The development and empirical evaluation of a partial competency model of trainer-instructor performance

by

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Thesis presented in partial fulfilment of the requirements for the degree of Master of Commerce in the Faculty of Economic and Management Sciences at Stellenbosch University

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March 2015

DECLARATION

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ABSTRACT

South Africa is faced with social and economic problems, including unemployment and inequality. The nature and extent of these problems are much higher than they should be given the country's level of resources. These social and economic challenges are not only due to global economic trends, but also due to distortions in the economy and society that occurred under Apartheid.

South Africa attempts to compete with other countries on the basis of an under-developed socio-economic infrastructure resulting from historical factors. These socio-economic problems caused by the country's under-developed human capital have a significant impact on organisations. Skills development, or more specifically, affirmative action skills development, presents one solution by which South Africa can combat and address the challenges it is currently facing. Affirmative action skills development involves providing individuals from the designated groups with access to skills development and educational opportunities in order to equip them with the currently deficit skills, knowledge, and abilities.

Human Resource Management, as an organisational function, is largely responsible for human capital development. The Industrial Psychology fraternity as custodian of the Human Resource function, therefore has a responsibility to assist organisations in identifying individuals who would gain maximum benefit from such affirmative action skills development opportunities. In response to this, several studies have been conducted to address the factors that determine whether or not an individual would be successful if entered into an affirmative action skills development programme (De Goede, 2007; Burger, 2013; Van Heerden, 2013). These learning potential competency models have made significant progress in determining the cognitive and non-cognitive factors – malleable and non-malleable - required by individuals to benefit from such opportunities. An additional challenge for the HR function is to furthermore design, develop and implement interventions aimed at optimising the success of those individuals admitted to affirmative development programmes.

This primary purpose of this study was to determine the role of the trainer-instructor in enhancing the malleable learning competency potential and situational latent variables that were shown to influence learning performance in previous learning potential structural models (De Goede, 2007; Burger, 2013; Van Heerden, 2013). Various trainer-instructor competencies and situational variables were included in the model to determine how these malleable learning competency potential latent variables identified by earlier studies (as determinants of learning performance) could be enhanced. Three student learning competency potential variables, two situational variables, and nine trainer-instructor competencies were added to the learning potential model in order to develop the trainer-instructor competency model. Due to the size of the model, the model was reduced to allow for empirical testing.

The reduced trainer-instructor structural model initially showed reasonable fit but the close fit hypothesis was nonetheless rejected. Three model revisions were undertaken in which a total of eleven paths were supported, three additional paths were added and three hypotheses were found to be insignificant. The final revised model showed good fit and the close fit hypothesis was rejected. Practical implications are discussed and suggestions for future research are made by indicating how the model can be further elaborated.

ACKNOWLEDGEMENTS

My deepest appreciation goes to the following people who have contributed to the successful completion of this study:

To God, who blessed me with the opportunity and ability to see this project through.

To thesis supervisor, Prof. Callie Theron, for his mentoring over the course of my undergraduate and post graduate studies. His wisdom, humility, passion for teaching and encyclopaedic knowledge of Industrial Psychology and research methodology has been a constant source of inspiration. Without his guidance and continuous support this dissertation would not have been possible.

My family and friends - especially Andries, Sandra, and Johan - for their continuous love, support, and encouragement.

To the students and staff (in particular Mr Gerhard Visser) of the FET college at which I collected the data for this study. Thank you for so kindly and eagerly assisting me with the collection of the data for this project.

Finally, to the Industrial Psychology Department for the financial support provided for my study through the Departmental Niche Area Bursary on Affirmative Development in the South African Workplace.

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1.1 Introduction

1.1.1 The purpose of organisations and the Human Resource Management function

Organisations exist to achieve goals that no independently acting individual could hope to achieve. An organisation is an amalgamation of people, business process and technology set up to achieve maximum efficiency and competitiveness in a specific market. The primary reason for its existence is to deliver products (goods and/or services) in a productive manner in order to add real economic value that will benefit its shareholders, government and the broader society. Organisations thus have a major responsibility towards society and shareholders to produce high quality products and services with economic utility through the combination and transformation of scarce factors of production.

A concept which has gained increasing popularity in today's highly competitive, globalised world is the *triple bottom line*. Profit forms an essential part of the economic value that organisations try to create for its stakeholders. An exclusive focus on profit is, however, undesirable in the long term. An organisation is a subsystem forming part of a larger suprasystem and the two systems are mutually dependent. If the subsystem ignores the interests of the suprasystem it will ultimately result in the failure or rejection of the subsystem. In this sense, the concept of the triple bottom line becomes vital. The triple bottom line goes beyond the traditional measures of profit, return on investment, and shareholder value, to include environmental and social dimensions. Private businesses, public organisations, and governments focussing on this expanded spectrum of values and criteria for measuring organisational and societal success - that is, evaluating performance along the three interrelated pillars of profit, people, and planet – can play a significant role in developing a sustainable society.

Two other perspectives tie in with the above argument. Firstly, an unwritten psychological contract exists between an organisation and the society which it aims to serve. This contract inherently implies that the organisation will combine and transform scarce resources to deliver value-adding, need-satisfying products to society on the condition that the organisation deals responsibly with the natural and human resources of the society. A violation of these conditions can lead to sanctions from the society and possibly even the termination of the contract. An alternative perspective is that organisations have a moral obligation to deal responsibly with the natural and human resources of a society in order to ensure the long-term sustainability of that society and to do so even if no short-term benefits are involved.

Having competent employees is a major factor determining the extent to which these organisational goals can be achieved. The degree to which organisations are able to successfully create economic value for its stakeholders is largely dependent on humans, the carriers of the production factor. Labour is the life giving production factor through which the other factors of production are mobilised. It represents the factor determining the effectiveness and efficiency with which the other factors of production are utilised (Gibson, Ivancevich, & Donnelly, 1997).

Human capital is crucial to achieve organisational effectiveness. It is the profit lever of the knowledge economy (Bontis & Fitz-enz, 2002). From an economic perspective, human capital refers to one of the factors of production which can add value by taking charge of all economic activities such as production, consumption, and transaction. Human capital has also been defined as a combination of an individual's genetic inheritance, education, experience and attitudes about life and business (Hudson, 1993). According to Beach (2009) the latter definition has been recognised in the literature as more important.

The efficiency with which organisations produce products and/or deliver services is determined by the quality of the human resources (i.e. human capital) an organisation has at its disposal and the manner in which these employees are utilised. Likewise, the extent to which the organisation performs well in the other two dimensions of organisational performance stressed by the triple bottom line perspective is determined by the quality of the human resources the organisation has at its disposal and the manner in which these employees are utilised. Various interventions are employed to control the quality of employees flowing in and through an organisation as well as affecting the quality of people currently employed by the organisation. For example, organisations attempt to employ the best candidates for a position, invest resources in their training and development, and create a working environment optimising job performance. The ability of the Human Resource

Practitioner or Industrial/Organisational Psychologist to regulate the entry of employees into the organisation through sound recruitment and selection practices, to train and develop the selected individuals, and to improve their environment in a way that optimises job performance, becomes vital.

The Human Resource Management function exists as one of the organisational functions. Its inclusion in the spectrum of organisational functions is justified through its commitment to contributing towards an organisation's goals through interventions that affect employee performance in such a manner that the monetary value of the improvement in performance exceeds the investment required to affect the improvement in performance. The Human Resource Management function aims to contribute to organisational goals through the attainment and maintenance of a competent and motivated workforce, as well as the effective and proficient utilisation of such a workforce (Nel et al., 2001). The Human Resource function achieves this by deriving and aligning the Human Resource Strategy with appropriate business strategy in a manner that contributes to competitive advantage (De Goede & Theron, 2010).

The Human Resource Function has to identify and understand the factors that contribute to employee job performance in order to attain and maintain a competent workforce. This has to be achieved through empirical research. Industrial Organisational Psychology research enables the field to formulate credible psychological explanations of the behaviour of working man in order to contribute positively to it. This research is possible as the behaviour of working man is not randomly determined. Rather, it is the systematic expression of a complex nomological network of person/individual and situational variables. Credible and valid theoretical explanations for the different facets of the behaviour of working man constitute a fundamental and indispensable, though not sufficient, prerequisite for efficient and equitable Human Resource Management (De Goede & Theron, 2010).

South Africa's socio-political history has inevitably influenced research on the behaviour of working man and subsequent interventions to positively influence the behaviour of working man in South Africa (Burger, 2012). It is therefore necessary to consider the past and present socio-political situation to understand the unique theoretical and practical issues and challenges facing Human Resource Management.

1.1.2 The challenges faced by Human Resource Management in South Africa

South Africa's history of racial discrimination was led by the Apartheid System. The National Party Government of South Africa enforced the Apartheid system of legal racial segregation between 1948 and 1993 (Van Heerden, 2013). This system reduced the rights of the majority 'non-white' South Africans and minority rule by White South Africans was maintained.

The Apartheid system segregated public services and facilities and provided White South Africans with services superior to those of Black South Africans. White South Africans gained both educationally and economically at the expense of other population groups. For example, the 1953 Bantu Education Act dictated that Black students had a separate education system to White students and Black students lacked the access and opportunities to education and development afforded to White students. Apartheid was thus designed to benefit Whites and disadvantage Blacks.

Black is a generic term which refers to Black Africans, Coloureds, Indians and Chinese who have been South African citizens prior to 1994, now called the previously disadvantaged group. The term *disadvantaged* implies being deprived of some of the basic necessities or advantages of life, such as adequate housing, medical care of educational facilities. Mayer (2003, p. 2) notes that the concept of disadvantagement focuses on being "denied access to the tools needed for self-sufficiency." People are regarded as disadvantaged to the extent that they are denied access to, and use of, the same tools found useful by the majority of society. This includes autonomy, incentive, responsibility, self-respect, community of support, health, education, information, employment, capital, and responsive support systems. According to Mayer, a major feature of disadvantagement is the presence of barriers to self-sufficiency which refers to the ways in which people are denied access to needed tools. Examples of barriers include unavailability of resources, lack of access to resources, the society's regard of a specific group, government and corporate practices, and certain conditions of the group itself. Overcoming disadvantagement thus means to overcome or remove barriers to self-sufficiency. Although removal of such barriers can take various forms, one solution includes enabling or empowering the disadvantaged to develop the tools or resources needed for their own self-sufficiency. Apartheid not only deprived Black South Africans from material resources, but also deprived them from self-sufficiency tools.

Towards the end of Apartheid popular resistance from the South African people, including mass and armed action, was intensified and pressure from the international community in support of the anti-Apartheid cause increased. South Africa faced several problems such poor economic growth, civil unrest, and international boycotts and sanctions (South African Government, 2012). This eventually led to the abolishment of Apartheid and the election of a new government in the first democratic elections in 1994.

Post-1994 elected government embarked on an extensive process geared towards the redistribution of economic, social, cultural and political power and resources in order to rectify the inequalities of Apartheid. The 2010 report on South African Development Indicators shows that significant progress has been made in developing and transforming an unequal society. According to the 2010 Development Indicators report (Republic of South Africa, 2010) growth in the gross domestic product (GDP) increased from 3.2% in 1994 to an all-time high of 5.5% in 2007, but decreased to -1.7% in 2009 due to the international economic crisis. Foreign direct investment (FDI) increased from -3.04 to 34.845 between 1994 and 2009. Government debt as a percentage of GDP decreased from 43.5% in 1994 to a low of 22.2% in 2009.

Access to social services has also increased substantially according to the 2010 Development Indicators report (Republic of South Africa, 2010). The percentage of households with access to water infrastructure above or equal to the Reconstruction and Development Programme (RDP) standard increased from 61.7% in 1994 to 93.8% in March 2010. The estimated overall number of households with access to sanitation has increased from 50.9% in 1994 to 79.9% in 2010. The estimated number of households with access to electricity has increased from 4.5 million (50.9%) in 1994 to 9.25 million (74.5%) in 2009 (Republic of South Africa, 2009).

Post-1994 South Africa has experienced major transformations in the workplace environment. Apartheid is a known determining causal factor for the large concentration of Black people in the lower-level positions in organisations (Du Plessis, 1995; Kahlenberg, 1996). Reviewing all discriminatory legislation and affording all employees equal opportunities has been pivotal in implementing corrective measures for this problem. South Africa has achieved much in the way of societal development and workplace transformation, but the speed with which change is occurring is not sufficient to meet the needs presented by accelerating, complex, and causally related social and economic challenges (Republic of South Africa, 2003).

Despite a multitude of government initiatives, various international and national social and economic indicators suggest that South Africa is not performing as well as it should be given its wealth and resources. This seems to reinforce the notion that South Africa is still disadvantaged by its history. Furthermore, there is strong criticism towards the corrective measures implemented by government and its effectiveness in bringing about the transformation that was its intent. This seems to be reflected, in part, in the declining social cohesion indicators in the 2010 Development Indicators Report (Republic of South Africa, 2010). The report indicates that in 2009 only 67% of South Africans were confident in a happy future for all races compared to the 74% in 2000. In 2000, 74% of South Africans were of the opinion that race relations were improving compared to the mere 46% in 2010. At the onset of 1994 76% of the population felt that the country was moving in the right direction compared to 42.8% at the onset of 2009.

South Africa has one of the highest unemployment rates in the world. According to aneki.com, a privately operated Canadian website serving as a source of continental and world rankings, South Africa is ranked 24th out of 165 countries in terms of the highest unemployment rate (Aneki.com, 2010). According to the World Factbook of the Central Intelligence Agency, South Africa is ranked 27th out of 200 countries in terms of the highest unemployment rate (Central Intelligence Agency, 2012). A recent survey by Bloomberg, a leader in business and financial information, found that South Africa has the highest official unemployment rate among the 61 countries surveyed (Roos, 2011). The total number of employed in June 2010 stood at 12 742 million with a labour absorption rate (the proportion of working-age population that is employed) of 40.6%. The national unemployment rate, narrowly defined (number of people who were without work in the week preceding the interview, have taken active steps to look for work, and were available for work), is currently at approximately 25% (Republic of South Africa, 2010). Broadly defined (number of people who were without work in the week preceding the interview and were available for work) the unemployment rate is estimated at 36-37% (Republic of South Africa, 2010; STATS SA, 2010). Sebusi (2007) suggests that there appears to be a racial trend underlying these statistics. While approximately 30% of Blacks are unemployed, only 20% of Coloureds, 14% of Indians are unemployed, and a mere 4% of

Whites are unemployed. When distinguishable and relatively visible groupings differ in the extent to which they are allowed the privilege of sharing in the employment opportunities of South Africa this is likely to contribute to the social unrest potential of the country. This in turn puts further downward pressure on the creation of additional job opportunities through economic growth.

Although several success stories exist attesting to the success of Black economic empowerment and although statistics indicate that South Africa's labour market is slowly transforming, transformation to date has not been broad-based and government considers the rate of transformation too slow. Mpho Nkeli, the chairperson of the Commission for Employment Equity, states in the 10th Annual CEE report that "[i]t is disappointing that 20 years after the release of former President Nelson Mandela, progress in the workplace is at the minimal level. I therefore beg to ask the question, how committed is the labour market to transformation?" (Commission for Employment Equity, 2010, p. 4). As a result of the slow transformation several amendments to the Employment Equity act are in progress in an attempt to speed up transformation and encourage the private sector to comply with employment equity targets. The recommended changes to the EEA envisions to drive better compliance and introduce more severe consequences for companies that defy the law (Commission for Employment Equity, 2010). The capacity of the monitoring unit has been increased to improve the pace of transformation; EE has been made a distinct criterion during the tendering process; the newly formed President's BEE Council will be engaged to highlight the poor progress in the implementation of the EEA; and the CEE has also redefined the name and shame and praise process (Commission for Employment Equity, 2010). Nkeli further notes that, "[i]t is a great pity that the country has to resort to tougher measures to drive transformation" (Commission for Employment Equity, 2010, p. 5).

A high unemployment rate is usually associated with a high poverty rate. It is estimated that in 2008, 50% of people lived below the poverty line of R524 per person per month, 39% lived below the poverty line of R388 per person per month, and 23% of people lived below the poverty line of R283 per person per month (Republic of South Africa, 2010). Bleby (2010, as cited in Burger 2012) notes that it is estimated that 75.4% of South African adults (36.75 million) earn an income equal to or less than R4166.67 per month (R50000 per annum) and 26% of South Africans live below the national poverty line of R515 a month - It is important to note that this amount falls below the personal income tax threshold of R63556 (Hazelhurst, 2012). Thus, although the tax base has grown from 6 million in 2010 to 13.7 million in 2012 (Hazelhurst, 2012), not all registered tax payers are eligible for income tax as many earn below this threshold. Joubert (2012), a reasearcher for the Solidarity Research Institute, reports figures giving even greater cause for concern. According to him, in the 2010/11 tax year only 5.9 million taxpayers were registered with SARS and personal income tax represented just 33.8% of the state's tax revenue. Of the 5.9 million tax payers approximately 4.7 million people had to submit tax returns and, therefore, approximately 1.2 million registered taxpayers can be ruled out when considering the number of people who really pay income tax. Joubert, after taking several calculations and adjustments into consideration states that approximately 3.2 million people were responsible for payment of 99% of all income tax in 2010/11; approximately 2.1 million people paid 92% of all income tax; and 1.4 million people paid 82% of all income tax. On the one hand this creates the problem that a select few have to generate the funds necessary to keep the government machinery running but on the other hand it underlines the fundamental problem that the majority of South Africans do not have access to employment opportunities that compensate them in a manner that makes them eligible to pay employment tax.

