting structural component due to the dominance of the measurement component in the comprehensive model. Thus, the conclusion was that the restrictions constituting the structural/model are meaningful and interpretable but not altogether convincingly so (Vandenberg

[138] The structural model fixes specific paths that were allowed to correlate in the measurement model to zero. The number of parameters that need to be estimated (t) is therefore lower

& Grelle, 2009). The RMSEA result obtained for the structural model on the sample was therefore interpreted to warrant the interpretation of the structural model parameter estimates even if not very convincingly so.

4.7.6.4 Further assessments of the final structural model (Model F)

The primary objective of the evaluation of the final structural model parameter estimates (Model F) was to determine whether each of the hypothesised path-specific relationships, as theoretically motivated in Chapter 2 and formulated as path-specific statistical hypotheses in Chapter 3, was supported by the data. When evaluating these path-specific hypotheses, four elements were taken into consideration: (a) *the signs* (i.e., positive or negative) of the parameters representing the paths between the latent variables to determine whether the direction of the hypothesised relationships was as theorised and predicted; (b) *the statistical significance* ($p < .05$) of the estimated path coefficient to determine whether the estimate can be generalised to the parameter; (c) *the magnitude* of the estimated parameters to determine the strength of the hypothesised relationships; and (d) *the squared multiple correlations* (R^2) for the structural equations to determine the proportion of variance in each endogenous latent variable that was accounted for by the latent variables that they were designed to impact upon it (Diamantopoulos & Siguaw, 2000).

The unstandardised parameters for the beta (**B**) and gamma (**Γ**) matrices, their standard error and z-values, provide a way to evaluate the causal linkages between the exogenous and endogenous variables[139]. The unstandardised beta matrix, depicted in Table 4.99, describes the slope of the regression of the eight endogenous latent variables in the reduced Wessels-Van der Westhuizen trainer-instructor structural model on the endogenous latent variables that were hypothesised to affect them. These parameters are statistically significant ($p < .05$) if $z > 1.6449$ given the direction nature of the alternative hypotheses (Theron, 2017).

Analysis of the beta matrix (see Table 4.99) indicated the all, apart from two, of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. Therefore H_{0i}: $\beta=0$ were rejected for i=124, 125, 127, 128, 129, 131, 135 and 137 in favour of Hai: $\beta > 0$ i=124, 125, 127, 128, 129, 131, 135 and 137. Therefore, support was found for the following 8 of the original 10 beta hypotheses[140]:

[139] It must, however, be emphasised again that a significant beta or gamma path coefficient estimate does not signify proof of a causal relationship or effect. As discussed in Chapter 2, a limitation of an *ex post facto* research designs is the prevention drawing causal inferences from significant path coefficients (Kerlinger & Lee, 2000).

[140] The β_{ij} estimates should strictly speaking be interpreted as partial regression slope coefficients. They therefore reflect the relative influence of η_j on η_i when controlling for the other η_k and/or ξ_k that have been structurally linked to η_j in the structural model. This firstly implies that the hypothesis being tested is not that η_j has a positive (or negative) influence on η_i but rather that that η_j has a

- ***Hypothesis 2:*** *Inspiring professional vision* (η_2) will positively influence *learning motivation* (η_1) (H_{a124}: $\beta_{12} > 0$).
- ***Hypothesis 3****: Learning climate* (η_3) will positively influence *learning motivation* (η_1) (H_{a125}: $\beta_{13} > 0$).
- ***Hypothesis 5:*** *Transformational trainer-instructor leadership* (η_5) will positively influence *learning climate* (η_3) (H_{a127}: $\beta_{35} > 0$).
- ***Hypothesis 6:*** *Transformational trainer-instructor leadership* (η_5) will positively influence *inspiring professional vision* (η_2) (H_{a128}: $\beta_{25} > 0$).
- ***Hypothesis 7****: Facilitating clarity and understanding* (η_8) will positively influence *structure in the learning material* (η_4) (H_{a129}: $\beta_{48} > 0$).
- ***Hypothesis 9****: Providing formative feedback* (η_6) will positively influence *facilitating clarity and understanding* (η_8) (H_{a131}: $\beta_{86} > 0$[141]).
- ***Hypothesis 13:*** *Trainer-instructor expert* (η_7) will positively influence *structure in the learning material* (η_4) (H_{a135}: $\beta_{47} > 0$).
- ***Hypothesis 15****: Trainer-instructor expert* (η_7) will positively influence *providing formative feedback* (η_6) (H_{a137}: $\beta_{67} > 0$).

The path from *inspiring profession vision* to *learning climate* was not statistically significant ($p > .05$) with a z-value .474 (< 1.6449). The path from *inspiring profession vision* to l*earning climate* was never found to be statistically significant in any of the models. Additionally, the path from *providing formative feedback* to *learning motivation* was not statistically significant z-value 1.185 (< 1.6449). This path was statistically significant in Model A to Model D but became insignificant in Model E with the addition of *structure in the learning material* as an additional determinant of learning motivation. *Providing formative feedback* therefore no longer explained unique variance in *learning motivation* that was not explained by *inspirational professional vision* and *learning climate* when the variance in *learning motivation* that is explained by *structure in the learning material* was also controlled. Given the findings on hypothesis 7 and hypothesis 9 this then means that the effect of *providing formative feedback* on *learning motivation* was not direct but rather mediated by *facilitating clarity and understanding* and *structure in the learning material*. Support was, therefore, not found for the following 2 of the original 10 beta hypotheses:

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positive (or negative) influence on η_i when controlling for η_k and/or ξ_k. This had been acknowledged through the use of the phrase *in the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model it is hypothesised that…* This secondly implied that the hypotheses being tested here are not in all cases the same hypotheses that were originally formulated because of the addition of 5 paths to the model.

[141] Support was not found of this path in Model C only.

- ***Hypothesis 4:*** *Inspiring professional vision* (η_2) will positively influence *learning climate* (η_3) (H_{0126}: $\beta_{32} = 0$).
- ***Hypothesis 10****: Providing formative feedback* (η_6) will positively influence *learning motivation* (η_1) (H_{0132}: $\beta_{16} = 0$).

Table 4.99

Unstandardised beta matrix for the final comprehensive model (Model F)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.425 (.029) 14.428	.131 (.059) 2.221	.112 (.035) 3.182	- -	.055 (.046) **1.185**	- -	- -
InspProf	- -	- -	- -	- -	.668 (.023) 29.284	- -	- -	- -
LearnCli	- -	.009 (.019) **.474**	- -	- -	.960 (.020) 48.273	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.218 (.060) 3.637	.654 (.059) 11.055
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	.500 (.039) 12.895	- -	- -	- -	.412 (.039) 10.490	
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.342 (.038) 8.974	- -	- -	.100 (.035) 2.827	.534 (.040) 13.441	

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

The process of elaborating the originally hypothesised reduced Wessels-Van der Westhuizen trainer-instructor performance structural model resulted in the testing of 5 additional path-specific hypotheses that were not originally theorised. Four of these were beta hypotheses. Support was found for the following 4 additional beta hypotheses[142]:

- **Hypothesis 17:** *Learning climate* (η_3) will positively influence *facilitating clarity and understanding* (η_8) (H_{0147}: $\beta_{83} = 0$).
- **Hypothesis 18**: *Trainer-instructor subject matter expert* (η_7) will positively influence *facilitating clarity and understanding* (η_8) (H_{0148}: $\beta_{87} = 0$).
- **Hypothesis 19**: *Learning climate* (η_3) will positively influence *providing formative feedback* (η_6) (H_{0149}: $\beta_{63} = 0$).

[142] It is acknowledged that the use of the term *support* here could be questioned. The specific paths were suggested by modification indices calculated on the current data set. Testing the statistical significance of the path coefficients on the same data that from which the modifications were derived does not provide an independent credible test of the data-driven proposals. To convincingly generate support for the data-driven additional path proposals the significance of the paths need to be tested on fresh data.

- **Hypothesis 20**: *Structure in the learning material* (η_4) will positively influence *learning motivation* (η_1) (H_{0150}: $\beta_{14} = 0$).

The unstandardised gamma matrix (depicted in Table 4.100) describes the slope of the regression of the eight endogenous latent variables in the reduced Wessels-Van der Westhuizen trainer-instructor structural model on specific exogenous latent variables. These parameters are, again, statistically significant ($p < .05$) if $z > 1.6449$ given the directional nature of H_{ai} (Theron, 2017).

Analysis of the gamma matrix (see Table 4.100) indicated the all of the paths were statistically significant ($p < .05$) with z-values greater than 1.6449. Therefore, support was found for the following gamma hypotheses:

- ***Hypothesis 11:*** *Lifelong learning trainer-instructor capacity* (ξ_1) will positively influence *transformational trainer-instructor leadership* (η_5) (H_{a133}: $\gamma_{51} > 0$).
- ***Hypothesis 12****: Lifelong learning trainer-instructor capacity* (ξ_1) will positively influence *trainer-instructor expert* (η_7) (H_{a134}: $\gamma_{71} > 0$)
- ***Hypothesis 16:*** *Trainer-instructor emotional intelligence* (ξ_2) will positively influence *transformational trainer-instructor leadership* (η_5) (H_{a138}: $\gamma_{52} > 0$).

However, the path from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material* was, still, not positive, as was theorised. This path was statistically significant ($p < .05$) but with a negative z-value -2.595 (< -1.6449). This path was found to be statistically significantly negative ($p < .05$) in the original reduced Wessels-Van der Westhuizen trainer-instructor performance structural model and in all the subsequent extended models (Models B – F). Therefore, support was not found for the following hypothesis:

- ***Hypothesis 14****:* The effect of *trainer-instructor expert* (η_7) on *structure in the learning material* (η_4) will be positively moderated by *facilitating clarity and understanding* (η_8) (H_{a136}: $\gamma_{43} < 0$).