Dependence on social assistance grants further testifies to the severity of the unemployment and poverty problem. It appears that social assistance grants expenditure has dramatically increased from R37 million in 2003/2004 to R80 million in 2009/2010 (Republic of South Africa, 2010). Ndlangisa (2011) states in 2011 nearly 31% of South Africans received social assistance grants. At the end of 2011, nearly 15.3 million people were eligible for social grants compared to the 2.5 million in 1998 (Fin24.com, 2012). Furthermore, the number of South Africans receiving social grants will swell to 16.7 million over the next three years according to the 2012/2013 budget. These statistics clearly indicate a great disparity between the number of income tax payers and the number of recipients of social grants. Furthermore, the R524 poverty line poverty headcount index decreased from 58% in 2000 to 49% in 2008 and the R283 poverty line poverty headcount decreased from 38% in 2000 to 22% in 2008 (Republic of South Africa, 2010). This decline in poverty headcount is largely due to an increase in social grant uptake. However, when considering this disparity in recipients of social grants and taxpayers, it becomes highly questionable whether this dependence on social grants can be sustainable in the long term and whether it contributes to economic growth and prosperity.

Inequality in the South African society also seems to be an imminent and prevailing challenge. A 2012 survey revealed that economic liberation is the most divisive issue in the country. According to the SA Reconciliation Barometer 2011, income inequality keeps South Africans more divided than race (Fin24.com, 2012). The Development Indicators Report (Republic of South Africa, 2010) states that GDP per capita (which averaged less than 1% per annum in period 1994 to 2003) has averaged 3.7% since 2003, with gross national income per capita increasing from R28 536 in 1994 to R35 905 in 2010. For the richest 10% of the population monthly income increased from R71 055 per month to R97 899. However, for the poorest 10% of the population monthly income increased from R783 to R1041 between 1994 and 2009. The poorest 20% of the South African population earn about 2.3% of national income, while the richest 20% earns about 70% of the income (National Planning Commission, 2011). Furthermore, there exist vast income inequalities with the 70% of income accruing to the richest 20% and the poorest 10% getting less than .6%. The inequality is racialised as the average income for Black individuals is R775.46 while the average income for White individuals is R7645.58, with Coloureds and Asian a distant in-between (Republic of South Africa, 2010). Substantial differences in average income by race group seem to continue with the majority of low income households being Black (National Planning Commission, 2011). In 2003 estimates for the proportion of the population living in poverty are in the order of 30% to 40% (Gelb, 2003; Landman, 2003).

The GINI coefficient provides a measure of how materially and economically unequal individuals in a given country are. In a society in which material benefits are distributed equally the index would be zero, in one in which all such benefits are bestowed on one person the GINI index would be 1 (Hoffman, 2007). In terms of the Gini coefficient, South Africa appears to have improved from being the most unequal country in the world. The most recent Gini figures, places South Africa at rank 123 out of 187 countries with a ranking of .578 (United Nations Development programme, 2011). A slightly different figure is provided by the Development Indicators Report which reports a coefficient of .666 for 2008 (Republic of South Africa, 2010). What is encouraging is that between-race inequality has decreased from .532 in 1994 to .331 in 2008. An opposite trend has emerged when looking at within-race inequality as this coefficient has increased from .349 in 1994 to .618 in 2008 (Republic of South Africa, 2010).[1]

Yet another indicator of economic and social equality is the Human Development Index (HDI), it is a comparative measure of life expectancy, literacy, education and standard of living for countries worldwide. It is a standard means of measuring well-being. According to the Human Development Index (HDI) South Africa has moved from a rating of .741 in 1995, to 111th place with a rating of .684 in 2003, to 123rd place with a rating of .619 in 2011 (United Nations Development Programme, 2003, 2011). South Africa appears to be regressing in HDI terms.

Inequality of racial representation in the workforce remains a problem. In order to meet both social and economic goals, the government has increasingly identified skills development and employment equity as fundamental issues (Daniels, 2007; Rankhumise & Netswera, 2010). A variety of legislative reforms such as the Employment Equity Act 55 of 1998 and in the Skills Development Act 97 of 1998 and initiatives such as Affirmative Action (AA) and Black Economic Empowerment (BEE) have been introduced with the aim of eliminating discrimination and promoting equal opportunities in the workplace (Rankhumise & Netswera, 2010). The South African Government has implemented these policy initiatives as part of several corrective measures to advance previously disadvantaged groups in an attempt to reverse the inequalities experienced under the Apartheid regime. The implementation of the Employment Equity Act puts pressure on the public and private sector to ensure that their workforce reflects and represents the demographics of the South African population (Republic of South Africa, 1998). However, strong criticism exists towards these corrective measures as they have not proved effective in producing the transformation they were intended to bring in 17 years of democracy. The 2009-2010 annual report of the Commission for Employment Equity stressed the marginal progress that has been made ten years after of the promulgation of the Employment Equity Act (Commission for Employment Equity, 2010). The report indicated that the national labour market was still very much racialised; with White South Africans still predominantly located in middle to high end occupations and Black South Africans remained at the lowest end of the labour market.

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[1] The within-race figure seems to refer to inequality averaged across all race groups and not specifically to the inequality within the Black racial group.

Africans constitute the 76.6% (40.5% male and 33.1% female) of the national economically active population in South Africa followed by Whites with 12.1% (6.7 male and 5.4 female), Coloureds with 11% (6% male and 5% female) and Indians with 3.2% (1.9% male and 1.3 female) (Commission of Employment Equity, 2011). Representation in the South African workplace does not reflect this profile. The 2010 report indicated that the representation of Coloureds, women, and people with disabilities still lags behind at most levels when measured against their Economically Active Population (EAP). Progress has been made in terms of Professionally Qualified and Skilled levels for both Black people and women. Whites still dominate the top management (White 73.1%, African 12.7%, Indian 6.8% and Coloured 4.6% and senior management (White 64.1%, African 17.6%, Indian 9.1%, and Coloured 7%) levels. The 11th CEE Report (2011) notes that research from BUSA shows that more than 90% of the CEO positions at JSE listed companies are still dominated by White males, with a number of them nearing retirement. The reports also show that White women are more likely to be employed at these levels than any other designated group. For the professionally qualified level, 47.7% are White, 31% are African, 10.4% Coloured and 8.8% Indian. At the skilled level, 51% are African, 28.5% are White, 13% are Coloured and 6.2% are Indian. The picture looks even bleaker when looking at BEE transactions. BEE transactions peaked in 2003 and 2004 with 28-30% of all merger and acquisition transactions being BEE transactions (Republic of South Africa, 2010). This has declined to 8.5% in 2009 and it appears that BEE levels of ownership still remain relatively low overall.

In terms of global competitiveness, South Africa is deteriorating. According to the World Competitiveness Report released by the International Institute for Management Development (2001) South Africa was the only African country covered and was ranked at 42 out of 49 countries surveyed. Competitiveness rankings are comprised of four components; economic performance, government efficiency, business efficiency, and infrastructure. In 2011, South Africa's global ranking in terms of competitiveness dropped dramatically from 44th out of 58 to 52nd out of 59 (Hazel, 2011). The Global Competitiveness Index, released by the World Economic Forum, defines competitiveness as a set of institutions, policies and factors that determine the level of productivity of a country (World Economic Forum, 2010). It provides a holistic overview of the factors that are critical to driving productivity and competitiveness and groups them into 12 pillars. South Africa fell from rank 45 in 2009-2010, to rank 54 of 139 countries in 2010-2011 (World Economic Forum, 2010). Worthy of special concern is the ranking of 129 out of 139 obtained for *health and primary education*, the ranking of 75 out of 139 obtained for *higher education and training*, and ranking 97 out of 139 for *labour market efficiency*. The Global Competitiveness Index cites that an inadequately educated workforce is considered to be the second most problematic factor for doing business in South Africa (World Economic Forum, 2010). It also notes that efforts must be made to increase the university enrolment rate which is only 15%, placing South Africa at 99th overall. South Africa's transformation from a resource-based economy to a knowledge-based economy is slow and deteriorating. South Africa has been gradually slipping on the knowledge-based economy index from 49th in 1995 to 65th in 2009 (Republic of South Africa, 2010). According to the Development Indicators Report this reflects the low-university throughput, slow internet penetration and decreased funding for research and development.

The issues described above paint a clear but nonetheless depressing picture of the status quo in South Africa. Although SA has made remarkable progress since the advent of democracy, the country is faced with remarkable challenges. Unemployment, poverty, income inequality, inequality in racial representation in the labour market and decreasing global competitiveness are all symptoms of a greater underlying problem. There are many challenges currently facing the South African economy, yet the biggest and most fundamental challenge the country is faced with is its skills crisis. South Africa's fundamental problem, underpinning unemployment, poverty, income inequality, inequality in racial representation in the labour market, and decreasing global competitiveness, is a problem of a lack of human capital. Too many South Africans have too little human capital to trade in the employment market or the entrepreneurial market. Most of these are Black individuals. The national skills shortage crisis constrains service delivery, equity, economic growth and competitiveness. It is affecting the performance of the state, the state of society as well as the economy's ability to compete in the global market. A skills shortage arises when the following situation or a combination thereof exists: a shortage of workers in a particular occupation, labour demands exceeding availability of skills, or workers lacking appropriate qualifications.

Skills shortages in South Africa are the direct consequence of the interplay between several socio-political and economic factors. The post-Apartheid government inherited a divided education and training system that comprised fifteen education departments the Apartheid government established along racial and regional lines (Rasool & Botha, 2011). Hofmeyr and Buckland (1992, as cited in Rasool & Botha, 2011) note that the Apartheid education and training systems produced structural chaos that wasted funds, caused inefficiency, and resulted in very poor graduate outputs.

Numerous studies and surveys have confirmed the nature and extent of the national skills crisis. The Solidarity Research Institute (2008a; 2008b) found that in 2007, a report released by Deloitte and Touche, indicated that 81% of companies struggle to find appropriate staff, and 76% of respondents reported that finding employment equity candidates was a significant problem. The survey also noted that there was a particular shortage of skills in various occupational fields such as finance, IT, sales and marketing, science, and engineering. The Bureau for Economic Research (BER) found that 47% of SA manufacturers said that the skills shortage was their most serious difficulty. The Grant Thornton Annual International Business Report of 2008 reported that nearly half of private businesses say a lack of skills is the biggest constraint to growth in South Africa. The survey showed that 48% of the businesses claimed to face a skills crunch. There appears to be a shortage of skills in every sector. Of special note is the huge shortage of artisans: South Africa only has 10% of the artisans it had two decades ago and it is estimated that the country has a 40% shortage of artisans. In 2008, South Africa was required to produce 50 000 artisans by 2010 and at least 12 500 artisans had to be produced from 2008 to 2012.

A main contributor to the skills crisis in South Africa is the current education and training system of the country. The system is characterised by low education standards, inadequate provision for early childhood development, declining grade 12 pass rates, declining enrolments at FET colleges, lack of resources, unqualified teachers, weak management and poor teacher morale (Rasool & Botha, 2011). Furthermore, high failure rates in schools, colleges, and universities offer little hope of reducing and resolving the skill shortages. Rasool and Botha, note that the South African Civil Society Information Service claim that these developments are obstacles to the production of the skills the economy requires.

The government's contribution to public education remains the single largest investment in public services. Education expenditure has grown 12% every year for the past three years and accounts for R140.4billion in provincial and national government spending for 2008/2009

(Manual, 2009, as cited in Rasool & Botha, 2011). Expenditure on education and skills will increase from R190billion in 2011/2012 to R215billion in 2013/2014 (Rasool & Botha, 2011). Despite the enormous expenditure on education, the educational system still appears to be struggling in making headway in producing the knowledgeable, skilled and competent individuals the job market requires. This is confirmed by the following statistics:

In the 2011 National Senior Certificate examinations at South Africa's state schools, 70.2% of matriculants passed their exams (SouthAfrica.info, 2012). This is a 2.4% percentage point increase on the previous year's pass rate of 67.8%. Only 24.3% of Grade 12 learner's qualified for Bachelor studies in 2011 and in 2010 only 31% passed mathematic, 30% passed science, and 35% passed accounting. These poor pass rates hold major implications for the skills shortage as these subjects are a prerequisite for individuals who wish to pursue careers in finance, IT, medicine, and science. Many Black students who enter tertiary institutions are reluctant to pursue careers in the science and technology fields and a large number remain marginalised because they lack the specialised skills the economy requires (Pandor, 2008, as cited in Rasool &Botha, 2011). Ray (2009) found that nearly 50% of all university drop-outs aged between 18-20 were Black. The Labour Force Survey of 2005 revealed that 42% of Africans between the ages of 15-24 stopped their studies and entered the labour market; more than 60% of them had a grade 12 qualification, while 33% had nothing more than grade 12 (Rasool & Botha, 2011). The weaknesses in the South African education system are bound to affect the preparedness of individuals that enter the job market and fail to produce students that are eligible to fulfil skills shortage occupations.

An equally disconcerting phenomenon is the high school drop-out rate. A panel discussion held in 2008 by the Institute for Race Relations revealed that of the 1.7 million students that started their grade 1 in 1995 and matriculated in 2007, only 31% reached matric exams, 21% passed their matric exams and only 3% managed to obtain university exemption (Solidarity Research Institute, 2008b). To improve the output of the education system, however, many more teachers are required. This too seems to be problematic as an average of 25 000 teachers leave the profession every year while only 7 000 enter it. Similarly, the study conducted by the Human Science Reseach Council (2002-2004, as cited in Rasool & Botha, 2011) reported that annually, for the period 2002-2004, only 109 000 of the 709 000 head count enrolment attained their qaulification. This translates into a R4.5 billion cost in grants and subsidies to the National treasury. This paints a rather bleak picture of the number of eligible students the education sector is able to produce to fill these positions.

The description of the current schooling system makes it clear that South Africa is inadequate in producing skills. However, the country also appears to be struggling in retaining skills. South Africa's skills are also deteriorating due to emigration and HIV/AIDS. Affirmative action affected many skilled people and some of those who opposed this policy opted to emigrate. South Africa's high crime rate, as opposed to better salary offers, a better quality of life and future for their children, economic stability, and improved health care elsewhere, are some of the factors that contribute the migration of skilled workers (Bezuidenhout, Joubert, Hiemstra & Struwig, 2009). In 2001, the country lost six times more professionals and technicians that it gained (Rasool & Botha, 2011). The unofficial number of emigrants is estimated at three times the official number (Centre for Development and Enterprise, 2008). The official number of emigrants per 1000 of the population was 4.98 (Immigration Statistics, 2011). According to the Centre for Development and Enterprise (2002), White skilled professionals are the majority of those that leave the country, as skills are concentrated in the White population due to the country's history. The emigration of skilled professionals in 1997 alone cost the government approximately R68 billion of investment in human capital because of the lost skills (Rasool & Botha, 2011).

1.1.3 Affirmative development: A potential solution

The current challenges facing South Africa is, to a large extent, the aftermath of Apartheid. Although government and the private sector appear to be committed to resolving these issues, the solutions provided focus too heavily on treating the symptoms described above rather than addressing the root cause. The underlying problem aggravating and causing many of these challenges is the fact that knowledge, skills and abilities are not evenly spread across all races. White South Africans have in the past enjoyed greater access to educational and development opportunities and this situation perpetuates in the present. If sustainable solutions are to be found to solve the challenges above, this fundamental cause has to be addressed. As such, it is posited that skills development present a sustainable means to combat and resolve the issues discussed. Admittedly, a range of other possible responses exist to alleviate the skills shortages such as freeing wages, developing a progressive immigration policy, reviewing labour marker policy, and improving industrial policy (Development Policy Research Unit, 2007). However, education and skills development remains a major tool, albeit not the sole solution, to address the current challenges facing South Africa. Given the existing skills shortages in South Africa and the significant distance to go in terms of employment equity in the private and public sector, the training and development of affirmative action candidates (also known as affirmative development) seems to be the most sustainable and high-impact means to address these problems and achieve equality for all.

1.1.3.1 The current implementation of affirmative development

The South African government is giving the issue of skills development considerable attention, however, skills shortages, poverty, unemployment, and inequality remain an unquestionable issue in South Africa. The proliferation of new legislation and policies reflect this. New legislation and policies aim to develop the skills and employability of all citizens in order to alleviate poverty, create employment opportunities, address historical inequalities and improve the competitiveness of the national economy (Du Toit & Van Tonder, 2009, as cited in Rasool & Botha, 2011).

In 2004 the ANC redesigned the national development vision and outlined a vision of four key areas of delivery over the next decade including halving unemployment; halving poverty; improving employment equity; and accelerating broad-based black economic empowerment (Mbeki, 2004, as cited in Human Sciences Research Council, 2005). This new vision, clearly envisaged a central role of human resource training and development in both the public and private sector. Skills shortages were identified as major impediments to socio-economic growth and development by the Human Resource Development Review (Kraak, 2004). Skills development is seen as a crucial tool of economic development. The development of better technical skills is regarded internationally as a key element of improving economic performance (Wolf, 2002, as cited in Human Sciences Research Council, 2005). Furthermore, a deficiency in skills at the individual level is widely seen as a major element in poverty as individuals without skills are unable to sell on the labour market, or to make a viable living in subsistence or self-employment activities, increasing the likelihood of an impoverished existence (Human Sciences Research Council, 2005).

South Africa has experienced an increase in the provision of training and development initiatives by organisations after 1994 (Badroodien, 2003). Attempting to (1) negate the inequity and disadvantage fostered under Apartheid; (2) meet the new education and training demands of the global economy; (3) address the scarce skills arising from South Africa's closed and highly protected economy; (4) contest the increase in emigration after 1994; and (5) assist the most vulnerable in the labour market, are all factors contributing to an increase in training and development activities. This increase is mainly the consequence of the proliferation of new legislation. The promulgation of the Skills Development Strategy of 1998 and National Skills development strategy of 2001 and 2005 sought to respond to these challenges and create a new institutional environment which would facilitate an expanded strategic investment in training and education in South Africa (Badroodien, 2003). The Skills Development Act created an enabling institutional and regulatory framework for expanding strategic investment in education and training across all economic sectors. As a result of this act, the Sector Education and Training Authorities (SETAs) were established by which representatives of organised labour and business promote skills development. The South African Qualifications Authority Act 1995 created a national qualifications framework (NQF) to increase accessibility and portability to learners to improve their qualifications, but in 2008 the National Qualifications Framework Act of 2008 repealed this act (Rasool & Botha, 2011).

Twenty five SETAs were created in 2000 to "serve as intermediary institutions and regulatory mechanisms between government and private sector organisations to provide the necessary co-ordination and financial incentives, and foster the social obligations to stimulate investment in training" (Badroodien, 2003, p. 439). SETAs are required to respond to the skills scarcity and organisational training needs of the various stakeholders by overseeing training and development initiatives. Organisations are required to pay a skills development levy of one per cent of total payroll costs and are allowed to reclaim actual training expenditure from sectoral training funds (Badroodien, 2003).

The Accelerated and Shared Growth Initiative for South Africa (ASGISA) was launched in February 2006 in response to the government's commitment to halve unemployment and poverty by 2014 (Rasool & Botha, 2011). In the same year, the Joint Initiative on Priority Skills Acquisition (JIPSA) was established to address the scarce and critical skills SA needed to meet ASGISA objectives. Two of the six binding constraints preventing South Africa from achieving its desired growth rate identified by ASGISA were shortages of suitably skilled workers and the spatial distortions of Apartheid that affect unskilled labour costs and deficiencies in state organisation, capacity and leadership.

The State of Skills Report 2007/2008 (Human Sciences Research Council, 2008b) reports that the training rate (expressed as the number of workers receiving training divided by the number of workers employed) was calculated at 53% in 2007. This shows a significant increase from the 16% reported in 2001 and the 25% reported in 2003. The training rate of large organisations equalled 64% and small organisations equalled 34%, indicating that workers of large organisations were almost twice as likely to received training to those employees of small organisations. The report also cited various training statistics based on race and access to training by race group can be viewed in three dimensions: equity of access to training on the basis of race; relative access to training by race; and firm size.

The first dimension, equity of access to training on the basis of race, indicated improvement from 2002/2003 to 2006/2007. In 2002/03, the difference between the race group with the highest and with the lowest aggregate training rate equalled 10%. This difference decreased to 8% in 2006/07, implying greater equality in access to training between the race groups receiving the most and the least access to training. The second dimension, relative access to training by race, indicated that in 2002/03, the order of training access by race was (from highest to lowest) Black, Coloured, White, and Indian. This changed in 2006/2007 to (from highest to lowest) Indian (59%), White (56%), Coloured (52%), Black (51%). Thus Black employees had the highest access to training in 2003 but the lowest in 2007. The third dimension, firm size, played a critical role in determining the training rate per race group. That is, training access was stratified first by size, and within that, by race. On average, an increase in training rates were found for all race groups across all enterprise size categories in the period. The largest increase in access to training in each race group from 2003 to 2007 was among employees in the large organisation category and the smallest increase in each race group was among employees within the small organisation category.

When reviewing national and international training statistics it becomes apparent that training and development activities are expensive exercises. Training expenditure as a percentage of payroll is determined by workforce size, wage rates and the occupational structure of sectors and organisations (Human Sciences Research Council, 2008b). It is estimated that between five and seven per cent of payroll is spent by organisations in countries such as Australia, Greece and the USA (Erasmus, Loedolff, Mda, & Nel, 2004). Lynch (1998, as cited in Gauld & Miller, 2004) states the USA spends $60 to $70 billion a year on workplace education and training. Australian companies spend $5 billion annually on employee training (Allan, 2002). It is estimated that South African organisations spend on average 2.1 per cent of their payroll, whereas large organisations spend over 2.8 per cent of their payroll on training (Erasmus et al., 2004). South Africa's top earning organisations spend millions on training and development. BHP Billington spent R55 million on employee training and development and R20 million on the recruitment and development of Black Females (BHP Billiton, 2005); Anglo American invested $137.7 million in 2010 in direct training activities (Anglo American PLC, 2010) and Sasol invested R421 million in employee training and development in 2009 of which R261 million was spent on the development of Black employees (Sasol, 2010).

Various surveys have been conducted to assess training trends in South African organisations under this new training system (Human Sciences Research Council, 2008a). The National Skills Survey of 2003 found that small organisations (11-50 employees) spend R2398 on training per trained employee and R1070 on training per employee; medium organisations (50-100) spend R2424 on training per trained employee and R1025 on training per employee; large organisations spend R4247 on training per trained employee and R1864 on training per employee, and an average of R3691 was spend on training per trained employee and R1613 on training per employee in small organisations. The survey also found that the average percentage of workers undergoing training (i.e. the training rate) across all sectors is 23% for small organisations, 24% for medium organisations, 25% for large organisations, and 24% on average for all organisations. Furthermore, the study found that the training rate in organisations according to race is 26% for African, 23% for Coloured, 18% for Indian, and 23% for White. The State of Skills report ((Human Sciences Research Council, 2008b) reported that from 2003 to 2007, the average expenditure per employee increased by 30% over the four year period. The report notes that although the training rate almost doubled during this period, the training expenditure increased much more slowly.

Although these statistics provide evidence that organisations make substantial investments in the training and development of their human capital, transformation in the private and public sector has been faced with various implementation difficulties. Given the workplace representation statistics discussed earlier, the conclusion can also be drawn that the impact of Affirmative Action in promoting equality after 17 years, as it is required in the Constitution, has failed significantly in promoting the achievement of equality (Hoffman, 2007). The Commission for Employment Equity (2008) supports this view as it reports that, although there has been encouraging movement towards achieving the objectives of the Employment Equity Act, the rate at which change occurs remains frustratingly slow. Of particular concern to the Commission for Employment Equity (2010) is the fact that despite the Employment Equity Act having been enacted more than a decade ago, a great portion of the productive population of South Africa remains grossly under-utilised.

The current government seems to have opted to focus on employment quotas and encouraging preferential procurement to ensure organisations have the ‘right’ racial demographics. Although demographic representation is an important aspect in transformation, it does not provide a long-term and sustainable solution to the challenges South Africa is faced with. The focus so far, appears to be on more superficial solutions, rather than on the longer-term approach of providing equal skills, which would have levelled the playing field and allowed people of all races to compete on equal terms. The consequence of this has been the creation of a new Black middle class consisting of individuals who are fortunate enough to be well educated. However, for the most Black South Africans, transformation has been slow to non-existent as skills shortages and high unemployment rates make it difficult to find paying work. This is evidenced by the increase in within-race inequality (as indicated by the Gini coefficient) and the rising unemployment figures.

The effectiveness of the policies implemented to bring transformation has been brought into question. Davis (2012, para. 15) aptly summarises the situation:

> The policies selected to affect transformation of South Africa’s labour market have been criticised as being discriminatory and ineffective, of encouraging cronyism, and of promoting token roles for blacks, without providing the necessary training and mentoring needed to create lasting and meaningful transformation… and it begs the question: are we using the right tools?

Davis (2012) states that research conducted by Rulof Burger and Rachel Jafta from the Economics department of the University of Stellenbosch indicates that the effects of affirmative action policies in reducing employment or wage gaps have been marginal at best. Their research found that improved access to education played a more significant role in addition to a small narrowing at the very top of the wage distribution. This suggests that affirmative action may have improved the fortune of individuals from the designated groups who were already more highly skilled. The benefits of the policy was deemed to be too small and concentrated on too few individuals to have benefited the average previously disadvantaged individual.

As a result, one of the greatest critiques against Affirmative Action is that it has become a number crunching game to government, business and industry (Solidarity Research Institute, 2008a; 2008b). Many organisations solely focus on the output of racial representation without training and developing individuals from the designated groups to successfully fulfil their new positions. In such cases, previously disadvantaged individuals are simply put into positions to fill quotas, without a real difference being made. Research conducted by the Sociology of Work Unit at the University of Witwatersrand in 2008 on the impact of employment equity since its inception found that companies aggressively implemented targets (for example, Eskom) suffered significant consequences due to rising levels of incompetence (Davis, 2012). Their research found that there was a shortage of suitably qualified candidates and raised concerns over the uneven quality produced by our education system.

De Goede and Theron (2010) state that affirmative action in its traditional interpretation in terms of quotas and preferential hiring is a shallow and insincere solution to the problem that denies the severity of the problem and will continue to hurt the very people it aims to help. Davis (2012, para. 21) quotes the words of human rights activist and social commentator, Rhoda Kadalie, "We can't put right the results of Apartheid education overnight." Accordingly, Kadalie (as cited in Davis, 2012, para. 21) states that "we need to be patient and put economic growth ahead of affirmative action until we are able to employ qualified blacks and women." She also says that she is "not against transformation, but considers it a human rights violation to put incompetent people in powerful positions" (Davies, 2012, para. 21). When viewed from this perspective the Commission for Employment Equity's decision to resort to tougher measures to drive transformation as the solution for the lack of significant transformation in South Africa is regretably inappropriate.

It thus follows that a *real and sincere* effort is required to correct past wrongs and the consequences thereof, and that the Human Resource Management and Industrial Organisational Psychology fraternity need to address this problem with a real sense of urgency (De Goede & Theron, 2010). The national skills shortage has been referred to as a ticking time bomb by the Ministry of Labour (Hoffman, 2007). The inability of large numbers of people to gain access to an economy that offers the key to an affluence that is flaunted before them day after day, despite the implicit promise that the advent of the new political dispensation would facilitate such access is, over time, bound to reach such levels of frustration that it will explode into widespread social unrest. History attests to the fact that when the many who have little or nothing to lose are taunted for long enough by the wealth of a few who have a lot more to lose, the frustration boils over to the detriment of all. According to Coetzee (2011) these issues render South Africa's young democracy vulnerable and threaten its continued existence. In their 2008 report, the Sociology of Work Unit at the University of Witwatersrand recommended a shift to address employment equity at an industry level as labour markets are sector-specific (Davis, 2012). Furthermore, they recommended a shift in focus from administrative compliance to active labour market interventions to ensure that there are adequately trained people to fill positions as they become available. Mpo Nkeli, the Chairperson of the CEE, seems to agree that industry holds the key to true transformation as she states the following (Commission for Employment Equity, 2010, p. iv):

> The labour market has the ability to innovate and be creative in the way they do business, I urge them to use the same innovation and energy to make meaningful transformation a reality in South Africa, because where there is a will, there is a way.

It must be stressed, however, that the successful implementation of affirmative development interventions will require close collaboration between the government, the private sector and civil society. The Synergos Institute, an organisation focused on fostering partnerships between communities, government and other role players to promote social justice and philanthropy, state that collaboration between government, business and civil society is necessary to overcome the complex social deficits the country is suffering from as a consequence of its history (Smith, 2007). This is a sentiment echoed by the Dinokeng scenarios developed by a select group of leaders from civil society and government, political parties, business, public administration, trade unions, religious groups, academia and the media (The Dinokeng Scenarios, n.d.). Currently, a climate of fragmentation is prevailing among the stakeholders in development and often solutions presented are quick-fix and project-based solutions that focus on social engineering rather than on solutions addressing systemic blockages, capitalising on the resources of all sectors and working for system-wide change. Smith (2007, para. 9) further states that "with its pivotal resources of finance, technical capacity, management expertise and innovation, business has a major role to play in effective partnerships."

It is undeniable that the primary function of government includes education, poverty alleviation, housing, and welfare. The question arises why the private sector should diverge from its primary goal of making a profit to assist the government in performing its primary functions and alleviating South Africa's social issues. Given the preceding discussion of the developmental challenges facing South Africa it is clear, firstly, how a lack of education is directly affecting the business sector through a skills shortage and, secondly, how social issues such as unemployment and poverty can affect businesses by means of increased crime rates and decreased spending on economic development. The active involvement of the private sector in this partnership with government is required, not only to ensure the success of affirmative development initiatives, but also because passivity on the side of the private sector means the current negative status quo will persist to their detriment (Van Heerden, 2013). Mazwai (2012) reports that research commissioned by the Black Business Executices Circle found that the management and ownership legs of the BEE reflected considerable activity, but that there was no movement in enterprise development and skills development. He states that "the very same private sector that complains that the country does not have the skills it requires is not itself growing the skills" (Mazwai, 2012, para. 7). It is unrealistic of the private sector to expect that government will address and resolve these challenges while they sit back with folded arms. The government neither has the resources required to accomplish this task, nor can the problem be solved with one-sided involvement. The private sector must contribute the pivotal resources at their disposal by being directly involved in offering affirmative development initiatives to deserving employment equity candidates within their organisations. The government signed agreements with the private sector on job and skills creation in 2011 (Mazwai, 2012) and some organisations are playing their part. Large organisations like Sasol, Pandor's 25, Eskom, Transnet, Woolworths, Discovery, Old Mutual, Microsoft South Africa, Nedbank, Edcon, Metropolitan, and Liberty are all active participants in offering affirmative development initiatives to EE candidates (Mazwai, 2012; Van Heerden, 2013). Mazwai (2012) states more companies need to become enthusiastic about true transformation and become future-minded, rather than focusing on a here-and-now approach. A stronger commitment and more active participation from the private sector is required. Affirmative development initiatives offered as a collaboration between government and the private sector is one of the most effective mechanisms through which the challenges facing the country can be addressed (Van Heerden, 2013). In the final analysis it is in the long-term interest of private sector organisations to become actively involved in affirmative development initiatives. To put it bluntly: if those that have access to wealth do not find meaningful ways of sharing it with those that currently do not have access to it, those that have access to wealth will lose it.

A final consideration necessitating the private sector to be more directly involved in offering affirmative development initiatives is a moral argument, rather than one focussing on economics. The increasing popularity of corporate social responsibility or corporate citizenship reflects the growing emphasis the private sector is placing on morality. Through affirmative development, organisations will be able to contribute towards the Millennium Development Goals (MDGs) such as the eradication of hunger and poverty, achieving universal primary education, promoting gender equality, reducing child mortality and combating diseases such as HIV/AIDS (Van Heerden, 2013). The goals are worthy of support simply because it is, morally, the right thing to do. Van Heerden (2013) notes that national initiatives, for example, ASGISA and JIPSA, regard economic growth and development as the most powerful tool available to realise the MDG's. These initiatives have listed the removal of skills shortages in the identified areas, and the development of a skilled and educated labour force, as prerequisites for economic growth and development, and the subsequent meeting of the MDG's. An ethically mature organisation has comprehensive policies and practices in place throughout the business that enables it to make decisions and conduct its operations ethically, meet legal requirements, and show consideration for society, communities and the environment (Fig, 2005). Fig (2005) states that currently there is little acknowledgement of the legacies of social and environmental injustice perpetrated by business under Apartheid. Taking responsibility would imply taking action to acknowledge, recognise and offer redress for Apartheid-era violations of human rights.

1.1.3.2 The need for a structural model of affirmative development trainer performance

Over the past few years the concept of learning potential has become an extremely popular and appealing concept in the area of affirmative development. This is due to the fact that adverse impact is usually created under the traditional, strict top-down criterion-referenced selection. Adverse impact is caused by the unjust and immoral conditions that existed under Apartheid. These conditions directly impacted the attributes required to perform successfully on the job and on psychological processes and structures that play a role in the development of attributes required to succeed on the job. The adverse impact and the disproportionate distribution of job opportunities across racial groups are problems to which the HR profession needs to find an intellectually honest solution. These problems should not only be addressed due to the potentially volatile consequences, but also because it is the right thing to do. The Industrial Organisational fraternity must honestly acknowledge the wrongdoings of the past and take ownership of the resultant problems. Human Resource practitioners and Industrial Psychologists cannot simply accept the current status quo. Practitioners should rather opt to critically question the status quo and adopt an innovative attitude. In order to proactively and effectively deal with the issues presented by the status quo, practitioners should engage in continuous intellectual and practical efforts to improve the success of current Human Resource Management interventions. Sustainable and true equality can and will not be achieved if the previously disadvantaged groups continue to lack the education, training and skills of those who were advantaged or not as disadvantaged. Quick fixes such as quotas or preferential hiring without the necessary development does not assist in addressing the fundamental issue. Provided that differences in criterion performance between groups can be attributed to differences in the levels of competency potential latent variables required to succeed on the job, an intellectually honest solution would be to provide those individuals with the opportunities to develop the still lacking knowledge, skills, abilities and coping strategies. The solution, therefore, lies in implementing aggressive affirmative development aimed at developing the job competency potential latent variables required to succeed in the job through educational opportunities.

Although a multipronged approach with various simultaneous remedial responses that acknowledge the complex aetiology of the problem is required, affirmative development programmes aimed at individuals who have already entered the labour market is one way the Industrial Organisational Psychology fraternity can contribute to achieving a more egalitarian society. A solution would, for example, include organisations investing in previously disadvantages schools to pro-actively address inadequacies in the South African educational system as part of corporate social investment projects. The failure to address the inadequacies in the South African education system will perpetuate the need for affirmative development of high potential individuals that have left school without their potential being developed. The drawback of such a solution is that results of such an investment would take a considerable period of time to manifest. In the interim, organisations could target those individuals from the previously disadvantaged group already in the job market that have the potential to learn. They should be identified and developed. Affirmative development programmes are designed to empower employees with the job competency potential and job competencies required to produce the outputs for which a specific job exists. The expectation is that the affirmative action candidate will be able to apply the newly derived knowledge to novel stimuli not explicitly covered in the affirmative action development programme. This approach presents an apt and sincere solution to the current status quo. However, resources are scarce and should be invested in a manner that maximises returns. That is, limited resources should be invested wisely in those that would benefit most from further developmental opportunities. This is where the concept of learning potential becomes very valuable.