The process of elaborating the originally hypothesised reduced Wessels-Van der Westhuizen trainer-instructor performance structural model resulted in the testing of 5 additional path-specific hypotheses that were not originally theorised. One of these was a gamma hypothesis. Support was found for the following additional gamma hypothesis:

- **Hypothesis 21**: *The trainer-instructor expert*facilitating clarity and understanding* interaction effect (ξ_3) will positively influence *learning motivation* (η_1) (H_{a151}: $\gamma_{13} > 0$).

Table 4.100

Unstandardised gamma matrix for the final comprehensive model (Model F)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	.153 (.028) 5.425
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.037 (.017) **-2.214**
TransLea	.731 (.045) 16.286	.230 (.044) 5.174	- -
ProFormF	- -	- -	- -
Exprt	.933 (.022) 42.668	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Neither *facilitating clarity and understanding* nor *subject matter expert* has been hypothesised to have a main effect on *learning motivation*. Neither has been nominated by the modification indices as an effect that will statistically significantly ($p < .01$) improve the fit of the comprehensive LISREL model. *Facilitating clarity and understanding*, therefore, has a positive effect on *learning motivation* provided that the trainer-instructor is a *subject matter expert*.

In interpreting the magnitude of the statistically significant effects it became problematic to rely on the unstandardised regression slope estimates since the metric in which these are expressed are different and not comparable across the different latent variables (Diamantopoulos & Siguaw, 2000). In order to avoid this problem, the magnitudes of the completely standardised regression slope estimates were interpreted (Diamantopoulos & Siguaw, 2000). The completely standardised beta and gamma estimates (see Table 4.101 and Table 4.102) reflect the average change expressed in standard deviation units in an endogenous latent variable (η_j), associated with a one standard deviation change in an endogenous (η_j) or exogenous latent variable (ξ_j) that had been structurally linked to it in the structural model, when holding constant all other η_k and/or ξ_k linked to it (Spangenberg & Theron, 2005). The completely standardised parameter estimates for the **B** and **Γ** are presented in Tables 4.101 and 4.102 respectively.

According to Table 4.101 and Table 4.102, out of all the significant effects obtained, the effect of *transformation trainer-instructor leadership* on *learning climate* was the most pronounced[143]. This

[143] It is acknowledged that concern about the discriminant validity with which the composite research questionnaire and the subsequent parcelling operationalised *learning climate* and *transformational leadership* to some degree erodes confidence in this finding.

was followed by the effect of *lifelong learning trainer-instructor capacity* on *trainer-instructor expert*.

Table 4.101

Completely standardised beta matrix for the final comprehensive model (Model F)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	.425	.131	.112	- -	.055	- -	- -
InspProf	- -	- -	- -	- -	.668	- -	- -	- -
LearnCli	- -	.009	- -	- -	**.960**	- -	- -	- -
StructLM	- -	- -	- -	- -	- -	- -	.218	.654
TransLea	- -	- -	- -	- -	- -	- -	- -	- -
ProFormF	- -	- -	.500	- -	- -	- -	.412	- -
Exprt	- -	- -	- -	- -	- -	- -	- -	- -
FacilCU	- -	- -	.342	- -	- -	.100	.534	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.102

Completely standardised gamma matrix for the final comprehensive model (Model F)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	.153
InspProf	- -	- -	- -
LearnCli	- -	- -	- -
StructLM	- -	- -	-.037
TransLea	.731	.230	- -
ProFormF	- -	- -	- -
Exprt	**.933**	- -	- -
FacilCU	- -	- -	- -

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

Additionally, the squared multiple correlations (R^2) for the eight endogenous latent variables were examined. Large R^2 values (> .50) in Table 4.103 reveal that satisfactory proportion of variance in each latent variable was explained by the final Wessels-Van der Westhuizen trainer-instructor performance structural model (Model F). The structural model successfully accounted for variance in six of the endogenous latent variables (> .50). The structural model was only marginally less successful in explaining variance in *learning motivation* (R^2 = .471 < .50) and *inspiring professional vision* (R^2 = .446 < .50). The delight in these rather impressive results, however, had to be tempered by the concerns about the discriminant validity with which the composite research questionnaire and the subsequent parcelling operationalised *learning climate* and *transformational leadership* as well as *facilitating clarity* and *subject matter expert*. It is noteworthy that the R^2 for these four latent variables were the highest.

Table 4.103

R^2 values for the endogenous latent variables in the final comprehensive model (Model F)

LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
.471	**.446**	.934	.718	.891	.768	.871	.868

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.104 depicts the unstandardised structural error variances for the 8 endogenous latent variables.

Table 4.104

Unstandardised psi matrix

LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
.529	.554	.066	.282	.109	.232	.129	.132
(.033)	(.025)	(.009)	(.016)	(.010)	(.014)	(.013)	(.011)
15.838	21.787	7.201	17.784	10.686	17.042	9.652	12.379

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.104 indicates that all endogenous latent variables were statistically significantly affected by structural error. H_{0i}: $\psi_{kk} = 0$ was therefore rejected for all i; i=139, 140. …, 146. The completely standardised $\boldsymbol{\Psi}$ is shown in Table 4.105.

Table 4.105

Completely standardised psi matrix

LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
.529	.554	.066	.282	.109	.232	.129	.132

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.105 reflects the proportions of variance in the endogenous latent variables that are not explained by the structural model. Table 4.105 echoes the findings of Table 4.104. The same cautionary note therefore also applies to Table 4.105.

It was hypothesised (in Hypothesis 8), during the literature review in Chapter 2, that the effect of *providing formative feedback* (η_6) on *structure in the learning material* (η_4) is mediated by *facilitating clarity and understanding* (η_8). To calculate an estimate for the hypothesised indirect effect and to test the statistical significance of the indirect effect estimate the SIMPLIS syntax for Model F was translated to LISREL syntax. This allowed the request to calculate the specific indirect effect of *providing formative feedback* (η_6) on *structure in the learning material* (η_4) via the CO command. After consulting the additional parameter matrix in the LISREL output, depicted in Table 4.104, it was found that this mediating path was supported z-value 3.149 (> 1.6449). Thus, support was found for Hypothesis 8 ($H_{a130:}$ $\beta_{86}\beta_{48} > 0$)

Table 4.106

Additional parameters

PA(1)
.066
(.021)
3.149

4.7.6.4 Modification indices of the final comprehensive model (Model F)

Although the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F) fitted the data the question reasonably well it should still be considered whether the model could be revised further, through the addition of freed paths, for future research. According to Theron (2017), modification indices with values greater than 6.64 indicated that the current fixed parameters would improve the fit of the model significantly (p < .05) if freed. However, when considering model modifications, Diamantopoulos and Siguaw (2000) advocated that these modifications should also be theoretically or substantially justified.

Table 4.107

Modification indices for beta matrix (final comprehensive model - Model F)

	LearnMot	InspProf	LearnCli	StructLM	TransLea	ProFormF	Exprt	FacilCU
LearnMot	- -	- -	- -	- -	- -	- -	- -	- -
InspProf	2.101	- -	- -	19.115	- -	4.148	11.659	.102
LearnCli	8.158	- -	- -	.013	- -	5.475	.917	.232
StructLM	10.434	**23.897**	4.916	- -	4.562	3.918	- -	- -
TransLea	.344	11.932	.266	5.249	- -	.216	2.631	.620
ProFormF	.002	2.027	- -	1.202	2.360	- -	- -	- -
Exprt	20.372	.153	5.031	1.486	3.975	3.188	- -	0.517
FacilCU	.014	1.305	- -	3.026	.234	- -	- -	- -

Note: LearMot refers to *learning motivation*, InspProf refers to *inspirational professional vision*, LearnCli refers to *learning climate*, StructLM refers to *structure in the learning material*, TransLea refers to *transformational trainer-instructor leadership*, ProFormF refers to *providing formative feedback*, Exprt refers to *trainer-instructor expert*, and FacilCU refers to *facilitating clarity and understanding*.

Table 4.108

Modification indices for gamma matrix (final comprehensive model - Model F)

	LLLCap	EmoIntel	ExprtFCU
LearnMot	- -	- -	- -
InspProf	- -	.001	2.553
LearnCli	.268	2.381	5.605
StructLM	1.587	.856	- -
TransLea	- -	- -	.454
ProFormF	3.803	5.303	2.221
Exprt	- -	.728	**53.526**
FacilCU	.020	2.516	**25.919**

Note: LLLCap refers to *lifelong learning trainer-instructor capacity*, EmoIntel refers to *trainer-instructor emotional intelligence*, and ExprtFCU refers to the interaction effect between *trainer-instructor expert* and *facilitating clarity and understanding*.

According to Table 4.108 (gamma), the parameter with the highest modification index value (53.526) was, still, for γ_{73} the path from *trainer-instructor expert*facilitating clarity and understanding* to *trainer-instructor expert*. The second highest value in the gamma modification index (25.919) was again for the path γ_{83} from *trainer-instructor expert*facilitating clarity and understanding* to *facilitating clarity and understanding*. However, these two paths do not make theoretical sense.

According to Table 4.107 (beta), the third highest modification index value (23.897) was the path β_{42} from *inspiring professional vision* to *structure in the learning material*. However, before adding this specific path, one should ask oneself whether adding an additional path with the third highest modification index value purely to increase (an already reasonable) RMSEA. Additionally, this path does not appear to be the theoretically strong enough either. As a result, no further paths were added to the final Wessels-Van der Westhuizen trainer-instructor performance structural model (Model F). However, future research should investigate the influence of *inspiring professional vision* on *structure in the learning material.*

4.8 SUMMARY OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE COMPREHENSIVE MODEL FIT

Robust maximum likelihood estimation, on the normalised data set, was utilised to fit the original reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model A). The results of the overall fit assessment resulted in both the exact fit null hypotheses (H_{0123a}: RMSEA = 0) and close fit null hypotheses (H_{0123b}: RMSEA $\leq$ .50) being rejected. However, the RMSEA value of .0699 showed reasonably good fit in the sample. In an attempt to improve model fit, some paths were freed based on the recommendations of the modification indices. A short summary of the additional paths that were freed follows:

- The path from *learning climate* to *facilitating clarity and understanding* (β_{83}) was introduced in Model B. Support was found for this path in Model B, Model C, Model D, Model E and Model F.
- The path from *trainer-instructor expert* to *facilitating clarity and understanding* (β_{87}) was introduced in Model C. Support was found for this path in Model C, Model D, Model E and Model F.
- The path from *learning climate* to *providing formative feedback* (β_{63}) was introduced in Model D. Support was found for this path in Model D, Model E and Model F.
- The path from *structure in the learning material* to *learning motivation* (β_{14}) was introduced in Model E. Support was found for this path in Model E and Model F.

- The path from *trainer-instructor expert*facilitating clarity and understanding* to *learning motivation* (γ_{14}) was introduced in Model F and support was found in Model F.

Robust maximum likelihood estimation, on the normalised data set, was utilised to fit the final comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model (Model F). The results of the overall fit assessment resulted in both the exact fit null hypotheses (H_{0123a}: RMSEA = 0) and close fit null hypotheses (H_{0123b}: RMSEA $\leq$ .50) being rejected. However, the RMSEA value of .0620 showed reasonably good fit in terms of the, more recent, acceptable critical cut-off value of .06 or maximum of .08 (Hooper et al., 2008; Hu & Bentler, 1999). Furthermore, an examination of the statistical power of the test of close fit indicated extremely high power even when the parametric RMSEA value was .06. This indicated that a position of reasonable comprehensive LISREL model fit in the parameter was tenable. A decomposition of the fit of the measurement and structural models in the comprehensive LISREL model indicated reasonable structural model fit approaching mediocrity. Nonetheless, it was concluded that the final Wessels-Van der Westhuizen trainer-instructor performance structural model showed sufficiently reasonable fit to allow for further interpretation of the structural model parameter estimates. Further interpretation of the structural model parameter estimates indicated that:

- Twelve of the fourteen beta coefficients were statistically significant ($p < .05$).
- All five of the gamma coefficients were statistically significant ($p < .05$) but only four of the five null hypotheses could be rejected due to the inappropriate sign obtained for γ_{43}.
- All the structural error variances were statistically significant ($p < .05$).
- The effects in the structural model were generally reasonably pronounced.
- The structural model generally explained quite substantial proportions of variance in the endogenous latent variables.
- Concerns about discriminant validity lowered confidence in the R^2 and effect size findings.

The results seem to validate the claim that the Wessels-Van der Westhuizen trainer-instructor performance structural model provides a valid (i.e., permissible) description of the psychological mechanism that regulates trainer-instructor performance.

The purpose of Chapter 4 was to report on the results obtained from this study. A summary of the final Wessels-Van der Westhuizen trainer-instructor performance structural model is depicted in Figure 4.13. The results section is thus concluded. The following chapter discusses the general conclusions drawn from the research and future research and practical recommendations derived from these conclusions in greater detail.

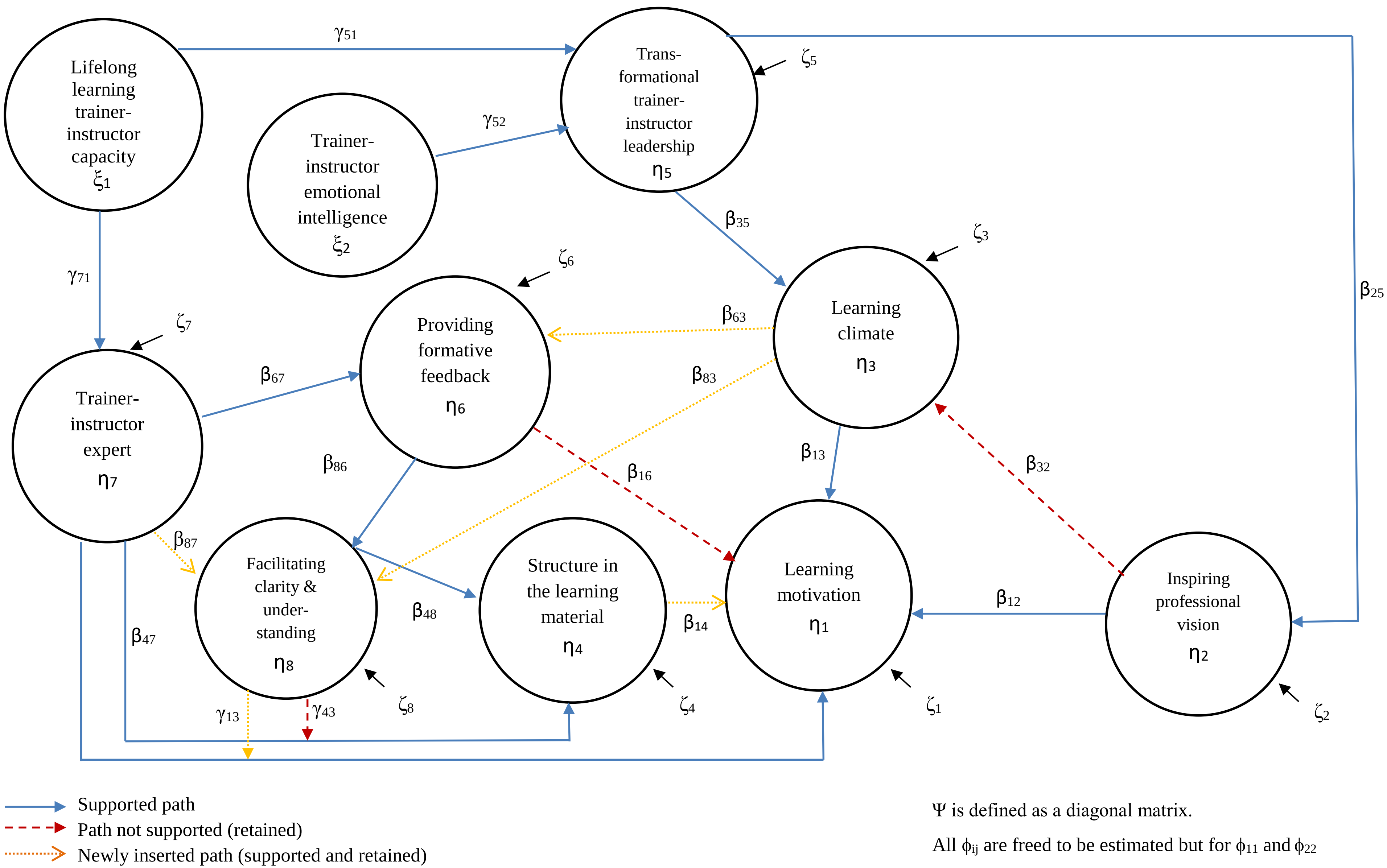

Figure 4.13. **The final Wessels-Van der Westhuizen affirmative development trainer-instructor performance structural model (Model F)**

CHAPTER 5 CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 INTRODUCTION

South Africa is currently faced with a myriad of social and economic challenges, as discussed in detail in Chapter 1. These social and economic challenges stem from the inequality created in the education system between 'Black' and 'White' South Africans during apartheid. The poor quality of the current education system, including poor quality of math and science education and poor national senior certificate pass rates, leads to a low percentage of individuals that qualify for bachelors or diploma programmes. As a result, many individuals enter the labour force without the proper qualifications and without the opportunity to further their education. Without proper qualifications or further tertiary educational opportunities, individuals do not have the chance to develop high valued or critical skills. Lack of these skills will reduce the individuals' chances of being employed, in certain jobs or occupations. Being less employable can lead to higher unemployment rates. Being unemployed means a lack of income and a lack of income, for an extended period of time, can lead to poverty. High poverty rates untimely lead to high crime rates.

Even now, many years after apartheid, these social and economic challenges still form part of the environment that influences organisational functioning as well as individual employee performance. Early interventions, such as providing pregnant and breastfeeding women with proper nutrition and supplements, providing young children with developmental and educational toys, should ideally be implemented by the South African Government in an attempt to rectify past inequality and enhance employability. The South African Government should also pro-actively address the inadequacies of the formal pre-primary, primary and secondary education system. Better quality education may lead to more individuals being allowed into tertiary educational institutions. This leads to more individuals obtaining highly valued and critical skills which makes these individuals more employable. Obtaining these skills can also enhance cognitive functioning that will assist individuals to discover gaps in the current market for new business ventures. Being more employable and starting new business ventures can increase income which, in turn, can decrease poverty and crime.