Learning potential refers to the extent to which the cognitive prerequisites, such as attributes and competencies, are met to benefit from novel learning opportunities. Similarly, training potential refers to the extent to which the prerequisites are met to benefit from the opportunity to develop new skills. As Taylor (n.d., as cited in Theron, 2010) states:

> …Hence, many disadvantaged individuals arrive at the workplace, training programs or educational institutions with gaps in their repertoire of skills. Affirmative action, when implemented correctly,

> should not simply overlook such skill and knowledge lacunae and advancing people anyway, just because of the colour of their skin. Real affirmative action must include a large development component. But resources are scarce, and not everyone would be able to receive the best development opportunities – those which prepare the person for managerial or technically challenging work. Some method is needed to identify individuals with the greatest potential to benefit from those scarce development opportunities which are most costly in terms of time and money… A much better approach is to use selection tools designed to identify candidates with the greatest potential to learn new skills and knowledge, particularly those skills which are crucial to success in the workplace, and training or educational programs. Instead of evaluating the individual's past skill acquisition, this new approach aims to assess the person's capacity to learn in the future.

The learning potential approach thus proposes that Human Resource practitioners and Industrial Psychologists should identify and develop previously disadvantaged individuals with the potential to benefit from cognitively challenging affirmative development opportunities. One manner in which this could be achieved is to directly identify and select individuals with potential into a job and develop them on-the-job. A commitment to appoint specific individuals is made before they have realised their potential. This approach appears to be in line with the spirit of the Employment Equity Act (Republic of South Africa, 1998, p. 22) where it states that:

> 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.

Ideally, however, learning potential and training potential implies a two-stage selection process for members from the disadvantaged group where a commitment to the appointment of specific individuals is not made before they have actually realised their potential. This approach is preferable to the single-stage approach seemingly preferred by the Employment Equity Act because it prevents the compounding of prediction error. In both cases two inferences have to be made: (1) How will those in contention perform on the development/learning performance criterion and (2) how will they, once developed, perform on the job performance criterion. In both inferences errors are made due to lack of perfect predictive validity. When individuals with learning potential are directly identified and selected into a job and develop on-the-job, two errors of predictions are compounded. A two-stage procedure, however, allows the prediction errors made in the prediction of learning performance to be factored into the second prediction on expected job performance. Stated differently, in the single-stage approach decisions are based on predicted job performance based on predicted learning performance whilst in the two-stage approach predicted job performance is based on actual learning performance.

The first stage in the two-stage approach would involve being selected on those attributes or competencies on which learning and training performance is dependent. Alternatively stated, due to limited resources only those previously disadvantaged individuals who would subsequently derive maximum benefit from such development opportunities should be identified and invested in. Individuals with high learning potential are therefore identified and selected for affirmative development programmes and developed off-the-job by targeting the attributes and competencies that determine successful job performance. Once the training and development intervention has been completed, applicants would then be assessed on their training/learning and other relevant knowledge, skills, and abilities (KSAs). Individuals with the highest expected job performance can be selected, based on a battery of predictors that could include an evaluation of the performance on the affirmative development programmes. Training and development will most likely continue once high potential applicants have been selected and placed in their positions.

The two-stage approach to transformation seems logically superior the single-stage approach. Will it, however, be sanctioned by those government institutions tasked with driving transformation? It can be argued that the deviation of the two-stage selection approach from the single-stage approach of directly selecting individuals with learning potential into the job, seemingly favoured by government, is to be in line with the Employment Equity Act of 1998 (Republic of South Africa, 1998, p. 24) which states that:

> (6) An employment equity plan may contain other measures that are consistent with the ***purposes*** of this Act.

A number of studies at Stellenbosch University (Burger, 2012; De Goede, 2007; De Goede & Theron, 2010; Van Heerden, 2013) have investigated the question: What constitutes learning potential? Learning performance comprises a structurally inter-linked nomological network of learning competencies (De Goede, 2007; Burger, 2012; Mahembe, 2012; Van Heerden, 2013). The level of competence that learners achieve on these learning competencies is not a random event; rather it is systematically determined by a complex nomological network of structurally inter-linked, person-centred, learning competency potential latent variables, and situation-centred learning competency potential latent variables. Stated more simply, whether a learner will achieve success at learning depends on the nature of the learner as well as the nature of the situation in which the learner finds him-/herself. Learning potential refers to the extent to which the prerequisites for learning success have been met.

A comprehensive learning potential structural model will explicate the manner in which person-centred learning competency potential latent variables and situation-centred learning competency potential latent variables structurally combine to affect the level of competence achieved on learning competencies. It will also explicate how these competencies in turn affect learning outcomes and how these outcomes, in turn, feed back into learning competency potential latent variables (probably predominantly person-centred variables). Some of the person-centred learning competency potential latent variables are not malleable. The only option in increasing the probability of successful learning performance, when focussing on these non-malleable latent variables, is through selection for development. Some of the person-centred learning competency potential latent variables are, however, malleable. When focussing on these malleable latent variables the probability of successful learning performance can be enhanced through development. Likewise, some, if not most of the situation-centred learning competency potential latent variables are malleable. The probability of successful learning performance should therefore also be enhanced through attempts to improve the favourability of the learning context.

Research on learning potential at Stellenbosch University has thus far almost exclusively focussed on the structural relations between the learning competencies comprising learning, and the person-centred learning competency potential latent variables that determine the level of competence achieved on the learning competencies. Learning performance is not solely determined by person-centred latent variables. Situational characteristics play a crucial, but often neglected, role in determining human behaviour (Funder, 2009; Mischel, 1973). An important situational variable that affect learning performance, is the nature of the training intervention.

It is clear from the above, that not only the identification of individuals that would benefit most from the training and development intervention is important, but also the training intervention itself plays a crucial role in affirmative development. Even if high potential individuals would be selected, but the training intervention fails to develop the competency potential latent variables and competencies that determine job success, the applicants will most likely not succeed on the job. The effectiveness of the affirmative development training programme, consequently, becomes a significant factor in the job success of affirmative action candidates.

The government has made strides in furthering skills development. However, numerous concerns appear to exist with regard to these skills development opportunities. The State of Skills (Human Sciences Research Council, 2008b) report reveals that 65% of 6819 learnership participants who enrolled in year one reported that they completed their qualification, 15% terminated their study and 20% were still registered. The Mail & Guardian (2007) reported that the 2007 Department of Labour implementation report on skills development stated that almost 80% of learners registered for SETA learnerships did not complete their training. Only 16507 out of 87687 participants completed their training from April 2005 to March 2007. This translates into a measly 19% completion rate. Alexander (2006, as cited in van Heerden, 2013) provides instances of skills development programmes where up to 90% of learners failed to complete their training. It can be argued that the poor performance of learnership participants is partly due to the poor recruitment and selection of learners into the skills development programmes, and partly due to insufficient support mechanism in the programmes (Mail & Guardian, 2007, Human Sciences Research Council, 2008a). The problem of poor selection can be addressed by selecting candidates on the basis of their learning potential and, consequently, increase the completion rate by providing development opportunities to those most likely to benefit from it.

The quality of training seems to be a particularly pivotal concern in skills development opportunities. According to the Human Sciences Research Council (2008a) the poor quality of training – either in the practical component at work or in the theoretical component in the classroom – is a prominent reason in participants' decision to terminate their participation. The inadequate quality of the training offered was also highlighted as the main reason why those who completed the learnership did not gain employment. Lastly, the poor quality of training is a major challenge to be overcome by trainers.

The successful implementation of affirmative action is heavily dependent on well-guided accelerated development initiatives that develop the job competency potential variables and job competencies required to succeed on the job. Training interventions are a critical determinant in the success or failure of affirmative action candidates (Human, 1993). Greef and Nel (2003) and Wingrove (1993) claim that the limited time and attention dedicated to the acceleration of on-the-job training is a cause for the lack of success in terms of affirmative action. The success of the affirmative development programme depends on high levels of investment of time and resources to provide sufficient support to affirmative action employees within the workplace.

The above argument warrants the broad overarching research initiating question, "what determines the success of trainees?" Learning success is defined in terms of learning competencies structurally mapped on latent learning outcome variables. The level of competence that a learner achieves is, in turn, determined by a nomological network of structurally interlinked person-centred and situation-centred learning competency potential latent variables. The overarching research initiating question as to the level of learning performance varies across learners and can therefore be dissected into at least three distinct, more focused, research initiating questions, namely:

- Why do learners vary in terms of the level of success that they achieve on the learning outcome latent variables? The question is therefore which competencies are instrumental in the achievement of which outcomes? The influences need, however, not necessarily be direct. The more appropriate question is therefore how do the structurally interlinked learning competencies structurally link to the structurally interlinked learning outcomes?
- Why do learners vary in terms of the level of competence that they achieve on the learning competencies? This question could be interpreted in one of two ways:

- Which person-centred learning competency potential latent variables affect the level of competence on which learning competencies?
- Which situation-centred learning competency potential latent variables affect the level of competence on which learning competencies?

The question why learners vary in terms of the level of success they achieve at learning can in the final analysis not be adequately answered if the answers obtained to these more distinct research initiating questions are not at some point integrated into a coherent structural model. Moreover, the effect of situational characteristics on the level of competence achieved on the learning competencies need not necessarily be direct but could be mediated by person-centred learning competency potential latent variables. Nonetheless, initially practical considerations necessitate a drilling down into specific, narrower, domains of the eventual comprehensive learning potential structural model.

A further narrowing of the focus when considering the effect of situational characteristics on the level of competence achieved on the learning competencies, results in the training programme as such, becoming the centre of interest. This focus results in the following specific research initiating question "what elements of training programmes influence the success of trainees?" The performance@learning models of De Goede (2007), Burger (2013), and van Heerden (2013) explicate the cognitive and non-cognitive person-centred competency potential latent variables affecting learning performance. What is evident from the literature is that training/learning performance is a highly complex construct determined by various situational (training programme) factors (e.g. effective planning of the training program, training content, training transfer at work, the goals and the extent of training, the training methods and means, the training venue and equipment) and individual factors (e.g. information processing capacity, transfer, automisation, personality variables, motivation, interest, learning strategies, self-efficacy, etc.).

It is generally accepted that the most important single experience in any learning process is the trainer-instructor (Ishler, Kindsvatter, & Wilen, 1988; De Santo, 1965; Gauld & Miller, 2004). De Santo (1965) states that a training programme will only prove successful if the trainer is competent in fulfilling their task. One could thus argue that a resource of significant importance in an affirmative development programme is the trainer-instructor. It is highly possible that, given the high drop-out rates of participants, the poor performance of learnership participants, and the complaints of poor quality training, the problem solely rests with incompetent and poor performing trainers. Given the salience of this resource, it is strange that the trainer has for the most part been neglected in training and development literature (Steiner, Dobbins, & Trahan, 1991).

According to Lieb (2001, as cited in Gauld & Miller, 2004) four critical elements of learning must be addressed to ensure that participants learn – all of which are affected by the trainer-instructor. The elements are: (1) motivation; (2) reinforcement (to encourage correct modes of behaviour and performance); (3) retention (demonstrate correct performance by practice); and (4) transference (by the use of association, similarity, degree of original learning, and critical attribute element). This is in line with Bhatti and Kaur (2010) who state that a pivotal issue of training and development is to engage employees in effective learning. Robotham (2004) notes that in order to maximize the utility of training it is important that trainer-instructors actively promote such engagement. Burger (2013), building on the work of De Goede (2007), found that conscientiousness, academic self-efficacy, learning motivation, time cognitively engaged, and academic self-leadership determined learning performance. This suggests that if the trainer wishes to play a pivotal role in affecting the learning performance of learners, they have to do so by affecting the (malleable) person-centred learning competency potential latent variables, such as the learning motivation and academic self-efficacy of the learner. Robotham (2004) further states that the engagement of employees with training activities can be increased by motivating them and making them realize how training can help them improve their performance and organisational productivity.

According to Hinrichs (1976, as cited in Steiner et al., 1991) the behaviour of the trainer-instructor is essential as the trainer is often the first interaction a new employee has with the organisation; the effectiveness of training can shape future attitudes toward the organisation; trainers are often the trainees' supervisors; and the training interactions can set the stage for future leader-subordinate relations. Trainer effectiveness is also known to play a significant role in return on investment of training initiatives (Gauld & Miller, 2004).

This all seems to suggest that trainer-instructors play a crucial role in the learning process and that the identification and selection of trainer-instructors should be done with the utmost care. An effective trainer in conjunction with effective programme elements (such as the effective planning of the training program, training transfer at work, the goals and the extent of training, the training methods and means, the training venue and equipment) are important for its total success (Nikandrou, Brinia, & Bereri, 2009).

Given the existing skills shortages in South Africa and the significant distance to go in terms of employment equity in the private and public sector, the training and development of affirmative action candidates seem to be the most sustainable and high-impact means to address these problems and achieve equality for all. Effective affirmative action programmes should thus emphasise the development and pipelining of skills (Solidarity Research Institute, 2008a). Authentic affirmative action empowers those individuals it aims to help by equipping them with the necessary skills and competencies to perform successfully in their jobs. From an economic sustainability and social responsibility perspective, the right thing to do is to empower previously disadvantaged individuals through knowledge and skills. This can only be achieved through targeted affirmative training and development interventions.

Sikora (1997, as cited in Gordon, 2003) states that there is no scientific method of separating what and how much a pupil learned from the teacher due to all the extraneous lists of traits attributed to the teacher. Teaching/training is thus an extremely complex behaviour but one in which the teacher nevertheless plays a crucial role. Kindsvatter and colleagues (1988) further note that there are seven beliefs and assumptions about effective teaching. These are: (1) the quality of teaching is directly contingent upon the quality of the decision that proceeds that teaching; (2) teaching is a complex behaviour; (3) teaching is a learned behaviour; (4) instruction should be based on the most effective strategies, methods, techniques, and behaviours as determined by current research and learning; (5) students must be motivated; (6) the social setting in which instruction occurs is a major factor affecting that instruction; and (7) teaching in the final analysis is a personal intervention.

Trainer-instructors are in a position to contribute significantly to the development, efficacy and future performance of affirmative action employees, the utility of training initiatives and, ultimately, to organisational performance. The empowerment and development of affirmative action candidates will contribute toward improving employment equity, accelerating broad-based black economic empowerment, and promoting economic development in South Africa. Equipping individuals with skills enables them to sell their skills on the labour market, enable self-employment activities, and subsequently decrease the likelihood of an impoverished existence.

In order to achieve the specific outcomes for which organisational training and development initiatives exist and to ensure trainee performance, trainer-instructors are required to perform certain duties successfully. Specific training-instructor competencies are thus implied, which are required to achieve the desired training outcome latent variables. The desired training outcome latent variables are, however, not affected directly. The learner achieves the training outcomes through specific learning behaviours or competencies. The learner, in turn, displays these learning behaviours that are instrumental in the achievement of the desired training outcomes as a function of specific person-centred and situation-centred characteristics. The trainer-instructor therefore affects training outcomes indirectly by affecting learner and situation characteristics that affect the level of competence achieved on learning competencies that, in turn, affect the outcomes achieved. The salient training-instruction outcomes are the learner and situational characteristics that affect the level of competence achieved on the learning competencies. The ability of trainer-instructors to achieve the desired outcomes depends on specific training-instructor competency potential latent variables and situation-centred competency potential latent variables. A three domain trainer-instructor competency model based on the SHL performance@work competency framework is thus implied (Bailey, Bartram & Kurtz, 2001; SHL as cited in Oehley, 2007) this explicates the manner in which trainer and situation competency potential latent variables impact on training competencies, which in turn, indirectly impact on learning performance latent variables. Causal links also exist among the latent variables, the competency potential, competency and outcome domains. A three domain, fully-fledged trainer-instructor competency model is thus implied.

The three domain trainer-instructor competency model (trainer-instructor and situation competency potential, training-instructing competencies, and training-instruction outcomes) is sequentially linked to a three-domain learning potential competency model (learner and situation competency potential, learning competencies, and learning outcomes). The trainer-instructor competency model and the learning potential competency model are sequentially linked in the sense that the training-instruction outcomes are the learner and situational competency potential latent variables that affect the level of competence achieved on the learning competencies. The learner competency model is in turn sequentially linked to a three-domain job competency model (job and situation competency potential, job competencies and job outcomes). The learner competency model and the job competency model are sequentially linked in the sense that the learning outcomes are the job competency potential latent variables that affect the level of competence achieved on the job competencies.

It would be overambitious to attempt to explicate the three sequentially linked competency models in a single research study. It is even too ambitious to attempt to explicate a single competency model in a single research study. This research study aims to focus on the trainer-instructor competency model. Consequently, for the purpose of this study, the focus will fall on the training-instructor competency domain and the training-instructor outcome latent variables domain.

The objective of the HRM function in an organisation is to enhance employee work performance in a manner that adds value (i.e. a positive return on investment) by ultimately improving service and product delivery to its stakeholders. Employee work performance should be interpreted in terms of (task and contextual) job behaviours and in terms of relevant job outcomes. The extent to which employees are regarded as successful depends on what they do and the extent to which that behaviour is instrumental in achieving the outcomes of the job. In order for Human Resource practitioners and Industrial Psychologists to constructively, rationally and purposefully manage the performance of trainer-instructors it is necessary for them to be knowledgeable of the competency potential, competencies, and outcome domains, and how they are causally related. The affirmative development trainer-instructor is an employee. Trainer-instructor work performance is not a “random walk in the work place”. It is the result of the lawful operation of a complex nomological network of person centred, and situational variables, that express themselves in the level of job performance achieved. The ability of the Human Resource and Industrial Organisational Psychology fraternity to purposefully and rationally affect improvements in trainer-instructor (and ultimately organisational) performance, depends on the extent to which the identity of these variables are known, and the extent to which the manner in which the variables combine affect performance. Given the preceding argument, validated competency models should enhance the effectiveness of HRM. Competency models should align the various HRM interventions amongst themselves and thereby increase the combined effectiveness of the interventions.

The objective of this study is, consequently, to develop a partial affirmative development trainer-instructor performance competency model by mapping the core training-instructor competencies onto the various training-instructor outcome latent variables (i.e. learning competency potential latent variables) that constitute trainer-instructor performance.

1.2 The research initiating question

Against the above background, the research initiating question driving this study is:

Why is there variance in the performance of trainer-instructors? What constitutes trainer-instructors' competencies, what are the training outcome latent variables these competencies are meant to achieve and how are these competencies and outcomes related?