The burden of rectifying the negative repercussions of apartheid and reducing the current social and economic challenges does not fall on the South African Government alone. While the South African Government should focus of early interventions and preventative measures (i.e., unborn babies, young children and school going children under 18 years of age) there are still many South Africans that were affected by apartheid that will not benefit from these early interventions (i.e., those who have already left school and those with skill shortages). Therefore, training and development programmes should be made available for individuals looking for work and those already employed but who which to develop or obtain highly valued skills. These training and development programmes (i.e., affirmative development programmes) should be developed and implemented by Human Resource Managers or Industrial Psychologists.

The main aim of any affirmative development, or training, programme is to elevate previously disadvantaged South Africans' standing on the job competency potential latent variables that they were prevented from developing during apartheid and that caused them to underperform on the job. The study of and research on learning potential (learning competency potential), learning performance (learning competencies) and knowledge, skills and abilities obtained through training (learning outcomes or job competency potential) are thus important in an attempt to reduce the current social and economic challenges. It was further argued that the malleable learning competency potential latent variables influencing learning performance are influenced by the level of competence that the trainer-instructor achieves on a structurally interlinked set of trainer-instructor competencies. The latter, in turn, is determined by a structurally interrelated set of trainer-instructor competency potential and training situational latent variables. As a result, the learning potential models and the trainer-instructor performance competency models have been developed.

Based on prior research conducted on learning competencies and learning competency potential (Burger, 2012; De Goede, 2007; Du Toit, 2014; Mahembe, 2014; Pretorius, 2014; Prinsloo, 2013; Van Heerden, 2013) as well as on first generation research conducted on the trainer-instructor performance and the trainer-instructor competency (Van der Westhuizen, 2015) the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model was developed.

The development of the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model departed from the full Van der Westhuizen affirmative development trainer-instructor competency model. The focus of the current research was on the trainer-instructor's performance and how the trainer-instructor can directly influence the malleable learning potential of their trainees. Therefore, the learning potential latent variables that were not directly influenced by the trainer-instructor was not considered for the purposes of this research (i.e., was not included in the Wessels-Van der Westhuizen model), namely transfer of learning/knowledge, automisation, information processing capacity, abstract reasoning capacity, learning performance during evaluation, time cognitively engaged, academic self-leadership, meta-cognitive regulation, conscientiousness and meta-cognitive knowledge. As a result, the Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, at the outset of the theorising, comprised of the following latent variables:

- Learning competency potential latent variables: *learning motivation*, *master learning goal orientation* and *academic self-efficacy*;
- Trainer-instructor outcome latent variables: *inspiring professional vision*, *accurate role perception*, *mastery classroom goal structure*, *learning climate* and *structure in the learning material*; and
- Trainer-instructor competency latent variables: *providing inspirational motivation*, *clarifying learning conceptions and requirements*, *fostering psychological safety and fairness*, *demonstrating individualised consideration*, *stimulating interest and involvement*, *providing autonomy support*, *enhancing student self-efficacy*, *promoting a mastery climate* and *facilitating clarity and understanding*.

During the literature review in Chapter 2, two new trainer-instructor competency latent variables were introduced, namely *transformational trainer-instructor leadership* and *providing formative feedback*; the newly added domain of 'training situational latent variables' included Van der Westhuizen's (2015) *mastery classroom goal structure*, *learning climate*, and *structure in the learning material*; and three new 'trainer-instructor competency potential latent variables' were developed, namely *lifelong learning trainer-instructor capacity*, *trainer-instructor expert*, *trainer-instructor emotional intelligence*.

During Chapter 3 an argument was made against the extensive structural model since it will lead to a time-consuming research study, which might not always be physically or practically possible. As a result, latent variables that were not directly influenced by any of the newly introduced trainer-instructor latent variables were consequently removed, namely the learning competency potential latent variables *academic self-efficacy and mastery learning goal orientation*; the trainer-instructor outcome latent variable *accuracy of role perception*; the training situational latent variable *mastery classroom goal structure*; and the trainer-instructor competency latent variables *clarifying learning conceptions and requirements*, *enhancing student self-efficacy*, and *promoting a mastery climate*. The removal of these latent variables resulted in the reduced Wessels-Van der Westhuizen affirmative development trainer-instructor competency model, depicted in Figure 3.1. This reduced model was subsequently empirically tested.

5.2 RESULTS

5.2.1 RESULTS OF THE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE MEASUREMENT MODEL

The fit of the Wessels-Van der Westhuizen trainer-instructor performance measurement model was evaluated to ascertain to what extent the indicator variables (i.e., item parcels) successfully operationalise the latent variables in the model. The overall goodness of fit of the measurement model was tested through structural equation modelling (SEM). Various indices were interpreted to evaluate the goodness of fit of the measurement model and it was found that the measurement model fitted the data reasonably well.

All the item parcels loaded statistically significantly ($p < .05$) on the latent variables they were designed to reflect. All the lambda null hypotheses were thus rejected. In general, and for most of the indicators, the values of the squared multiple correlations were quite high, except for LC_4 ($R^2 = .418 < .50$) and EI_1 ($R^2 = .473 < .50$). LC_4 and EI_1 were also flagged as problematic indicators of their respective latent variables due to the fact that more variance (θ_δ=.582 and θ_δ=.527 respectively) was explained by measurement error than was explained by the latent variable these indicators were designed to reflect.

There appeared to be sufficient evidence to conclude that the operationalisation of the latent variables in the reduced Wessels-Van der Westhuizen trainer-instructor performance measurement model was adequately successful. Therefore, further analysis of the reduced Wessels-Van der Westhuizen trainer-instructor performance structural model was allowed with the aim of investigating the relationship between the latent variables.

5.2.2 RESULTS OF THE COMPREHENSIVE WESSELS-VAN DER WESTHUIZEN TRAINER-INSTRUCTOR PERFORMANCE LISREL MODEL

Although the reduced comprehensive Wessels-Van der Westhuizen trainer-instructor performance LISREL model initially (Model A) showed reasonable fit, in terms of the RMSEA, the close fit hypothesis was nonetheless rejected. Modification to the model was therefore considered. In an attempt to improve the fit four more models (Model B, Model C, Model D, and Model E), each with a new path added based on the modification indices, were fitted. In the end, the fifth model (Model F) was used as the final comprehensive LISREL model. Decomposition of the fit of the comprehensive LISREL model into the fit of the measurement and structural models showed that although the comprehensive LISREL model showed reasonable fit, the fit of the structural model had to be regarded as reasonable but approaching mediocrity. The structural model fit was nonetheless still considered sufficient to warrant the interpretation of the structural model parameter estimates and to test the path-specific hypotheses.

In terms of the beta hypotheses, eight (of the original[144] ten) beta hypotheses were supported, namely:

- ***Hypothesis 2:*** *inspiring professional vision* will positively influence *learning motivation*;
- ***Hypothesis 3****: learning climate* will positively influence *learning motivation*;
- ***Hypothesis 5:*** *transformational trainer-instructor leadership* will positively influence *learning climate*;
- ***Hypothesis 6:*** *transformational trainer-instructor leadership* will positively influence *inspiring professional vision*;
- ***Hypothesis 7****: facilitating clarity and understanding* will positively influence *structure in the learning material*;
- ***Hypothesis 9****: providing formative feedback* will positively influence *facilitating clarity and understanding*;
- ***Hypothesis 13:*** *trainer-instructor expert* will positively influence *structure in the learning material*; and
- ***Hypothesis 15****: trainer-instructor expert* will positively influence *providing formative feedback.*

Support was not found for the following two original beta hypotheses:

- ***Hypothesis 4:*** *inspiring professional vision* will positively influence *learning climate* and
- ***Hypothesis 10****: providing formative feedback* will positively influence *learning motivation*.

In terms of the gamma hypotheses, three of the four original[145] gamma hypotheses were supported. Although, the *trainer-instructor expert* x *facilitating clarity and understanding* interaction effect on *structure in the learning material* was statistically significant ($p < .05$), the parameter estimate was found to be negative, and not positive as was originally hypothesised, and consequently the interaction effect null hypothesis could not be rejected. Support was therefore obtained for the following gamma hypotheses:

- ***Hypothesis 11:*** *lifelong learning trainer-instructor capacity* will positively influence *transformational trainer-instructor leadership*;

[144] Original in the senses that these hypotheses were developed through theorising based on an extensive literature review.
[145] Original in the senses that these hypotheses were developed through theorising based on an extensive literature review.

- ***Hypothesis 12****: lifelong learning trainer-instructor capacity* will positively influence *trainer-instructor expert*; and
- ***Hypothesis 16:*** *trainer-instructor emotional intelligence* will positively influence *transformational trainer-instructor leadership*.

Support was not obtained for the following gamma hypothesis:

- ***Hypothesis 14****:* the effect of *trainer-instructor expert* on *structure in the learning material* will be positively moderated by *facilitating clarity and understanding.*

Additionally, support was also found for the mediating influence hypothesis namely, ***Hypothesis 8:*** the relationship between *providing formative feedback* and *structure in the learning material* will be mediated by *facilitating clarity and understanding*.

The modification of the original comprehensive LISREL model (Model A) resulted in the testing of five additional path-specific hypotheses that were not originally formulated. Support was obtained in the final model (Model F) for the following five additional hypotheses:

- **Hypothesis 17:** *learning climate* will positively influence *facilitating clarity and understanding*.
- **Hypothesis 18**: *trainer-instructor subject matter expert* will positively influence *facilitating clarity and understanding*.
- **Hypothesis 19**: *learning climate* will positively influence *providing formative feedback.*
- **Hypothesis 20**: s*tructure in the learning material* will positively influence *learning motivation*.
- **Hypothesis 21**: the *trainer-instructor expert*facilitating clarity and understanding* interaction effect will positively influence *learning motivation*.