1.3 The research objectives

In an attempt to address the foregoing research initiating question, the proposed study will focus on 1) identifying the competencies that trainer-instructors have to display to perform successfully in their jobs; 2) identifying the training outcome latent variables that are affected by the competencies that trainer-instructors have to be displayed to perform successfully in their jobs as measured by the outcomes they are expected to achieve; and 3) identifying how these competencies and outcome latent variables are causally related. The overall objective is, consequently, to develop a partial trainer-instructor performance competency model depicting the network of core competencies affecting the training outcome latent variables. Lastly, the fit of proposed structural model will be tested and the significance of the hypothesised paths in the proposed structural model will be evaluated.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This section aims to provide a comprehensive overview of trainer performance and trainer performance outcomes. Given the overarching objective of the study, i.e. building a partial competency model of trainer-instructor performance, a general overview of the nature of competency modelling will firstly be provided. Secondly, the concept of training will be discussed followed by an analysis of the term "affirmative development trainer-instructor". This will provide context when discussing and deciding on relevant training and learning performance outcomes, as well as selecting the most appropriate trainer-instructor competencies. Thirdly, trainer performance outcome latent variables will be defined and discussed. Fourthly, trainer competency latent variables will be identified and discussed. Lastly, hypotheses will be made pertaining to the manner in which the competencies are causally related to the outcome latent variables; this will be depicted in the form of a structural model.

2.2 An overview of competency modelling

2.2.1 Defining competencies

Considerable conceptual confusion exists in the Industrial Psychology literature with regard to the concepts of competencies and competency modelling. This is evident in the prevailing lack of consensus (Bailey et al., 2001; Cheng, Dainty & Moore, 2003). The meaning of these concepts vary according to the context in which they are used and the requirements of the user (Bailey et al., 2001; Cheng et al., 2003; Hoffmann, 1999; Rees & Garnsey, 2003; Whiddett & Hollyforde, 2000).

There exist two basic views regarding competencies: that competencies are attributes causally related to job success or that competencies are bundles of behaviour causally related to job success. The conceptual confusion is further aggravated in that the term 'job success' in these two views on competencies refers to different phenomena.

Competencies viewed as person attributes have been formally defined as the "characteristic of an individual that has been shown to drive superior job performance" and as "including both visible competencies of knowledge and skills and underlying elements of competencies like traits and motives" (Hartle, 1995, p. 107). It can also be a motive, trait, aspect of one's self-image, skills or knowledge that is used (Boyatzis, 1982). Many researchers agree that competencies are the knowledge, skills, abilities and other characteristics (KSAOs) that are needed for effective performance in a job (Campion, Fink, Ruggeberg, Carr, Phillips & Odman, 2011). This is primarily an American view.

The other view considers competencies as bundles of behaviour. SHL (2011, p. 3) defines competencies as "behaviours that support the attainment of organisational objectives." Bartram (2005, p. 1187) defines competencies as "sets of behaviours that are instrumental in the delivery of desired results or outcomes". Similarly, Cooper, Lawrence, Kierstead, Lynch and Luce (1998, as cited in Myburgh, 2011, p. 4) define competencies as "individual performance behaviours that are observable, measureable and critical to successful individual or corporate performance". Competencies, according to this view, are regarded as relatively stable sets of behaviours that are instrumental in the delivery of superior performance defined in terms of the outcomes the individual is held accountable for. The behavioural interpretation of competencies is primarily a British view.

South Africa seems to subscribe to the latter interpretation of competencies. The Public Service defines competencies as a "set of behaviour patterns an individual needs to display in order to perform effectively and efficiently in his or her position" (Department of Public Service Administration, 2003, p. 157). The National Qualifications Framework (NQF) defined standards on national training schemes in terms of outcomes. Standards on these outcomes are translated back to the behaviours on which these outcomes are dependent to set behavioural standards (Vorster & Roodt, 2003).

2.2.2 Defining competency modelling

The definitions of competency models and competency modelling in part depend on the user's conceptualisation of competencies. If the user endorses the view that competencies are person characteristics, competency models refer to collections of KSAOs that are needed for effective performance (Campion et al., 2011). However, if the behavioural view is endorsed, competencies refer to collections of behaviours that are needed for effective performance and the model looks slightly different. The SHL Performance@Work competency framework presents a possible solution to the conceptual confusion surrounding competencies and competency modelling. According to SHL (2000, p. 6) the Performance@Work refers to:

> [A] model of performance at work that defines the relationship between competency potential, competency requirements and competencies themselves. 'Competencies' are defined as behaviours that support the attainment of organisational objectives. 'Competency potential' is seen to derive from individual dispositions and attainments and 'competency requirements' refer both to facilitators of and barriers to effective performance in the workplace. The framework points to ways in which people and the work setting interact*, and has implications for how performance is managed in the workplace.*

The SHL model clarifies these concepts and postulates that the employee is characterised by a set of critical attributes (competency potential) that determine the behaviour (competencies) that is instrumental to achieving the outcomes for which the employee is held accountable. Competency potential refers to person constructs that can be relatively stable dispositions (such as personality, values, motives, etc.) or to more variable attainments (such as knowledge and skills). It refers to the characteristics or abilities that enable an employee to perform effectively in the job situation. Competencies are bundles of related behaviour that constitute successful performance on the job and lead to at least some of the outcomes for which the individual is held accountable. Competencies can thus be viewed as performance constructs. Bartram (2005) postulates that competencies are what Campbell (1990) originally defined as performance or the actual behaviour of employees.

Although it is very seldom interpreted as such, it is evident from the above, that a competency model is essentially a three-domain structural model that maps a network of causally inter-related person characteristics onto a network of causally inter-related competencies, and that then maps the latter onto a network of causally inter-related outcome variables. The effect of the person characteristics on the performance dimensions and the effect of the latter on the outcome variables are in turn moderated by environmental variables. In the British competency modelling view (in contrast to the American view) the person characteristics would be referred to as competency potential latent variables and the key performance dimensions as competencies (Bartram D. , 2005). Outcomes refer to the results that an employee achieves through his/her behaviour and can include factors like customer satisfaction, generated profit or wastage levels. Jobs are designed to accomplish specific outcomes. Organisational strategy will determine the specific nature of these outcomes. Competency requirements are derived from the outcomes for which the job exists.

For the purpose of this study, the competencies and the performance outcomes are to be considered the most important variables as they constitute job performance. A competency will refer to a set of behaviour patterns that an incumbent needs to bring to a position so that they can perform their tasks and functions with competence (Woodruffe, 1993).

2.2.3 Defining the performance construct

Given the objective of the human resource function, the performance construct forms the focal point of all human resource management actions. The existing definitions in performance literature do not generally emphasise performance as a construct that encompasses both a behavioural- and outcome domains, nor do they emphasise that the content of these two domains are structurally inter-related. Instead, performance definitions tend to focus on one domain at the exclusion of the other. Some definitions do, however, indirectly imply the other neglected domain.

Viswesvaran and Ones (2000) define job performance as measurable actions; behaviours or outcomes that employees engage in or bring about which are linked to and contribute to organisational goals. They emphasise both behaviours and outcomes. Hunt (1996) and Bartram (2005) employ a narrower, more restricted interpretation of the performance construct that would typically refer to competencies only. Similarly, Hunt (1996; p. 52) defines job performance as "actions or behaviours relevant to the organisation's goals". Hunt's definition includes both productive and counterproductive behaviours that impact on the fulfilment of an organisation's goals. Although these two definitions seem to interpret performance behaviourally, they imply that employees are hired to do specific things well because they are instrumental in achieving specific, desired outcomes and not because these actions have intrinsic value.

Campbell (1990) also stresses that performance should be interpreted behaviourally and acknowledges that important organisational outcomes determine what constitutes relevant behaviour. According to Campbell (1990, p. 704), "performance is behaviour…. it includes only those actions or behaviours relevant to the organisation's goals." Bernardin and Beatty (1984) include both outcomes and behaviours in their definition of performance although they place the emphasis on the former. They define performance as: "those outcomes that are produced or behaviours that are exhibited in order to perform certain job activities over a specified period of time" (Bernardin & Beatty, 1984, p. 12).

Jobs exist to achieve specific outcome latent variables. Employees are instrumental in the achievement of these specific desirable latent outcome variables as they are expected to perform well on specific latent behavioural performance dimensions that lead to these outcomes. According to the above definitions, an employee's success in their job could be judged in terms of the employee's behavioural actions as well as in terms of that which the employee achieves through these actions.

For the purpose of this study, performance constitutes both behaviours and outcomes. Thus, in terms of the SHL Performance@Work model, performance is the nomological network of structural relations existing between an interrelated set of latent behavioural performance dimensions (competencies) and an interrelated set of latent outcome variables valued by the organisation and that contribute to organisational goals. In order to fully evaluate performance in terms of this definition both the latent behavioural performance dimensions and the latent outcome variables have to be measured. Furthermore, the meaning of performance is spread over the whole of the performance structural model by means of the structurally inter-related network of specific values that the whole network of performance latent variables carries. Meaning will consequently be lost, if the structural model is dissected.

Employee performance on these tasks are not a random walk event, but rather systematically determined by a complex nomological network of person and environmental characteristics. The objective of this study is to show that specific behaviours displayed by the trainer-instructor affect specific student learning performance latent variables. It is thus important to focus on the behaviour trainer-instructor display which is assumed to be related to superior job performance. Underlying personal characteristics (such as personality, values, motivation, etc.) probably play a role in trainer performance outcomes, but most likely do so via their effect on the manner in which the trainer-instructor behaviourally responds in his or her job. Since specific structural relationships are assumed between the job competencies and outcomes, the competency-outcome structural model could be used as a basis to investigate the construct validity of an operational competency/criterion measure.

2.2.4 The idea of three sequentially linked competency models

The ultimate purpose of affirmative development training, and consequently, the affirmative development trainer, is to modify knowledge, skills and behaviour of EE employees to enable them to achieve their job objectives (in other words the outcomes for which the job exists) through enhancing competence on the competencies that are instrumental in achieving these outcomes (Erasmus et al., 2004). According to Campbell and Kuncel (2001, as cited in Chiaburu & Tekleab, 2005), training is ultimately a planned intervention designed to enhance the determinants of individual job performance (interpreted in terms of structurally inter-related competencies and outcomes). The objective of affirmative development training is to improve EE employee job performance in an organsiation. As has been established in the previous discussion, as a result of the inequalities suffered under Apartheid employees from the previously disadvantaged group might not be able to meet performance standards due to less developed competency potential variables and competencies. Affirmative development can thus be viewed as a deliberate intervention implemented by an organisation to address existing or anticipated shortcomings in competency potential variables (such as knowledge, or attitudes). Rae (2002, p. 25) defines training as "any planned activity designed to help an individual or group to learn to perform a job or task effectively".[2]

As discussed above the performance of the trainer consists of behaviours the trainer-instructor displays which constitute of behaviours and the outcomes the trainer-instructor aims to affect or achieve. The question that now arises is what are the outcomes the trainer-

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[2]It is important to consider that training can also include education as they are not completely distinct categories and various methods and terms are used within organisations (Erasmus et al., 2004). For example, training has elements of education in it and employees who are in training for a job specific purpose are being developed in the process. Thus, training, development and education are not completely distinct concepts, but rather overlapping and complementary processes. Education usually refers to "activities that provide the knowledge, skills, and moral values that individuals require in the ordinary course of life" (Erasmus et al., 2004, p.2). The purpose of eduaction is to enable individuals to contribute to society through the promotion of an understanding of social traditions. It includes the study of literacy, numeracy, cultures, natural laws and form the basis of personal development, communication and learning. Both education and training create circumstances in which an employee can acquire and apply the skills, knowledge and attitudes that will meet organisational goals. They state that education provides a general basis that prepares individuals for life while training prepares individuals to perform specific tasks in a specific job.

instructor attempts to affect? In order to answer this, one has to consider the purpose of affirmative development:

The purpose of affirmative development is to enable learners to achieve specific results or learning outcomes, that is, the attainment of certain deficit competency potential and competencies. The trainer-instructor cannot directly install knowledge and abilities (competency potential) in learners. The trainer-instructor can only create conditions conducive to effective learning. It is the "job" of the learner to learn. The learning outcomes, or results, learners attempt to achieve will only be achieved if certain behaviours are displayed in the classroom (i.e. learning competencies). Whether these learning behaviours will be displayed in the classroom is, in turn, dependent on the presence or absence of person-centred characteristics (i.e. learning competency potential variables). These learning competency variables comprise of either more malleable attainments or stable dispositions which are more difficult to modify. This line of reasoning suggests that the trainer-instructor cannot directly impact the results or learning outcome variables, but that the trainer-instructor can affect the level of the (malleable) person-centred learning competency potential variables and the (malleable) situation-centred learning competency potential, which determine the learning behaviours displayed in class and which, in turn, affect the learning outcomes the achieved by the student.

Affirmative development trainers aim to equip learners with the needed competency potential and competiencies so that they will be able to apply these when performing their jobs. It is important to note that the learning outcome that trainer-instructors aim to affect is the job competency potential that the individual requires to effectively perform in their job. In affirmative development programmes students develop the necessary KSAOs through learning in the classroom interpreted behaviourally in terms of a set of structurally inter-related learning competencies to apply these to novel problems in order to reach appropriate solutions outside the classroom. The ability of learners to accomplish the former, is referred to as their classroom learning performance whilst the latter is evaluated by assessing their learning performance during evalutation. The essence of classroom learning is to transfer the knowledge and skills acquired during prior learning onto the novel problems presented as learning material in the classroom. The purpose of classroom learning is, again, to transfer the knowledge and skills acquired during training and development intervention (through transfer and automisation) to novel problems the individual will be confronted with on the job. This implies action-learning in the workplace. Higher levels of classroom learning performance should thus translate into higher levels of job performance as finding solutions to novel job problems *is* action learning. The same learning competencies (such as automisation and transfer) that are required to perform in the classroom, are required to perform during an evalution, and also during action learning on the job. All three contexts require the transfer of knowledge and automisation[3] in order to solve novel problems. Thus, although the context differs, the same set of competencies are, essentially, involved. A different context does, however, imply a problem of a different nature.

When looking at the bigger picture, three sequentially linked competency models, which amalgamate into one comprehensive affirmative development structural model, are implied: A model explicating the relationship between trainer-instructor performance, learning performance of the affirmative action candidate, and the job performance of the affirmative action candidate. The outcomes of the trainer-instructor performance model are the learning competency potential latent variables in the learning performance model and the outcomes of the learning performance model are the job competency potential variables of the job performance model. It is via learning performance that the trainer-instructor attempts to affect this chain of outcomes.

2.3 Defining the concept of an affirmative development trainer

Rae (2002) notes that "trainer" has various meanings generally stemming from the function the trainer performs. He discusses the various meanings of trainers, which, amongst other things, the work place instructor, instructor, trainer/tutor, facilitator, consultant, advisor, trainer of trainers, training designer, and training manager. A brief overview of some of these roles is now provided:

1. Workplace instructor: On-the-job instructors are skilled, experienced and efficient operatives in the area of their normal employment. They have an interest and commitment to the development of others and an interest in helping people become

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[3] It is thereby not implied that transfer and automisation are the only learning competencies comprising learning performance.

proficient in a function in which they themselves are proficient. They may either be very experienced and excel in training others or lack the competence to be an effective trainer.

2. The instructor: The instructor operates in an environment that emphasises a teacher-taught environment (at least in the earlier stages) in which mechanical, technical and procedural tasks are taught. Instructors should be self-disciplined, highly informed about the subject (at least to the teaching level required but preferably beyond), and must have an updated manual from which to instruct.
3. The trainer/tutor: Trainer/tutors are required to have vast knowledge concerning techinques, methods, and approaches. The primary activity is the presentation of the training session, often utilising a variety of visual aids, linking the lecture with the discussion or other actvitites. The trainer also often designs the learning events.
4. The training designer: The training designer identifies and analyses the needs of the learners and trainers and designs the total training package. This includes the development of instructional briefs, manuals, trainer- or learner handbooks, handouts, etc.
5. Training manager: A manager in charge of the training function.

Despite these various descriptions, these titles are not universally applied or interpreted in a clear-cut manner. Trainers are often called instructors, learning skills or skills development faciliatators, learning skills coordinators, human resource supporters, or human resource development practitioners, and the like. Rae (2002) subsequently defines a trainer as a person who facilitates the learning of others including responsibilities for managing, organising, advising, developing and conducting training.

For the purpose of this study, the term trainer-instructor will be used and the affirmative development trainer-instructor will be defined as a person who faciliates the learning of previously disadvantaged individuals in the classroom to achieve the attainment of deficit competency potential latent variables and competencies.

2.4 Trainer outcomes

As illustrated by the SHL model discussed earlier, trainer performance consists of various structurally inter-linked competencies and outcomes. Outcomes refer to the results the employee (trainer-instructor) achieves or affects through their behaviour. The competencies required by the trainer-instructor will be derived from the outcomes for which the training job exists.

Hutchinson (1999) states that teaching is a complex intervention involving the synergistic action of several components as factors at both the student (e.g., motivation, learning styles) and teacher (e.g., rapport, teaching alliance, immediacy skills) level that have the potential to influence teaching effectiveness. Teacher effectiveness and accountability is a well-known concept in research (Christophersen, Elstad, & Turmo, 2010). The question is what influence a trainer-instructor exerts over their students' learning outcomes, that is, what is the causal relationship between what the trainer-instructor does and the student-related outcomes that the learner achieves?

Any training initiative is ultimately an attempt to improve work performance. This occurs through learning. Instructional and training theories state that learning involves a change in knowledge, cognition, attitudes, beliefs or skills (Tomcho & Foels, 2008). Seidel and Shavelson (2007) define learning as a set of constructive processes in which the individual student builds, activates, elaborates and organises knowledge structures – alone or socially. These processes are internal to the student and can be faciliated and fostered by components of teaching.

Traditionally, trainer effectiveness has been conceptualised and measured by the essential, but somewhat narrow construct of student achievement (i.e. learning performance during evaluation). Doyle (1977) reports that teacher behaviours seldom account for more than 10% of the variance in learning outcomes as measured traditionally. This evidence does not mean, however, that trainer-instructors have no impact on outcomes as the trainer-instructor influence mainly operates indirectly. In terms of the earlier theorising on sequentially linked competency models, the trainer-instructor affects the (malleable) person-centred and (malleable) situation-centred learning competency potential latent variables that affect the level of competence that is achieved on the competencies that affects the level achieved on the job competency potential that affects the learning performance during evaluation. Trainer-instructors are typically the most salient people in the training setting. They define most of the learning tasks, provide assistance, construct formal and informal performance situations, define the major standards for evaluation of performance, provide students with feedback, and react to student behaviour with different emotions (Ziegler, Dresel, & Stoeger, 2008). Trainer-instructors thus have a significant role to play in influencing the information processing, motivation, and learning of the trainee (Towler & Dipboye, 2001).

The level of learning performance students achieve in a development programme is complexly determined by a nomological network of latent variables that characterise the students and the context in which they have to learn. If the impact of the trainer-instructor on the learning performance of the learner is to be validly understood, the network of latent variables characterising the learners, as well as the context in which they have to learn, its impact on the learning competencies and how these in turn affect the learning outcomes achieved, need to be validly understood. A trainer@work structural model needs to be sequentially linked to a learner@learning competency model. Various studies have been conducted on learning performance, but the most promising thus far, in the field of affirmative development, is the De Goede learning performance model (2007). *Classroom learning performance,* according to the De Goede (2007) model, comprises two learning competencies: *transfer of knowledge* and *automisation*. These two competencies are influenced by competency potential latent variables, namely *abstract thinking capacity* and *information processing capacity*. The model did not, however, capture the full complexity of the psychological dynamics underlying learning performance. The model failed to acknowledge that learning performance is not solely determined by cognitive learning competency potential latent variables (Burger, 2012). Burger (2012) and Van Heerden (2013) subsequently expanded the De Goede (2007) learning potential structural model through the insertion of additional learning competencies as well as non-cognitive learning competency potential latent variables.

A brief discussion of each of De Goede (2007), Burger-De Goede (2012), and Van Heerden (2013) models follows.

2.4.1 The learning performance models

2.4.1.1 The De Goede (2007) learning performance model

De Goede (2007) conducted research based on the work of Taylor (1989, 1992, 1994) on the concept of learning potential, and devised a model of the competencies and competency potential latent variables contributing towards learning performance. The research was primarily based on Taylor's APIL-B test battery, a learning potential measure. His research culminated in a performance@learning competency model delineating the competencies and competency potential latent variables that will allow one learner to be more successful than another learner in an affirmative development intervention. De Goede theorised that the competencies, *transfer of knowledge* and *automisation*, and the competency potential latent variables, *information processing capacity* and *abstract thinking capacity*, are required to achieve the desired learning outcomes. De Goede argued that differences between individuals in learning performance during evaluation[4] can be explained in terms of the four constructs: a*bstract reasoning capacity*, *information processing capacity* (speed, accuracy, and flexibility), *transfer of knowledge* and *automisation*.

De Goede (2007) proposed a structural model based on Taylor's theoretical position and his conceptualisation of how the constructs interact. The structural model shown in Figure 2.1 depicts the hypothesised causal paths between the constructs that constitute learning potential. The model shows that an individual's capacity to *transfer knowledge* is causally linked to the individual's *abstract reasoning capacity*. An individual's ability to *automate* is causally linked to their *capacity to process information*. Furthermore, that *transfer of knowledge* and *automisation* are causally linked to *learning performance during evaluation*.

The model was tested on 434 new recruits from the South African Police Service Training College in Philippi, Cape Town, in order to obtain empirical proof that the relationships postulated in the learning potential structural model provide a plausible explanation for differences in learning performance during evaluation. *Abstract thinking capacity*, *information processing capacity*, *transfer of knowledge*, and *automisation* were measured by means of administering sub-tests of the APIL-B test battery. *Learning performance* was determined by two measures used by the South African Police Service (SAPS) in the evaluation of constables in their basic training programme. The scores obtained by entry level constables in the Specific Crimes and Statutory Law modules were used as measures of *learning performance*.

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[4] De Goede (2007) never formally made the distinction between classroom learning performance and learning performance during evaluation.

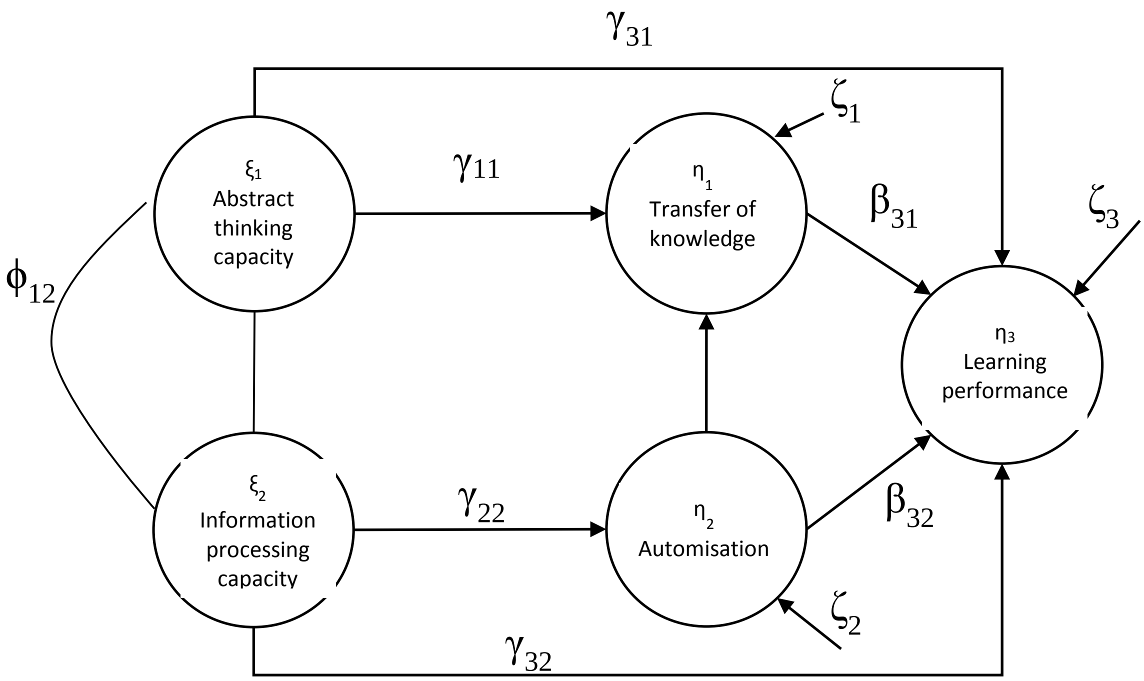

Figure 2.1. De Goede (2007) learning potential structural model

Although reasonable model fit was obtained, only limited support for the proposed causal paths was obtained. Support was found for only four of the ten hypotheses. The relationship postulated between *information processing capacity* and *automisation* was corroborated. The direct path hypothesised between *information processing capacity* and *learning performance* was corroborated. The direct path hypothesised between *automisation* and *transfer of knowledge* was corroborated. Support was also obtained for the indirect effect of *information processing capacity* on *learning performance*, mediated by *automisation*. De Goede found no support for the hypothesised direct linkages between *abstract thinking capacity* and *transfer of knowledge*, between *abstract thinking capacity* and *learning performance*, between *transfer of knowledge* and *learning performance* and between *automisation* and *learning performance*. The hypothesised indirect effect of *abstract thinking capacity* on *learning performance* mediated by *automisation* was also not corroborated.

According to De Goede (2007) the degree of measurement model fit achieved was reasonable as was the claim that the specific indicator variables used reflected the specific latent variables included in the learning potential structural model. However, De Goede (2007) stated that the validity of the *learning performance* and *transfer of knowledge* measures seemed to be questionable. De Goede raised the concern that the *learning performance* measure did not really reflect the ability to creatively use newly obtained knowledge in problem solving (i.e. did not reflect action learning). Furthermore, he argued that the *transfer of knowledge* measure cannot easily be changed as it forms an integral part of the APIL-B battery. The need to modify the model based on the findings of his study thus existed. In retrospect it became clear that De Goede's (2007) failure to formally distinguish between classroom learning performance and learning performance during evaluation played an important part in his findings. *Transfer of knowledge* and *automisation* in De Goede's (2007) model constitute classroom learning performance. It therefore involves combining and adapting prior learning to create meaningful structure in the novel learning material presented in the classroom (and not the geometric learning material presented by the APIL-B) and to write those insights to memory.

The De Goede model focused exclusively on cognitive ability as a determinant of learning performance; however, it is extremely unlikely that cognitive ability would be the sole determinant of learning performance. Moreover, if non-cognitive determinants of classroom learning were operating they most probably did not directly affect the two learning competencies identified by Taylor (1989, 1992, 1994) and De Goede (2007). The learning domain consists of more than two learning competencies. Burger (2012) decided to modify the De Goede learning potential structural model and elaborate the model by expanding the number of learning competencies that constitute learning performance as well as adding the non-cognitive determinants of learning performance. Van Heerden (2013) also produced an elaborate De Goede model suggesting further cognitive and non-cognitive variables to be included.

The Burger (2012) and Van Heerden (2013) models will briefly be discussed. In order to comprehend how the trainer-instructor can influence the learning performance of affirmative development students, a complete overview of the performance@learning model is required. It is important to realise that the trainer will affect learning performance mainly through their affect/influence on learners' person-centred learning competency potential latent variables and possibly also through their affect/influence on situation-centred learning competency potential latent variables. This implies that only the more malleable person-centred and situation-centred competency potential latent variables (rather than the more stable dispositions) will be subject to the influence of the trainer.

2.4.1.2 The Burger-De Goede learning performance model (2012)

Burger (2012) proposed a modified and elaborated structural model based on De Goede's theoretical position of learning performance and his conceptualisation of how the constructs interact. The aim was to find a model that would more closely approximate the psychological process by actually determining the level of learning performance achieved by previously disadvantaged trainees in affirmative development programmes. She included the learning competencies *transfer of knowledge, automisation, time cognitively engaged,* and *academic self-leadership* and the learning competency potential variables *information processing capacity, abstract reasoning capacity, conscientiousness, learning motivation, academic self-efficacy, expectancy of learning performance, valence of learning performance,* and *instrumentality of learning performance*, into her elaborated hypothesised model. This elaborated hypothesised model is depicted in Figure 2.2.

Burger's (2011) elaborated hypothesised model was reduced in the interest of practical expediency. The final model included only *time cognitively engaged, conscientiousness, academic self-efficacy, learning motivation,* and *academic self-leadership.* The structural model shown in Figure 3 depicts the specific paths or hypothesised causal linkages between the constructs that constitute learning performance of the reduced model. The model shows that an individual's *time cognitive engagement* positively influences *learning performance* and *academic self-efficacy*. It is also proposed that *conscientiousness* will positively influence *time cognitively engaged*, *learning motivation*, *and academic self-leadership*. *Learning motivation* was hypothesised to be causally linked to *time cognitively engaged* and *academic self-leadership*. It was hypothesised that *academic self-leadership* will positively influence *learning motivation*, *time cognitively engaged*, and *academic self-efficacy*. A causal relationship between *academic self-efficacy and academic self-leadership* and *academic self-efficacy and learning motivation* was hypothesised. Lastly, *learning performance* was hypothesised to positively influence *academic self-efficacy*.

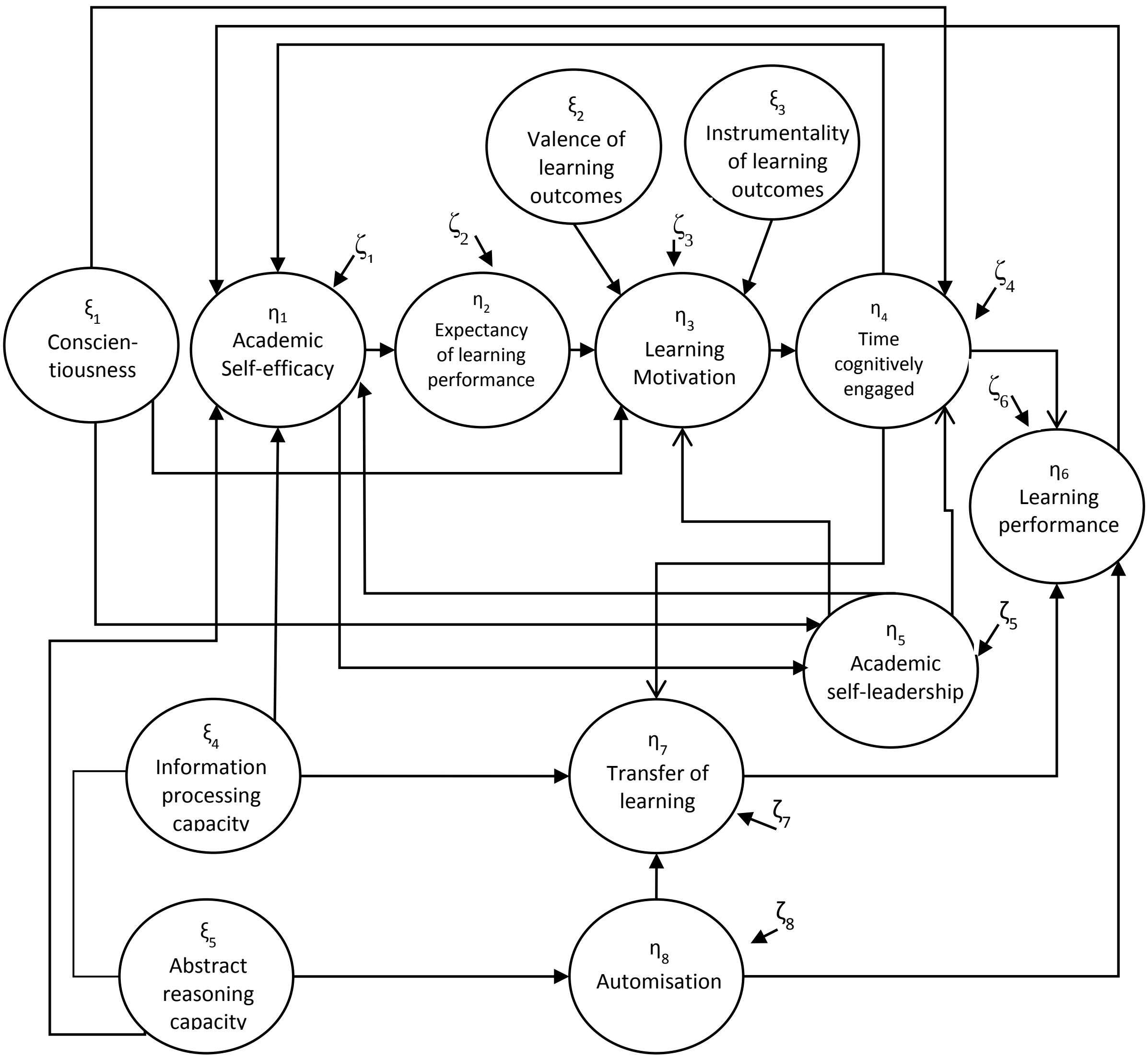

Figure 2.2. The Burger-De Goede (2012) elaborated learning potential structural model

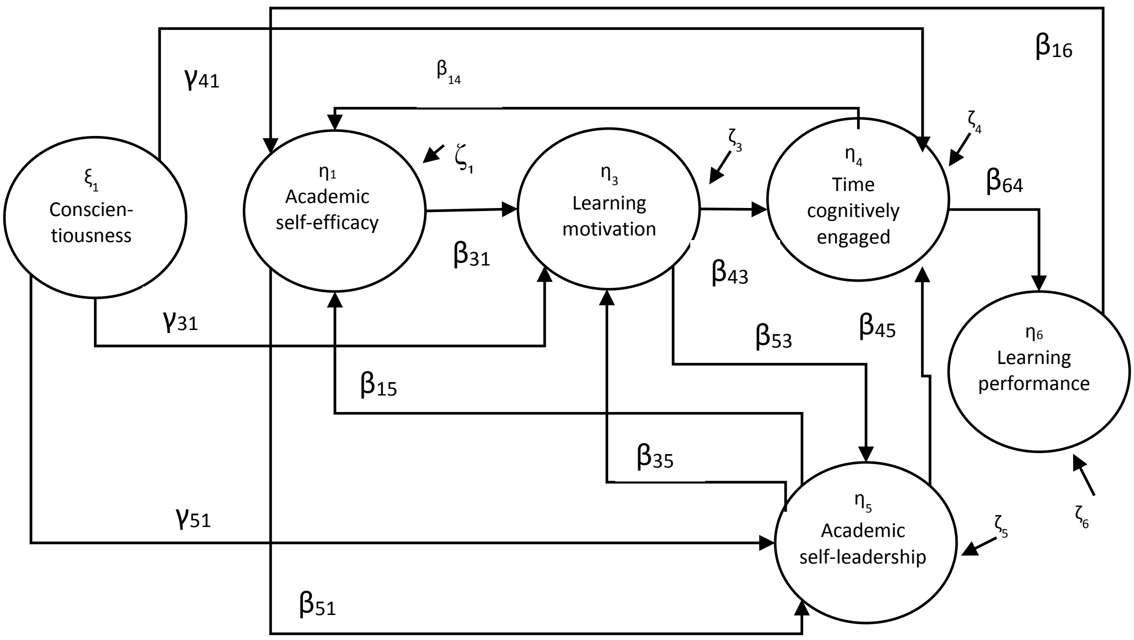

Figure 2.3. The Burger-De Goede reduced elaborated learning potential structural model

The reduced hypothesised structural model initially failed to converge. After the path from *learning motivation* to *academic self-leadership* was deleted, the model successfully converged. The structural model fitted the data well. No support was found for the hypothesis that *time cognitively engaged* positively influences *academic self-efficacy.* This path was consequently deleted and a path was added from *learning performance* to *learning motivation* after which the model was re-run and good model fit was obtained. All the path-specific null hypothesises were rejected and support was obtained for all the path-specific substantive research hypotheses referred to above, except for the path between *academic self-efficacy* and *academic self-leadership,* where the sign of the estimated path coefficient was not in line with the direction of the effect that was hypothesised.