5.3 PRACTICAL IMPLICATIONS

Understanding how the trainer-instructor's performance influences the learning success of affirmative development trainees during training and development programmes can assist HRM in developing stock interventions (i.e., training interventions for the affirmative development trainer-instructor aimed at modifying malleable trainer-instructor competency potential latent variables). Additionally, it can assist HRM in developing flow interventions such as recruitment and selection of affirmative development trainer-instructors that have the appropriate level of a combination of trainer-instructor competency potential and competency latent variables that will allow for optimal influence of other trainer-instructor competencies and outcomes as well as the learning potential latent variables with the aim of enhancing the learning potential and learning success of affirmative development trainee. This, in turn, can lead to successful selection into the job and/or job success for these trainees. Which, ultimately, increases the organisation's profits.

5.4 LIMITATIONS

The first limitation is related to measurement instruments, a pre-test should be done in an identical manner as to the testing of the final model analysis with the aim of refining and deleting poor items in order to avoid issues of validity and reliability when the final model is analysed. However, the current research study did not conduct a pre-test, on the newly developed items, due to several resource constraints. The psychometric integrity of the selected measurement instruments was thus empirically evaluated for the first time as part of the final model analysis. The same data that was used to psychometrically evaluate (and possibly refine) the newly developed scales was therefore also used to empirically evaluate the measurement and structural models. This is acknowledged as a methodological limitation.

The second limitation is that only a portion of the full Wessels-Van der Westhuizen affirmative development trainer-instructor performance model was empirically tested. Future studies should test the full Van der Westhuizen-Wessels affirmative development trainer-instructor performance model to gain a more complete picture.

The third limitation is the fact that the current research solely focused on trainer-instructor competencies and trainer-instructor outcomes. Future research should consider supplementing this model with the insights provided by the job-demands-resources model/framework. The JD-R model emphasises the important role played by situational characteristics (via the job demand and job resource variable domains) as well as the need to build psychological states into the competency model (these psychological states could include both competency potential variables and outcomes). Psychological states, such as engagement, commitment, satisfaction, psychological empowerment, psychological ownership, are argued to affect performance (competencies). These psychological states are also argued to be affected by the level of competence achieved on the competencies and outcomes, which constitutes performance (Theron, 2015b).

A fourth limitation is the fact that the study modified the original structural model based on feedback obtained from the modification indices calculated for $\mathbf{\Gamma}$ and $\mathbf{B}$ but then tested the significance of the resultant path coefficients on the same data that suggested the path. Ideally, the modified models should have been fitted on a new data set drawn from the same population.

A fifth limitation is the high statistical power that resulted from the large sample that was used to evaluate the fit of the measurement and comprehensive LISREL models. Initial attempts to muster a large enough sample met with relatively little success. The sampling population was subsequently enlarged to offer the possibility of a larger sample despite a low response rate. The eventual sample size caught the researchers somewhat by surprise. A better option probably would have been to split the available sample into a validation sample and a cross-validation sample.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

5.5.1 GENERAL FUTURE RESEARCH SUGGESTIONS

Future research should empirically test the data-driven suggestions derived from the current study on a new sample collected from the same target population.

Future research could focus on adding additional *trainer-instructor competency potential latent variables*, additional *trainer-instructor competency latent variables* and additional *training situational latent variables*, and/or add additional pathways between the current and future latent variables to the existing Wessels-Van der Westhuizen affirmative development trainer-instructor competency model.

The two consistently statistically weak paths (from *inspiring profession vision* to *learning climate*; and from *trainer-instructor expert*facilitating clarity and understanding* to *structure in the learning material*) were not deleted during this research. Future research should test these paths on a new sample from the same target population. If these paths again fail to garner the necessary empirical support, they should be deleted.

In terms of the three sequentially linked models, future research could focus on the further elaborating the manner in which the trainer-instructor competency model (trainer@work competency model) structurally interlocks with the learning potential competency model (performance@learning competency model).

Future studies, could also, focus on utilising the current Wessels-Van der Westhuizen's affirmative development trainer-instructor performance competency model's latent variables as predictors for selection purposes.

5.5.2 ADDING DIMENSIONS TO THE LEARNING CLIMATE

During the literature review to investigate the inclusion of *mastery goal structure* as a possible dimension of the learning climate, other additional learning climate dimensions were discovered. Future research should investigate whether any additional dimension of *learning climate* should be seriously considered. Future research should also consider zooming in on the structural relations existing between the dimensions of *learning climate*.

The Classroom Climate Questionnaire (CCQ), developed by Trickett and Moos (1973), measures classroom climate as a construct consisting of the following nine psychosocial dimensions, namely *involvement*, *affiliation*, *support*, *task orientation*, *competition*, *order and organisation*, *rule clarity*, *teacher control*, and *innovation*. Teacher *support*, *involvement* and *affiliation* all assess an *interpersonal relationship* second-order component or factor. *Task orientation* and *competition* assess a *goal-orientation* second-order competent or factor (Trickett & Moos, 1973). The *involvement* dimension relates to how students pay attention, put energy into and show interest in the classroom activities (Trickett & Moos, 1973). It can be argued that this dimension is related to the current learning climate dimension of *interest and involvement*. *Affiliation* refers to how well students work together and get along with each other. *Support* relates to how teachers express a personal interest in their students' learning by going out of their way to assist the student where needed (Trickett & Moos, 1973). It can be argued that this dimension is related to the current learning climate dimension of *teacher academic support*. *Task orientation* refers to how well the classroom activities are aligned with academic accomplishments and the time spent on the lesson for the day. *Competition* refers to the academic competition among the students in the classroom to get the best marks or results. *Order and organisation* refer to how well order is maintained in the classroom and how well the classroom activities are planned for and organised. *Rule clarity* refers to the rules of conduct within the classroom and if they are clearly stated and understood by the students as well as the consequences for breaking such rules. *Teacher control* refers to the classroom rules and how strict the teacher is. *Innovation* refers to the extent to which different modes or methods of teaching and teaching styles within the classroom and different classroom activities are used on different days (Trickett & Moos, 1973).

Based on McBer (2001) conceptualisation of *classroom climate*, which is the collective perceptions by students of what it feels like to be a student in a particular classroom or a particular teacher's classroom, there are nine dimensions of *classroom climate*, namely *clarity*, *order*, *standards*, *fairness*, *participation*, *support*, *safety*, *interest*, and *environment*.

- *Clarity* denotes how each lesson are aligned with the broader subject, the purpose of the lesson and the clarity concerning the school's aims and objectives.
- *Order* refers to how classroom discipline, order and civilised behaviours are instilled and maintained.

- *Standards* refer to the extent to which clear, precise (high) standards exist on how students should behave within the classroom and what each student should do or try to achieve.
- *Fairness* denotes the degree to which there is an absence of bias or favouritism within the classroom as well as the inclusion of a consistent link between classroom rewards and actual performance (McBer, 2001). It can be argued that this dimension is related, to some degree, to the current learning climate dimension of *psychological safety and fairness* in that both include the element of absence of bias against any individual or group of learners (i.e., freedom) (Blanton, as cited in Van der Westhuizen, 2015).
- *Participation* denotes the opportunity for students to participate actively in the classroom or during a lesson, by joining in discussions, questioning, giving out materials and other similar classroom activities (McBer, 2001). It can be argued that this dimension is related to the current learning climate dimension of *interest and involvement* in that both include the element of involvement or the willingness to participate in discussions (Pickett & Fraser, 2010).
- *Support* relates to feeling emotionally supported in the classroom, which leads to students being willingnes to try new things and learn from mistakes (McBer, 2001). It can be argued that this dimension is related, to some degree, to the current learning climate dimension of *teacher emotional support* since both (support and teacher emotional support) includes mutual respect and positive relationships among teachers and their students create an emotionally supportive classroom (Shin & Ryan, 2017).
- *Safety* is the degree to which the classroom is a safe place, where students are not at risk from emotional or physical bullying, or other fear-arousing factors (McBer, 2001). It can be argued that this dimension is related, to some degree, to the current learning climate dimension of *psychological safety and fairness* in that both include the freedom from fear or concern about potential embarrassment, unfair treatment or judgement (i.e., psychological safety) (Van der Westhuizen, 2015).
- *Interest* related to the feeling that the classroom is an interesting and exciting place to be, where the students feel stimulated to learn (McBer, 2001). It can be argued that this dimension is related, to some degree, to the current learning climate dimension of *interest and involvement* in that both include the element of interest which motivates the learner to engage in learning tasks at hand (Dewey, as cited in Shroff & Vogel, 2009).
- *Environment* refers to the feeling that the classroom is a comfortable, well-organised, clean and an attractive physical environment (McBer, 2001).

As a result, it can be argued that Van der Westhuizen's (2015) five dimensions of learning climate are well aligned with McBer's (2001) dimensions of classroom climate, barring McBer's (2001) dimensions of *clarity*, *order*, *standards* and *environment*.

Lombarts and colleagues (2014) utilised the Dutch Residency Educational Climate Test (D-RECT) to measure *learning climate* for residency training programmes in teaching hospitals. This questionnaire has eleven learning climate subscales, namely *supervision*, *coaching and assessment*, *feedback*, *teamwork*, *peer collaboration*, *professional relations between attending*, *work adaptation to residents' competence levels*, *attendings' attitude towards residents*, *formal organised education sessions*, the *role of the programme director*, and *patient sign-out* (Lombarts et al., 2014).