Conscientiousness was shown to positively influence *time cognitively, academic self-leadership* and *learning motivation*. *Academic self-efficacy* was found to positively influence *learning motivation*. *Academic self-efficacy* was also shown to positively influence *academic self-leadership*. *Learning motivation* was shown to influence *time cognitively engaged,* as well as *academic self-leadership*. A positive relationship was found between *learning motivation* and *time cognitively engaged* and between *learning motivation and academic self-leadership. The path between time cognitively engaged* and *learning performance* was corroborated. No support was found for the path between *time cognitively engaged* and *academic self-efficacy.*

Academic self-leadership was found to have a positive relationship with *time cognitively engaged*, and *learning motivation* and therefore indirectly influenced *learning performance* through these three constructs. The path from *academic self-leadership* to *academic self-efficacy* was, however, removed as no support was found for it in the study. The path indicating the feedback effect from *learning performance* to *academic self-efficacy* was corroborated. Lastly, Burger (2012) added a path from *learning performance* to *learning motivation* to indicate another feedback loop. After the addition of this path, as well as the removal of the path from *time cognitively engaged* to *academic self-efficacy,* the model fitted the data very well.

2.4.1.3 The Van Heerden-De Goede (2012) learning performance model

Van Heerden (2013) proposed a further modified and elaborated structural model based on Burger-De Goede (2012) model. Van Heerden (2013) included the learning competency potential variables *information processing capacity, abstract reasoning capacity, meta-cognitive knowledge, conscientiousness, learning motivation, academic self-efficacy,* and *locus of control.* The following learning competencies were included: *transfer of knowledge, automisation, time cognitively engaged,* and *meta-cognitive regulation.* Thus, in contrast to the Burger-De Goede (2012) model, the Van-Heerden-De Goede model included meta-cognitive knowledge, meta-cognitive regulation, and locus of control and excluded academic self-leadership. The Van Heerden-De Goede model also differentiated between learning performance in the classroom and learning performance during evaluation. The elaborated Van Heerden-De Goede model (2013) is depicted in Figure 2.4.

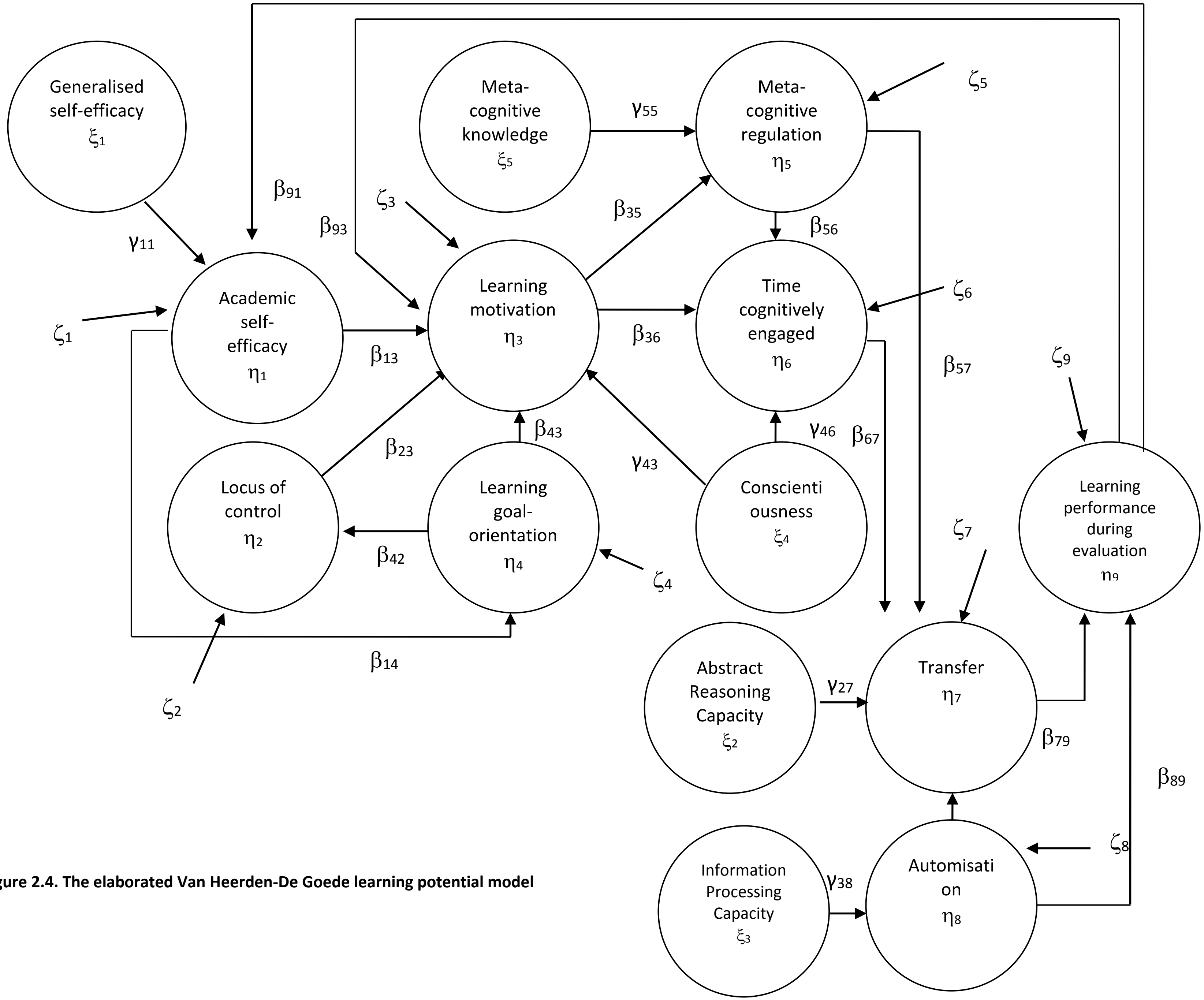

Figure 2.4. The elaborated Van Heerden-De Goede learning potential model

Van Heerden's (2013) hypothesised elaborated model was reduced primarily because of the practical difficulty of appropriately operationalising *transfer* and *automisatio*n as learning competencies constituting *classroom learning performance* but also partly in the interest of practical expediency. The final model included only *meta-cognitive knowledge, meta-cognitive regulation, time cognitively engaged, conscientiousness, academic self-efficacy, learning motivation, locus of control, learning goal orientation,* and *learning performance during evaluation.* The structural model shown in Figure 2.5 depicts the specific paths or hypothesised causal linkages between the constructs of the reduced model. The reduced hypothesised model is depicted in Figure 2.5.

Van Heerden (2013) found that the reduced learning potential structural model initially showed poor fit, and modification of the model was therefore considered. Two paths were initially found to be non-significant. No support was (somewhat surprisingly and disappointingly) found for the hypothesis that *time cognitively engaged* influences *learning performance*. Support was (again somewhat surprisingly and disappointingly) not found for the hypothesised feedback relationship between *learning performance and learning motivation*. Furthermore, no support was found for the hypothesis that *conscientiousness* influences *time cognitively engaged.* The modification indices suggested that an additional path should be added between *meta-cognitive knowledge* and *academic self-efficacy*. This suggests that individuals with more knowledge about learning and about how to learn will have a higher level of belief in their own ability to learn. This path was subsequently added to the structural model. The model was subsequently re-run and the output analysed again.

The modification indices suggested that an additional path be added between m*eta-cognitive knowledge* and *learning goal-orientation.* This relationship makes substantive sense. An individual with more knowledge about learning and how to learn will be more likely to be goal directed towards learning. The path was therefore added to the structural model. The model was subsequently re-run and the output analysed again. The modification indices indicated that the path between *academic self-efficacy* and *learning goal-orientation* was insignificant and therefore removed.

The model was subsequently re-run and the output analysed again. No paths needed to be removed. The overall goodness of fit statistics indicated that the structural model fits the data well indicating good model fit was achieved.

Conscientiousness was found to positively influence *learning motivation. Academic self-efficacy* was shown, in the current study, to positively influence l*earning motivation*. *Learning motivation* was shown to influence *time cognitively engaged* as well as *meta-cognitive regulation. Learning motivation* was therefore found to be the driving factor compelling individuals into engaging the behaviours that lead to increased learning.

Meta-cognitive knowledge was found to positively influence *academic self-efficacy*, *learning goal-orientation* as well as *meta-cognitive regulation*. The results indicated that *meta-cognitive regulation* positively affects *learning performance during evaluation.* Lastly, *learning performance* was found to have a feedback-effect in the learning potential structural model in that it influences *academic self-efficacy*.

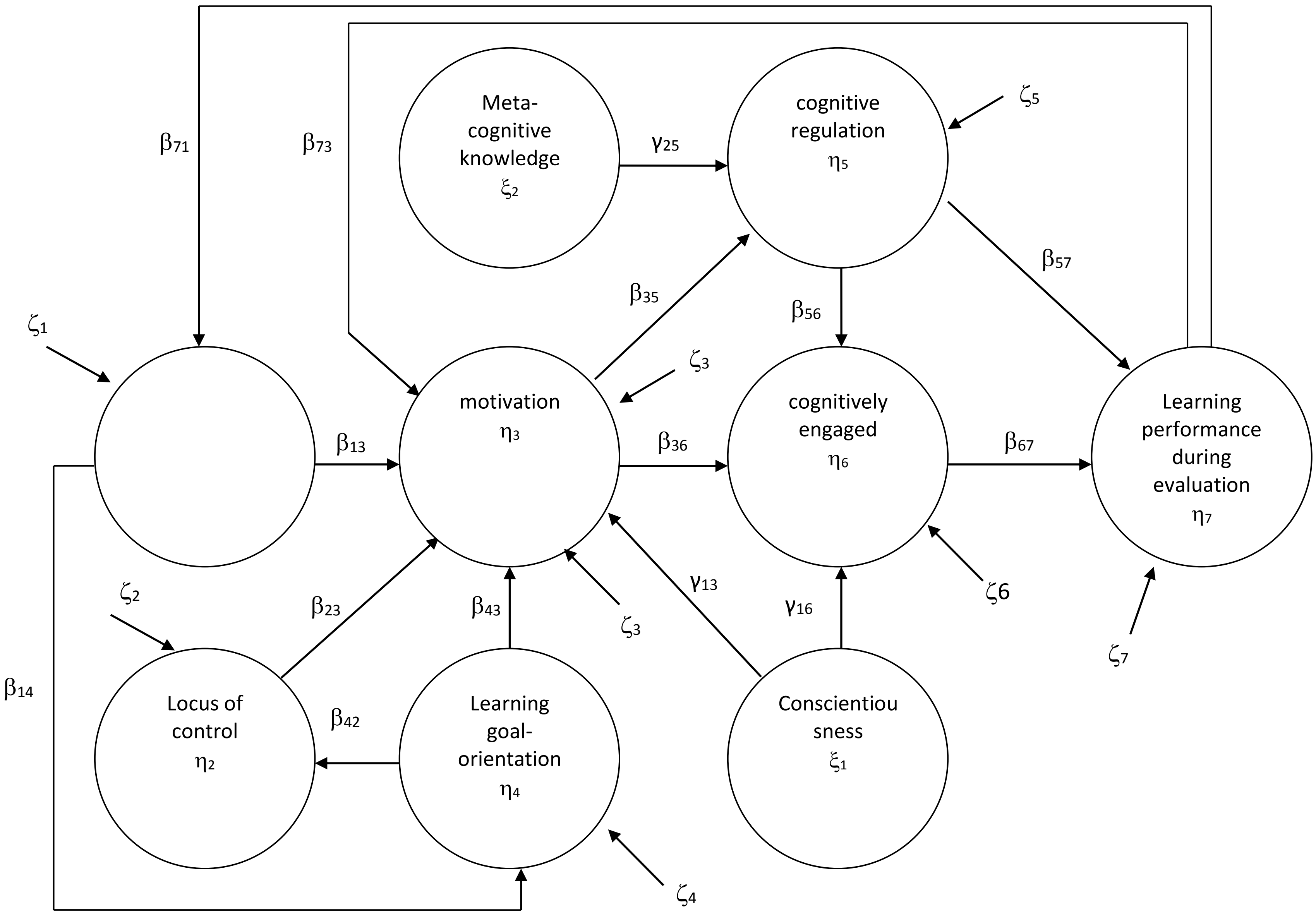

Figure 2.5. The reduced Van Heerden-De Goede learning potential structural model

2.4.2 Learning performance

Bloom (1976, as cited in Christophel, 1990) states that learning has been conceptualised as a process involving the acquisition or modification of cognitive, affective, and/or behavioural outcomes. Cognitive learning emphasises understanding and retention of knowledge; affective learning focuses on a positive or negative attitude toward the subject or the teacher; and behavioural learning is the development of skills. In their meta-analysis. Seidel and Shavelson (2007) summarised teaching effectiveness studies and evaluated the effect of various teaching variables and components on teaching effects and student outcomes. They differentiated teaching effects on student learning outcomes according to three outcome measures: learning processes, motivational-affective, and cognitive. Learning processes focused on the regulation of learning activities in the process of knowledge acquisition (e.g. students' cognitive engagement, quality of learning motivation, application of deep learning strategies, etc.). Motivational-affective and cognitive outcomes referred to the long term results of learning. Motivational-affective outcomes consisted of motivational, affective and conative results (e.g. development of stable interests, motivational orientations, attitudes or belief systems). Cognitive outcomes referred to results of learning with respect to the development of knowledge, measured either by standardised achievement and competency tests or specific tests of content understanding or student performance.

Instructor effectiveness and student learning has traditionally relied on achievement outcome measures such as graded performance (Schonwëtter, Clifton, & Perry, 2002; Tomcho & Foels, 2008). The assessment of instruction thus often includes the aggregation of one or more specific changes as reflected in graded performance (e.g. exams, graded assignments, course grades), often assessed by using paper-and-pencil type exams or tests. This would be classified as a cognitive outcome in terms of the Seidel and Shavelson categorisation. Stiggins (2008, as cited in Tomcho & Foels, 2008) reports that an assessment approach that best reflects the students' learning expected from the teaching activity is typically selected. Grades or the assessment of knowledge or skills/behaviour or attitudes are all assessment approaches that can be utilised. Obtaining new declarative or procedural knowledge or skills is inherent in the learning process and is generally readily acquired change; however, attitudes are more stable characteristics that may require longer exposure to instruction activities and methods to produce change (Olson & Zanna, 1993). Various researchers have found that instruction results in greater change in knowledge and behaviour than in attitude change (Tomcho & Foels, 2008).

Important to note is that various research has pointed to the imperfection of these measures. McKeachie, Pintrich, Lin and Smith (1986, as cited in Schonwëtter et al., 2002) state that these measures may not be suitable criteria of instruction as they are potentially poor indicators of learning solely generated from the specific teaching behaviours of instructors. Furthermore, learners may also compensate for ineffective teaching when faced with a written test by increased study or by obtaining assistance from their peers, thereby further confounding teaching effects attributable to instructors. Tomcho and Foels (2008) also state that course or exam grades as a measure of learning outcomes may not be a clear test of a particular teaching activity component as it is often the result of multiple influences. To circumvent this, Schonwëtter et al. (2002) used perception of learning as an achievement indicator. Perception of learning refers to the extent to which learners think they have learned from a lecture or training.

De Goede (2007) referred to learning performance as the level of malleable job competency potential latent variables. This refers to the malleable and non-malleable person characteristics that directly and/or indirectly determine the level of competence that job incumbents achieve on the job competencies. Affirmative development training programmes aim to increase the level of the malleable job competency potential latent variables that determine job performance. According to Taylor (1994) learning performance is demonstrated when an individual acquires specialised skills through transfer of fairly specialised skills and abilities. De Goede (2007) and Burger (2012) consequently defined learning performance as *the extent to which an individual has acquired a specific skill, ability or knowledge corresponding to the specific learning situation*.

De Goede and Theron (2010) argued that the latent variable *learning performance* should be removed from the modified model as the learning competencies already constitute *learning performance*, more specifically classroom learning performance. This recommendation can easily be misunderstood. The essence of De Goede and Theron's (2010) argument was that learning performance cannot be modelled separately from the learning competencies and outcomes that constitute learning. Learning is a never-ending process. They therefore proposed that a longitudinal explanatory structural model should be developed in which provision is made for the level of crystallised abilities at different points in time and the competence in using it in transfer at different points in time. A clear distinction can then be made between learning performance in the classroom and subsequent action-learning in the work-place. This implies that *transfer* and *automisation* latent variables should be operationalised utilising stimuli from the actual learning task (De Goede & Theron, 2010).

Van Heerden (2013) also stresses that De Goede and Theron's (2010) recommendation to delete the l*earning performance* latent variable can easily be misunderstood. She notes that the intention of De Goede and Theron (2010) was to clarify the point that the current *learning performance* latent variable should not be seen as conceptually distinct from *learning performance in the classroom*. Numerous learning competencies constitute learning performance of which the De Goede model only encapsulates two of these competencies, namely *transfer* and *automisation*. Additional learning competencies are most likely involved (Burger, 2012; De Goede, 2007; De Goede & Theron, 2010; Van Heerden, 2013). Van Heerden (2012) states that these learning competencies constitute *learning performance in the classroom* and the same learning competencies also constitute *learning performance during evaluation*. The same learning competencies also comprise *action learning in the workplace*.