According to Lombarts and colleagues (2014), *learning climate* is a complex multifaceted concept that is difficult to measure. This statement is clear in that there are many other, possible, dimension of *learning climate*, other than the five that were utilised in the current study, and it also depends on the specific learning environment (e.g., school setting, training hospitals setting). However, focusing on all the possible dimensions of *learning climate* was not the focus of this research. Future studies might possibly focus only on the classroom or *learning climate*, its dimension, its determinants and the manner in which it influences the learner's learning potential.

5.5.3 TRANSFORMATIONAL TRAINER-INSTRUCTOR LEADERSHIP

The conceptualising of *transformational trainer-instructor leadership* was already quite extensive. Consequently, the following theorising was omitted since it was considered not to have a direct influence on the current focus of the study.

5.5.3.1 Professional development programmes for transformational trainer-instructor leadership

Teacher leaders can either be appointed formally for positional teacher leadership roles or they can develop for non-positional teacher leader roles (Ackerman & Mackenzie, 2006; Anderson, 2004; Frost, 2012; Silva et al., 2000; York-Barr & Duke, 2004). However, there were many negative consequences associated with these formally appointed positions. As a result, fewer teacher leaders might emerge, which would then, in turn, have a negative influence on the school as a whole (e.g., reduced academic achievement of students and/or difficulty changing with ever-changing global and local demands and legislation). Rather than becoming appointed teacher leaders, in a formal role, teacher leaders should emerge, as a result, of enhanced and organised school structures that ensure collective decision-making and problem-solving and/or as part of a professional development programme or where schools operate as learning organisations (Hart, 1995; Odell, 1997; Silins &

Mulford, 2004). Administrative support, such as collective decision-making and problem-solving, as well as listening to, and respecting, teacher leaders, provide teacher leaders with autonomy. Collective decision-making (i.e., support from administration) was identified as part of one of the four general themes of factors that influence teacher leadership identified in Wenner and Campbell's (2017) meta-analysis on teacher leadership[146].

In terms of professional development programmes, for teachers to be effective in this new role as a teacher leader, universities and schools must develop programmes that will develop the knowledge and skills necessary for success (Clemson-Ingram & Fessler, 1997; Wenner & Campbell, 2017; Yielder & Codling, 2004). In addition to providing professional learning and teacher leadership development, these development programmes can also enhance teachers' influence over curriculum creation and administrative decision-making as well as providing teacher leaders with the opportunity to test new ideas (Smylie, as cited in Silins & Mulford, 2004). General skills that such professional development programmes should focus on or influence in order to assist teachers in adapting to their new leadership roles include, the ability to lead and work with groups, training in school subject content, workshops, action research, problem-solving and leadership skills, mentoring and teaching adults (Angelle & DeHart, 2011; Katzenmeyer & Moller, as cited in Muijs & Harris, 2007; Odell, 1997; Wenner & Campbell, 2017). These programmes should provide the teacher leaders in training a safe environment for risk-taking. An environment where these teacher leaders will not be criticised for mistakes or trying out new ideas. These programmes should also allow the teacher leader in training to engage in and fully contribute to curriculum planning, assessment designs and collaborative decision-making (Danielson, 2007). Professional development was identified as part of one of the four general themes of factors that influence teacher leadership identified in Wenner and Campbell's (2017) meta-analysis on teacher leadership. More specifically, professional development belongs to the theme of external training and support for teacher leaders (Wenner & Campbell, 2017). Additionally, when school leaders are constantly mentored, they are more prone to become effective leaders and lead effective schools (Msila, 2016). Msila's (2016) further found that the absence of mentoring in South African schools might be one of the reasons why South African schools are failing.

[146] The four general themes of factors that support or facilitate teacher leadership, identified in Wenner and Campbell's (2017, p. 153) meta-analysis, are "*external training and support for teacher leaders*, *support from administration*, *climate and structural factors that better allow teacher leaders to do their work*, and *clear-cut job responsibilities and recognition for meeting those responsibilities*".

5.5.3.2 Factors influencing transformational trainer-instructor leadership

Factors negatively influencing the success and quality of teacher leadership, that should be limited or removed, include the following, poor interrelationships (i.e., poor relationships[147]) with other teachers, school management, administrators and principals (Katzenmeyer & Moller, as cited in Muijs & Harris, 2007; Wenner & Campbell, 2017); conflicts between teacher groups (Muijs & Harris, 2007); heavy or overwhelming workloads, long hours (i.e., lack of time) (Knight & Trowler, as cited in Marshall et al., 2011; / & Campbell, 2017); poor appraisal practices, lack of resources (Knight & Trowler, as cited in Marshall et al., 2011; inappropriate school structures (i.e., climate and structural factors) , such as strict hierarchical structures or poor communication (Knight & Trowler, as cited in Marshall et al., 2011; Wenner & Campbell, 2017); personal characteristics such as lack of confidence (Wenner & Campbell, 2017); and when senior management or school principals are not committed to teacher leadership by not providing space for learning and by not creating a culture that supports teacher leadership (Muijs et al., 2013).

Understanding what influences, either negatively or positively, teacher leadership will allow schools, universities and professional development programmes to enhance those positive influences and factors and to reduce or eliminate those negative influences and factors in order to enhance the quality of teacher leadership. This will then, in turn, enhance the influence that teacher leaders have on school improvement and student academic learning. Although it is important to determine wherever or not teacher leadership is malleable, in order to manipulate teacher leadership to produce maximum teacher leadership outcomes, the purpose of this research is, however, not on the influences of teacher leadership, but rather on what influences teacher leadership has on the performance of a trainer-instructor leader and their trainees. Future studies should focus on how these influences and factors can be utilised for the purposes of professional teacher leadership training and development programmes.

5.5.3.3 School principle competency model

For teacher leaders to be effective they should also have a special relationship with their principals (Angelle & DeHart, 2011). Principals play a role in creating a supportive school environment that allowed teacher leaders to perform their job. The elements in the school environment that allow or support teacher leaders in performing their jobs range from logistical items to cultural norms (Wenner & Campbell, 2017). Logistical items include, for example, changing schedules (Borchers, as cited in

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[147] The four general themes of the factors that inhibit teacher leadership, identified in Wenner and Campbell's (2017, p. 154) meta-analysis, are: "*lack of time, poor relationships with peers and/or administration, climate and structural factors*, and *personal characteristics*".

Wenner & Campbell, 2017) or giving the teacher leaders the space and time as well as the responsibility to make important decisions related to the curriculum (Chew & Andrews, 2010). Cultural norms include, for example, continuous learning (Hunzicker, 2012) and risk-taking without penalty or criticism (Danielson, 2007; Wenner & Campbell, 2017). Principles influence on the school environment (i.e., climate and structural factors) is a part of one of the four general themes of factors that influence teacher leadership identified in Wenner and Campbell's (2017) meta-analysis on teacher leadership. Furthermore, school principals can influence the quality of teacher leadership and the development thereof when they become role models, provide support and resources, nurture teacher leadership and when they understand the job responsibilities and job description (i.e., role clarity) of teacher leaders (Ackerman & Mackenzie, 2006; Angelle & DeHart, 2011; Lashway, 1998; Wenner & Campbell, 2017). Only when principals know how crucial it is to improve the quality of teaching in classrooms will they be able to influence the quality of teacher leadership or those individuals who show potential for becoming teacher leaders (Ackerman & Mackenzie, 2006; Anderson, 2004).

The impact of the school principal on individual trainer-instructors depends on the level of competence that the school principal achieves on specific school principal competencies. The school principal through the level of competence on the school principal competence that he/she achieves affects specific malleable trainer-instructor competency potential latent variables and/or situational characteristics that, in turn, affect the level of competence that the trainer-instructor achieves on the trainer-instructor competencies. The extent to which the school principal displays competence on these competencies, in turn, depend on specific school principal competency potential latent variables and specific situational latent variables. This line of reasoning again underscores the need to think in terms of four inter-linked competency models, to develop a school principal competency model (see, for example, Janse van Rensburg, 2015) and to graft the school principal competency model onto the trainer-instructor competency model[148] that is turn structurally linked to learner competency model and that is finally structurally linked to a job competency model.

5.5.4 MULTI-GROUP STRUCTURAL MODELS

It was argued that the nomological network of latent variables underlying the affirmative development trainer-instructor performance does not, in essence, differ from those of other trainer-instructors, educators or teachers. The same latent variables that influence or determine the affirmative development trainer-instructor's performance might also play a part in influencing or determining the

[148] The school principal, through the level of competency achieved on the *competencies constituting school principal performance* will affect the *school principal outcome* that, in turn, are the malleable *trainer-instructor competency potential latent variables* and the *trainer-instructor situational latent variables* that affect trainer-instructor performance defined in terms of competencies and outcomes.

performance of other trainer-instructors, educators or teachers in other educational settings, such as high schools or all other universities. This argument has, as yet, not been supported by empirical evidence. Therefore, future studies should conduct a multi-group structural invariance and equivalence study to give credence or legitimacy to this line of reasoning.

5.5.5 OTHER LEARNING POTENTIAL LATENT VARIABLES

5.5.5.1 Learner reflection

For the purpose of this research, the term reflection was focused on the trainer-instructor's learning process. Future research on the learning potential competency models could include reflection or reflective thinking as a *learning competency latent variable*.

5.5.6 OTHER TRAINER-INSTRUCTOR LATENT VARIABLES

Lifelong learning trainer-instructor capacity in the current reduced Wessels-van der Westhuizen trainer-instructor performance structural model acknowledges that the trainer-instructor is expected to remain an active learner. The current *lifelong learning trainer-instructor capacity* latent variable really encapsulates another learner competency model applicable to the trainer-instructor rather than the learner that he/she lecturers to. Future research should endeavour to gradually unpack some of this dynamic.

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APPENDIX A: THE COMPOSITE TRAINER-INSTRUCTOR RESEARCH QUESTIONNAIRE

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY

1. *SOLICITING INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

THE DEVELOPMENT AND EMPIRICAL EVALUATION OF A COMPETENCY MODEL OF TRAINER-INSTRUCTOR PERFORMANCE: AN ELABORATION ON A PARTIAL COMPETENCY MODEL OF TRAINER-INSTRUCTOR PERFORMANCE

You are asked to participate in a research study conducted by Annemie Wessels, from the Department of Industrial Psychology at Stellenbosch University. The purpose of gathering this information pertains to the completion of a master's thesis. You were selected as a possible participant in this study because the focus of this study is on enhancing trainer-instructor performance and its effect on the learning performance of adult learners and, since you are currently enrolled at an University, you qualify as an adult learner.

1. PURPOSE OF THE STUDY

The objective of the research is to investigate the factors that influence the performance of an affirmative development trainer-instructor and the effect a trainer-instructor's behaviour has on trainees' learning performance. Stated differently, the study aims to establish what makes a trainer-instructor successful and what influence your instructor or lecturer has on your learning performance. The purpose of the research is to improve trainee learning performance by improving the influence a trainer-instructor has on the learning performance of the trainee or adult learner.

2. PROCEDURES

If you volunteer to participate in this study, you will be asked to complete a questionnaire that will take about 15-25 minutes to complete. The questionnaire will be filled out anonymously online and can thus be done during a time period that best suits you and that does not interfere with your classes or study schedule. After having read the informed consent formulation, should you decide to volunteer to participate in the research, you have the option to save and exit (i.e. leave) the questionnaire to complete it at a later time. The questionnaire can, thus, be completed in one sitting or in stages. However, please complete the full questionnaire before the 22nd of June 2018, at 23:50. Once you have filled in and submitted the questionnaire, it will mark the full extent of your participation in the study, no other participation, action(s) or time will be required from you.

3. POTENTIAL RISKS AND DISCOMFORTS

The ratings or scores you provide on the questionnaire might make you think about the performance of your instructor or lecturer, which might lead to feelings of being dissatisfied with the quality of your instructor. If you do experience dissatisfaction or concerns regarding your instructor's performance, you should address it through the formal communication channels available at your institution. However, your ratings will be completely confidential and anonymous. This means that no information or answers you provide will be shared with any of your fellow students, any management personnel at the university or with your instructor or lecturer. Apart from potential dissatisfaction with your instructor and the time you need to set apart to complete the questionnaire, no other physical or psychological risks or discomforts are foreseen as a result of your participation is anticipated.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Furthermore, the overall results obtained from this study will potentially benefit learning institutions in the future as well as benefiting organisations in facilitating skills development. In other words, by participating in the study you provide valuable information that can be used to enhance instructor or lecture performance, which may then ensure higher student or trainee learning performance and, ultimately, higher employee performance on the job one day.

5. PAYMENT FOR PARTICIPATION

You will not be paid for your participation. If you volunteer to participate in the study, by completing the online questionnaire, you can enter into a lucky draw. As a result of participating in the study you, therefore, will stand a chance to win one of three Van Schaik Bookstore, Stellenbosch, vouchers worth R1000 each. At the end of the questionnaire you will be offered a link to a second, independent short electronic survey that will only ask for your cell phone number. The responses to the second questionnaire will result in an independent data set that cannot be linked to the responses to the first questionnaire. The three lucky draw winners will be randomly selected and contacted via text message (i.e. sms).

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and any information that could identify you will remain confidential and will be disclosed only with your permission or as required by law. Furthermore, the information gathered in this study cannot be directly linked to you. Confidentiality will be maintained by restricting access to the data. Only the researcher and her supervisor will have access to the data (information collected from the questionnaires). The results of this study will be published in the form of a completed thesis as well as in an accredited journal, but confidentiality will be maintained. Participant's names will not be published.

7. PARTICIPATION AND WITHDRAWAL

You have a choice whether or not to be in the study (i.e. voluntary participation). Even if you volunteer to be in the study, you may withdraw at any time if you feel the need to stop, and it will be without consequences of any kind. There will be no punishment should you wish to stop participating at any time. The researcher or investigator may withdraw you from this research if circumstances arise which warrant doing so. However, your participation is greatly appreciated.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact the researchers: Ms Annemie Wessels [0731746174; 19617143@sun.co.za] or Prof. Callie Theron [0842734139; ccth@sun.ac.za].

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent, to participate, at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development at Stellenbosch University.

10. INFORMED CONSENT DECISION

I have read and understood the foregoing information and voluntarily agree to participate in the research under the stipulated conditions.

- [ ] Yes I accept
- [ ] No I decline

2. **BIOGRAPHICAL INFORMATION**

Your response to this questionnaire is completely anonymous and confidential. Only the researcher will see your responses in the form of a data sheet. However, your name, surname, any other identification or contact details will not be linked to any of your responses.

The following biographical information is, however, required to describe the demographic composition of the sample that participated in the study.

Instructions:
Please choose the option that best fits your biographical information on the date of completing this questionnaire.

3. ***Gender**
   - Male
   - Female

4. ***Age**
   - 18-20
   - 21-25
   - 26-30
   - 31 or older

5. ***Population Group**
   - Black
   - Coloured
   - Asian (Indian, Korean, Chinese, Japanese)
   - White
   - Other:

6. ***Home Language**
   - isiZulu
   - isiXhosa
   - Afrikaans
   - English
   - Tshivenda
   - Xitsonga
   - Sepedi
   - Setswana
   - Sesotho
   - isiNdebele
   - Siswati
   - Other:

7. ***Highest Level of Education**
   (Please select highest level of education already completed)
   - High School Grade 12
   - Certificate
   - Diploma
   - Degree

- Honours
- Masters or PhD
- Other:

8. ***Regarding my degree/tertiary education:**

- I am still busy completing my degree/tertiary education.
- I completed my degree/tertiary education last year.
- I completed my degree/tertiary education in the last 5 years.

9. ## *GENERAL INSTRUCTIONS

Think back on the lecturers you have had during the second semester of 2017. More specifically, think back on the best/most competent lecturer you have had as well as the worst/least competent lecturer you have had.

The questions in this questionnaire are focused on rating the lecturer (i.e. trainer-instructor). Thus, please choose one lecturer (either the most competent or the least competent). Keep this lecturer in mind as you answer the questions on the lecturer in this questionnaire and your response to the manner in which he/she taught the module that he/she was responsible for.

Additionally, please keep in mind your chosen lecturer's specific module (i.e. the module that this lecturer has taught you), since some of the questions in this questionnaire are focused on rating your experience in a particular module.

I will rate:

- ◯ The most competent lecturer
- ◯ The least competent lecturer

10. ***LEARNING MOTIVATION**

Learning motivation is the desire or intention to invest high levels of consistent effort or energy in order to learn and master the content or training material of the model.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the level of learning motivation that you experienced during the specific module you have identified.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
I intended to increase my knowledge after completing this module.						
When I did not understand some parts of this module I tried harder by, for example, asking questions.						
I was willing to work very hard to increase my knowledge and understanding while attending class for this module.						
I wanted to learn as much as I could from this module.						
I was motivated to learn the work covered in this module.						
I intended to do my best in this module.						

11. *INSPIRING PROFESSIONAL VISION

Inspiring professional vision denotes the extent to which there exists a clear and professional vision in the mind of the student that inspires effort and a desire to learn.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the extent to which the module contributed to you having a clear and positive professional image of what your future job will entail once you have completed your studies.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
This module excited me about my future career.	○	○	○	○	○	○
This module assisted me in forming a clear picture in my mind about what my future job will entail once I complete my studies.	○	○	○	○	○	○
This module contributed to the belief that I will add value to society as a professional/employee.	○	○	○	○	○	○
This module contributed to the belief that I will have a successful career.	○	○	○	○	○	○
This module assissted me in creating a clear idea of where I want to be in 5 years.	○	○	○	○	○	○
This module created the ability to see the relevance of the learning activities to my future career.	○	○	○	○	○	○
In this module I could see the value of what I learn for my future career.	○	○	○	○	○	○
In this module I could see how I can use what I learned to make a difference in society.	○	○	○	○	○	○

12.

*LEARNING CLIMATE

A learning climate is the general atmosphere in the classroom associated with (i) lecturer emotional support, (ii) lecturer academic support, (iii) psychological safety and fairness, (iv) involvement and interest, and (v) autonomy that is conducive to student/learner learning.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the level of the learning climate that existed in the specific module.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
In our class, the lecturer respected students' opinions.	◯	◯	◯	◯	◯	◯
In our class, the lecturer understood how students' felt about learning in general and other issues.	◯	◯	◯	◯	◯	◯
In our class, the lecturer tried to help students when they were sad or upset.	◯	◯	◯	◯	◯	◯
In our class, students could rely on the lecturer for help when they needed it.	◯	◯	◯	◯	◯	◯
In our class, the lecturer enjoyed to see students working.	◯	◯	◯	◯	◯	◯
In our class, the lecturer cared about how well students learned.	◯	◯	◯	◯	◯	◯
In our class, the lecturer wanted students to do their best.	◯	◯	◯	◯	◯	◯
In our class, the lecturer liked to help students learn.	◯	◯	◯	◯	◯	◯
In our class, students felt respected.	◯	◯	◯	◯	◯	◯
In our class, students were treated fairly and equally.	◯	◯	◯	◯	◯	◯
In our class, students respected each other's opinions.	◯	◯	◯	◯	◯	◯
In our class, students felt comfortable to discuss their ideas.	◯	◯	◯	◯	◯	◯
In our class, students valued one another and the contributions that were made.	◯	◯	◯	◯	◯	◯
In our class, students were considerate of each other's feelings.	◯	◯	◯	◯	◯	◯
In our class, students discussed ideas and work.	◯	◯	◯	◯	◯	◯
In our class, students showed interest in the work and activities.	◯	◯	◯	◯	◯	◯
In our class, students discussed possible solutions to problems with each other.	◯	◯	◯	◯	◯	◯
In our class, students shared ideas with one another.	◯	◯	◯	◯	◯	◯
In our class, students tried to teach or explain things to one another.	◯	◯	◯	◯	◯	◯
In our class, students had opportunities to discuss many ways and strategies to approach the work.	◯	◯	◯	◯	◯	◯
In our class, students had opportunities to find many different ways of solving problems.	◯	◯	◯	◯	◯	◯
In our class, students had opportunities to be independent problem solvers.	◯	◯	◯	◯	◯	◯
In our class, students had opportunities to use mistakes as learning experiences.	◯	◯	◯	◯	◯	◯

In our class, students had opportunities to say why the solutions they found were good so that everyone can learn.	○	○	○	○	○	○

13. *STRUCTURE IN THE LEARNING MATERIAL

Structure in the learning material represents the meaningful structure within which the important parts of the learning material are presented as meaningfully integrated and connected network of concepts. In other words, the ability of the lecturer to present or teach in such a manner as to allow for the students to put together different parts of information as well as combine new information with current or old information.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the degree to which the learning material was structured in the specific module.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The learning material was presented in a format that made it easy to find structure.	○	○	○	○	○	○
Meaningful connections could be found between the various sections or information in the learning material.	○	○	○	○	○	○
The learning material was presented in a format that allows for critical thinking and understanding.	○	○	○	○	○	○
The crucial and important aspects of the work or learning material stood out clearly for me.	○	○	○	○	○	○

14. *TRANSFORMATIONAL TRAINER-INSTRUCTOR LEADERSHIP

Transformational trainer-instructor leadership is a trainer-instructor competency that allows the trainer-instructor to combine teacher practises inside the classroom with transformational leadership inside and outside the classroom (e.g. (i) individualised consideration, (ii) intellectual stimulation, (iii) idealised influence or charisma, and (iv) inspirational motivation) in order to, ultimately, attain academic goals.

Instructions:
Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the level of transformational leadership competence that the lecturer in the specific module displayed.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer showed concern for students.	○	○	○	○	○	○
The lecturer was patient when helping students with their problems.	○	○	○	○	○	○
The lecturer paid close attention to each individual student's learning needs.	○	○	○	○	○	○
The lecturer gave students the chance to explain their ideas and to assess and refine them.	○	○	○	○	○	○
The lecturer made the students feel excited or interested in the class material.	○	○	○	○	○	○
The lecturer stimulated the students' innovation and creativity.	○	○	○	○	○	○
The lecturer showed respect and positive regard for all students which inspired the students to do the same.	○	○	○	○	○	○
The lecturer gave us the change to share our feelings, ideas and/or voice our concerns in a way that made us feel safe.	○	○	○	○	○	○
The lecturer did not abuse his/her authoritative power in order to gain the students trust and respect.	○	○	○	○	○	○
The lecturer helped students to create a positive vision or view of their career.	○	○	○	○	○	○
The lecturer encouraged students to see challenges and difficulties related to assignments and tests as learning opportunities.	○	○	○	○	○	○
The lecturer used positive and inspirational messages and verbal communication to motivate students.	○	○	○	○	○	○

15. *FACILITATING CLARITY AND UNDERSTANDING

Facilitating clarity and understanding includes the instructional behaviour (on the part of the lecturer) that facilitates the creation of a learning structure through making lectures easy to outline, organising arguments well and explaining the learning material clearly.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the level of competence with which the lecturer facilitated clarity and understanding in the specific module.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer clearly verbally explained the module content and information (e.g. effective use of examples).	○	○	○	○	○	○
The lecturer clearly non-verbally explained the module content and information (e.g. through enthusiasm).	○	○	○	○	○	○
The lecturer's classes were well organised (e.g. effective use of summaries).	○	○	○	○	○	○
The lecturer spoke clearly (e.g. he/she was easily heard and/or speed and tone of his/her voice fostered clarity and understanding).	○	○	○	○	○	○
The lecturer frequently asked whether we were still following him/her.	○	○	○	○	○	○
The lecturer was willing to again explain aspects of the work that we did not initially understand.	○	○	○	○	○	○

16. ***PROVIDING FORMATIVE FEEDBACK**

Providing formative feedback includes lecturers providing students/learners with verbal praise and recognition directly after correct responses or learning performance. It also includes providing students/learners with corrective feedback on responses or behaviours where there is still room for improvement or where the behaviours were not yet done perfectly according to learning outcomes. Formative feedback thus allow students/learners to adjust or change their learning strategies and behaviours to ensure appropriate future learning performance.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the level of competence with which the lecturer provided formative feedback in the specific module.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer gave feedback directly or at least timeously after each learning activity, action or assessment.	○	○	○	○	○	○
The lecturer provided critical and detailed yet supportive feedback.	○	○	○	○	○	○
The feedback information the lecturer gave me was directly related to the learning outcomes, assessment or task criteria.	○	○	○	○	○	○
The feedback information the lecturer gave me was focused only on my academic work and not on my personality, gender, race or religion.	○	○	○	○	○	○
The lecturer clearly stated the purpose of the information or feedback when given.	○	○	○	○	○	○
The lecturer informed me of behaviour or performance not yet done correctly and then provided an opportunity to rectify or improve it.	○	○	○	○	○	○
The lecturer provided too little feedback during the course of the module.	○	○	○	○	○	○

Page 11

17. ***LIFELONG LEARNING TRAINER-INSTRUCTOR CAPACITY**

Lifelong learning trainer-instructor capacity is the ability of an individual lecturer to continuously engage in (i) reflecting on his/her subject matter and on teaching, as well as (ii) research and learning on his/her subject matter and on teaching practices and to then continuously share his/her newly acquired knowledge and information with others over the course of his/her professional teaching career.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the extent to which the lecturer has shown his/her capacity as a lifelong learner in the specific module.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer was continuously reinventing and creating new ways of presenting the lesson which lead to a positive class atmosphere.						
The lecturer had the ability to change his/her lecture style mid lesson if he/she saw it was not working.						
The lecturer asked for feedback from the class about his/her lecture styles.						
The lecturer continuously shared newly learned/read knowledge and research findings related to his/her subject or teaching styles with the class.						
The lecturer conducted research, on a specific topic or question asked by a student when he/she did not have the knowledge or answer, and got back to us.						
The lecture continuously went on short courses and workshops and other learning, training and development programmes.						

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18. *TRAINER-INSTRUCTOR EXPERT

Trainer-instructor expert denotes the ability of a lecturer to acquire and retain extensive knowledge and deep understanding of (i) content knowledge (knowledge of the specific subject being taught) and of (ii) practical knowledge (knowledge of the all learning and the teaching processes and appropriate teaching methods).

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the degree to which the lecturer in the specific module was an expert of the subject matter that he/she taught and an expert at teaching.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer had the ability to discuss his/her subject with the class in detail.						
The lecturer stayed up to date on any changes within his/her specific field of interest or subject.						
The lecturer has been teaching his/her subject for many years and therefore knows the text book and course work articles thoroughly.						
The lecturer had the ability to manage and adapt to changes in technology utilised in the classroom.						
The lecturer had the ability to provide many additional examples of the learning material as related to real-life situations.						
The lecturer's teaching style or ability to present and explain the subject or course work was effective for enhancing learning.						

Page 13

19. *TRAINER-INSTRUCTOR EMOTIONAL INTELLIGENCE

Trainer-instructor emotional intelligence (i) ability of the lecturer to recognise, monitor and manage his/her own feelings and emotions, (ii) the ability of the lecturer to recognise and monitor his/her students' feelings and emotions, and (iii) the ability of the lecturer to use this information to guide his/her own thinking, actions, behaviours and planning as well as guide and manage their relationships with others.

Instructions:

Think of the module and lecturer that you have identified above.
Please indicate the extent to which you agree or disagree that the following statements accurately describe the emotional intelligence of the lecturer in the specific module

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Unable to rate
The lecturer had the ability to control his/her emotions during heated debates on sensitive topics discussed during class time.	○	○	○	○	○	○
The lecturer never lost his/her tempter during lectures.	○	○	○	○	○	○
During stressful times, where the academic pressure was high, the lecturer was considerate of our feelings.	○	○	○	○	○	○
The lecturer had the ability to understand how the class felt even when the class did not say anything.	○	○	○	○	○	○
The lecturer had the ability to adapt his/her teaching style based on the emotions in the class.	○	○	○	○	○	○
The lecturer had the ability to manage our learning expectations and feelings.	○	○	○	○	○	○

20. ***Thank you for partaking in the research.**

Should you wish to enter the lucky draw, for a chance to win one of three Van Schaik Bookstore vouchers worth R1000 each, please select "continue".

If you choose "continue" it will take you to a second, independent short, electronic survey that will only ask for your cell phone number. The response to the second questionnaire will result in an independent data set that cannot be linked to the responses to the first questionnaire

If not, please select "stop" to end your participation in this survey.

- [ ] Continue
- [ ] Stop

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This marks the end of the survey.

Thank you for taking the survey.