As discussed earlier, *learning performance in the classroom* and *learning performance during evaluation* essentially constitute the same array of learning competencies, however, the nature of the learning problem differs. The nature of the crystallised ability (or prior learning) that is transferred differs and the nature of the insight being automated differs. In the classroom specific crystallised ability developed through prior learning is transferred onto the novel learning problems comprising the curriculum (Van Heerden, 2013). Once meaningful structure has been found in the learning material, it needs to be automated. Actual transfer takes place in the classroom and the subsequent *automisation* of the derived insight determines *learning performance during evaluation*. De Goede and Theron (2010) used the APIL-B subtests to measure *transfer* and *automisation* as dimensions of learning performance in the classroom. To ensure that no individual or group is unfairly disadvantaged due to prior learning, the APIL-B uses essentially meaningless learning material to assess *learning performance* in a simulated learning opportunity. Van Heerden (2013) states that the APIL-B subtests cannot be considered valid measures of the extent to which *transfer* and *automisation* takes place in the classroom. *Classroom learning performance* should rather be measured by tracking the extent to which learners successfully transfer prior learning onto the novel learning material presented in the classroom and the extent to which they successfully automate the newly constructed meaning. *Learning performance during evaluation,* in turn, should be measured by providing learners with novel learning problems that they should be able to solve by using the crystallised knowledge that they should have developed through *transfer* and *automisation* in the classroom. As such, l*earning performance during evaluation* involves transfer of the newly derived knowledge that has been automated onto novel learning problems related to (but qualitatively distinct from) those encountered in the classroom (Van Heerden, 2013).

2.4.3 Learning competencies

2.4.3.1 Transfer of knowledge

Transfer of knowledge is the process through which an individual acquires new job-specific knowledge, abilities and insight. In acquiring the new job competency potential, new skills, knowledge, and abilities are built on old ones to form an integrated conceptual framework more general and elaborative than the existing framework (Taylor, 1994). It is through the process of transfer that an individual's existing abilities contribute to the development of new abilities (Ferguson, 1954; Taylor 1994, 1992). De Goede and Theron (2010) state that transfer is the process through which crystallised abilities develop from the confrontation between fluid intelligence (Cattell, 1971) and novel stimuli (Taylor, 1994). According to Mc Geoch (1946, as cited in De Goede & Theron, 2010) transfer occurs when the individual applies what they already know to a novel problem. Alternatively, transfer is the effect previously learned behaviour has on a new learning task (Gouws, Louw, Meyer, & Plug, 1979). Various researchers believe that transfer is a crucial aspect of learning and cognitive development and believe that individuals who are able to transfer their existing insight onto novel learning tasks more effectively will show superior learning performance (Taylor, 1994; Ferguson, 1954). A definite difference appears to exist between above average students and lower-ability students in their ability to transfer their existing insight to novel learning tasks. Ferretti and Butterfield (1992) and Campione, Brown, Ferrara, Jones and Steinberg (1985) found that lower students had greater difficulty in transfer than their high-ability counterparts. Taylor (1994) believes that in the context of education and training, a good student is a student who is able to apply the knowledge they have acquired from prior learning to different but related problems.

In light of the above, one could thus argue that successful performance in an educational or training context would require a learner to transfer their knowledge, skills, or abilities to learning tasks. Burger (2012, p. 25) constitutively defined *transfer of knowledge* as *the adaptation of knowledge and skill to address problems somewhat different to those already encountered*. De Goede (2007) and Burger (2012) added *transfer of knowledge* to the learning potential structural model as a critical competency comprising both classroom learning performance, learning performance during evaluation and action learning. Learning performance and therefore transfer of knowledge is not restricted to the classroom. Classroom learning through transfer is valuable and important because the resultant insight has to be used in subsequent transfer onto novel (experiential learning) problems outside the classroom in the world of work.

2.4.3.2 Automisation

Taylor (1994) states a learning task is not fully completed even when an individual make sense of novel stimuli. Unless automisation takes place, the stimulus will remain a novel problem that has to be solved on every instance it is encountered. Taylor (1994) postulates that a cognitive algorithm that captures the insight of the problem-solving derived through transfer has to be created and stored. This algorithm can be retrieved when the individual is faced with a related problem. This newly derived insight should be integrated into the existing knowledge base in order to serve as a cognitive platform from which subsequent problem-solving or transfer can occur (Sternberg, 1984). Without automisation subsequent transfer cannot benefit from past learning. The only way a learner will become more efficient and effective in executing a task is to automate many of the operations involved in performing the task (De Goede & Theron, 2010).

De Goede and Theron (2010) provide a useful interpretation of automisation. They state that, when faced with a novel learning task, a learner would first attempt to cope with the problem by scanning their existing bank of knowledge, skills and abilities. If they have already automated a way of coping with a similar problem, the individual will use the learned response to deal with the new problem in a similar manner. If the individual does not possess automated and directly applicable knowledge, skills or abilities, they will utilise their fluid intelligence (abstract reasoning capacity) to cope with the task by transferring existing, relevant, but not directly applicable skills, knowledge, and abilities to solve the problem. Once again, when the task has been mastered, the individual can add what has been learned to their existing knowledge and skills base. When faced with a novel task, the individual can now apply learned knowledge from a more elaborate framework of knowledge, skills, and abilities to master the new task.

Burger (2012, p. 26) constitutively defined *automisation* as *an individual pre-consciously making something learned a part of him or herself.* De Goede (2007) and Burger (2012) added *automisation* in the performance@learning model as it is an important dimension of learning.

2.4.3.3 Time cognitively engaged

Burger (2012) added time cognitively engaged as a learning competency comprising learning performance. In the ideal learning situation, learners should be highly engaged with the learning task as higher levels of engagement are often associated with higher levels of learning performance. Student engagement is often considered to be a better predictor of the outcomes of learning as it has been positively associated with college-reported grade point average, GPA scores, as well as personal development (Burger, 2012). Her conceptualisation of the concept included two aspects: the amount of effort exerted by the individual as well as the duration for which the individual exerts effort. She defined *time cognitively engaged* as *the extent to which individuals were spending time attending to and expending effort in their learning tasks encountered*. It is therefore an elaboration of the concept of cognitive engagement, including a component of time-on-task.

Burger (2012) postulated that this concept was especially relevant to members from the previously disadvantaged group as they may, due to their lower levels of crystallised abilities (due to lack of learning opportunities), be required to exert more effort and spend more time on a learning task. She cited the study of Carini, Kuh and Klein (2004) who seemingly found support for this argument as their study suggests that low ability students benefited more from engagement than their high ability counterparts, particularly in terms of their RAND and

GRE scores, and to a lesser extent, their GPA[5,6]. Individuals with higher levels of crystallised intelligence may simply require less effort to achieve similar academic results. In order to achieve good academic results, high ability students seem to need to expend less effort in learning activities. Carini et al. (2004) found that low ability students had a .17 correlation between total time spent preparing/studying for class and their RAND score while the correlation for high ability students was found to be .01.

Research has indicated that engaged learners tend to be more focused, directed, goal oriented and relentless during their interaction with social and environmental learning conditions (Reeve, Jang, Carrell, Jeon, & Barch, 2004). Engagement is described by the motivation literature as possessing the qualities of (1) sustained, effortful and enthusiastic participation, (2) a positive attitude, (3) intense effort, (4) focused attention and (5) goal directedness (Darabi, Nelson, & Paas, 2007). Highly engaged individuals display sustained involvement in learning activities; they initiate action when given the opportunity and exert intense effort and concentration in the implementation of learning tasks.

A myriad of definitions exist for student engagement (Appleton, Christensen, & Furlong, 2008). Although agreement exists on the fact that it is a multidimensional construct, considerable disagreement exists on the number and types of dimensions. It ranges from two to four dimensions including behavioural (e.g. positive conduct, effort, participation), emotional or affective (e.g. interest, identification, belonging, positive attitude about learning), and cognitive (e.g. self-regulation, learning goals, investment in learning). Furthermore, researchers have proposed an engagement taxonomy with four subtypes: academic, behavioural, cognitive, and psychological. Academic indicators include variables such as time on task, credits earned toward graduation, and homework completion;

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[5] Student learning was assessed by academic performance as measured by the RAND and GRE test scores, and college-reported GPA. The RAND measures are cognitive and performance tests consisting of two performance tests and four critical thinking tests. Subject areas for the critical thinking tasks included science, social science, and arts and humanities. Two essay prompts from the GRE were administered: a 45-minute make-an-argument prompt requiring students to take and argue a position on a topic and a 30-minute break-an-argument prompt requiring students to critically analyse a given position on an issue. Researchers also obtained cumulative GPA and total SAT scores for most students (Carini et al., 2004). The "ability" score used in the study seems to tap into crystallised intelligence (as it relates to specific subject areas) as well as fluid intelligence (critical thinking skills).

[6] It is important to be cognisant of the fact that "academic ability" may be conceptualised and measured differently by various researchers. It cannot simply be assumed that all researchers employ the same conceptualisation of "academic ability".

behavioural indicators include attendance, suspensions, voluntary classroom participation, and extracurricular participation; cognitive indicators include self-regulation, relevance of schoolwork to future endeavours, value of learning, personal goals and autonomy; and psychological indicators refer to feelings of identification or belonging, and relationships with teachers and peers.

Marks (2000) define engagement as a psychological process referring to the attention, interest, investment, and effort students expend in the learning process. Similarly, Newmann, Wehlage, and Lamborn (1992) define engagement as students' psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote. Skinner and Belmont (1993) define student engagement as the intensity and emotional quality of learners' involvement in initiating and carrying out learning activities. It includes emotional as well as behavioural components as engaged learners show behavioural involvement in learning activities accompanied by positive emotional overtones. They choose challenging tasks, initiate action when provided with the opportunity, they exert intense effort and concentration in the execution of learning tasks, and show generally positive emotions during the execution of learning tasks such as optimism, interest, enthusiasm and curiosity. According to Skinner and Belmont (1993) the polar opposite of engagement is disaffection which is characterised by passiveness, the lack of effort and resilience, negative emotions such as anger, depression, and anxiety, withdrawal from learning activities and even rebellion. This motivational type of engagement differs from cognitive engagement with the latter referring to the level of thinking skills used by the learner.

Burger (2012) notes that these definitions imply the use of three interrelated criteria to assess student engagement levels:

1) Cognitive criteria: the extent to which students are attending to and expending mental effort in the learning tasks encountered,
2) Behavioural criteria: the extent to which students are making active responses to the learning tasks presented, and
3) Affective criteria: the level of student investment in, and their emotional reactions to, the learning tasks.

Fredricks, Blumenfeld, and Parism (2004) reviewed the existing literature on academic engagement. They examined behavioural, emotional and cognitive engagement. Behavioural engagement draws on the idea of participation. Emotional engagement involves positive and negative reactions to instructors, classmates, academics, and the academic institution and is supposed to create ties to an institution and influence willingness to do the work. Lastly, cognitive engagement employs the idea of investment, incorporating thoughtfulness and willingness to exert the effort to understand complex ideas and master difficult skills.

Cognitive engagement has been approached from two different perspectives in the literature (Fredricks et al., 2004). The one approach specifically emphasises a psychological investment in learning, whereas the other approach focuses on cognition and highlights strategic learning. The first approach emphasises psychological investment in learning, a desire to go beyond the requirements, and a preference for challenge (Newmann et al., 1992; Connell & Wellborn, 1991: Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989). Connell and Wellborn (1991) defined cognitive engagement as holding flexibility in problem solving, preference for hard work, and positive coping in the face of failure. Newmann et al. (1992) define engagement as psychological investment in and effort directed toward learning, understanding and mastering the knowledge and skills that the learning material is intended to promote. Wehlage et al. (1989) refer to engagement as the psychological investment required to understand and to master knowledge and skills explicitly taught.

The second approach focuses on strategic or self-regulating elements of cognitive engagement. Cognitively engaged students use metacognitive strategies to plan, monitor, and evaluate their cognition when accomplishing tasks (Pintrich & De Groot, 1990; Zimmerman, 1990). These students employ learning strategies such as rehearsing, summarising, and elaborating to remember, organise, and comprehend the learning material (Corno & Mandinach, 1983). They are able to sustain their cognitive engagement by managing and controlling their effort on tasks (Pintrich & De Groot, 1990). This conceptualisation of cognitive engagement overlaps significantly with the competency *meta-cognitive regulation* which is defined as the planning, monitoring, and evaluation of learning activities (see 2.4.4.4). This view of cognitive engagement is, subsequently, not endorsed by this study.

Various researchers have found that cognitive engagement is a bipolar construct, enabling a qualitative distinction to be made between deep and surface-level strategy use (Rastegar, Jahromi, Haghigli, & Akbari, 2010; Metallidou & Vlachou, 2007; Fredricks et al., 2004; Greene & Miller, 1996). Cognitively engaged learners will employ deep cognitive processing during the learning process, whereas non-cognitively engaged students will utilise surface cognitive processing. Deep cognitive processing involves exerting more mental effort; creating more connection among ideas; integrating concepts; and achieving greater understanding of ideas (Liem, Lau, & Nie, 2007; Weinstein & Mayer, 1986, as cited in Fredricks et al., 2004). It also involves active learning processes to facilitate long-term retention of information, for example, searching for patterns and principles; attempting to integrate new information with prior knowledge and experience (Sins, Van Joolingen, Savelsbergh, & van Hout-Wolters, 2008).

Surface cognitive processing, in contrast, involves studying learning material with the intention of reproducing information without any further analysis (Phan, 2010). It is characterised by the memorisation and reproduction of the learning materials; limited reflection; and treating the learning material as more or less unrelated bits of information Sins et al., 2008; Liem et al., 2007). It aims to store new information into short-term memory mainly through repeatedly reading the learning material.

Burger (2012) exclusively focused on cognitive engagement in the elaboration of her learning potential structural model as it was deemed the most relevant to her study of learning potential. She encapsulated aspects of cognitive engagement in the construct *time cognitively engaged.* More specifically, *her definition of the construct implied an individual adopting a deep cognitive processing approach to learning.*

The time-component included in Burger's (2011) conceptualisation of the construct involved time-on-learning-task. Time-on-learning-task has been repeatedly recognised as a significant contributor to academic success. This is due to the fact that learning is partly a function of the time spent engaged on a task and that time on task has been found to have direct implications for learning (Gest & Gest, 2005). Thus, individual differences in the amount of time spent on a task will contribute to individual differences in academic skills. Burger (2012) included this component in her definition in order to not only measure the quality aspect of cognitive engagement, but also the quantity aspect of the variable. Time cognitively engaged refers to the time spent by an individual with their attention directed towards the learning task in an attempt to form structure and ultimately transfer existing knowledge to the current task. The amount of effort a learner exerts as well as the duration of this effort exertion is a vital combination (Burger, 2012).

Research has repeatedly demonstrated the achievement benefits of cognitive engagement (Fredricks et al., 2004). Substantive engagement, which is almost synonymous with cognitive engagement, has been found to be positively related to test scores related to students' in-depth understanding and synthesis (Nystrand & Gamoran, 1991). Various researchers have demonstrated the benefits of strategy use (Fredricks et al., 2004). Boekarts, Pintrich and Zeidner (2000, as cited in Fredricks et al., 2004) and Zimmerman (1990) found that students who employ metacognitive strategies perform better on several academic achievement indicators. In her thesis, Burger (2012) cites various studies demonstrating the positive effect of cognitively engagement on learning performance. Zhu and colleagues (2009) found a positive effect of cognitive engagement on achievement (indicated by knowledge gain) in a physical education environment. Similarly, Metallidou and Vlachou (2007) found that a positive association between primary school students' cognitive engagement and their maths and language achievement. Furthermore, Chamorro-Premuzic, Furnham, and Ackerman (2006) found that typical intellectual engagement (TIE), a measure of levels of intellectual investment, provided significant incremental validity over psychometric general intelligence and the Big Five personality factors in predicting academic performance. With regard to time on learning task, various researchers have found that time on learning task is a strong determinant of academic achievement (Nonis & Hudson, 2006; Gettinger & Seibert, 2002; Singh, Granville, & Dika, 2002). Consequently, the proportion of engaged time that the student is productive and active relates to achievement.

Two other dimensions of engagement

Behavioural and emotional engagement are two other dimensions of engagement excluded from the elborated De Goede model. Fredricks et al. (2004) state behavioural engagement is most commonly defined in three ways. It is either defined as positive conduct, such as abiding by rules, adhering to classroom norms, and the absence of disruptive behaviours, or as involving participation in school-related activities such as athletics or school governance (Finn & Rock, 1997; Finn, Pannozzo, & Voelkl, 1995; Finn, 1993). The latter refers to involvement in learning and academic tasks and includes behaviours such as effort, persistence, concentration, attention, asking questions, and contributing to class discussions (Birch & Ladd, 1997; Finn et al., 1995; Skinner & Belmont, 1993). As such, behavioural engagement could be constitutively defined as *students' active responses to the learning tasks presented.* Numerous studies have demonstrated a positive relationship between behavioural engagement and achievement-related outcomes (Fredricks et al., 2004). They report that a consistent relationship exists between instructor and student reports of behavioural engagement and achievement across a variety of samples, although the strength of the correlation varies across studies. This could be due to the variety of students studied, ranging from at-risk to gifted students, and possibly due to the use of various achievement measures.

Fredricks and colleagues (2004) state that emotional engagement is conceptualised as students' affective reactions in the classroom, including interest, boredom, happiness, sadness and anxiety (Connell & Wellborn, 1991; Skinner & Belmont, 1993). They also report that some researchers assess emotional engagement by measuring emotional reactions to the school and the teacher or conceptualise it as identification with school and feelings of belonging and value (Fredricks et al., 2004). Connell and Wellborn (1994, as cited in Klem & Connell, 2004) define emotional engagement as heightened levels of positive emotion during the completion of an activity, demonstrated by enthusiasm, optimism, curiosity, and interest. Affective engagement could thus be constitutively defined as *students' positive emotional reactions to the learning task and environment.*

The research on emotional engagement and achievement is much more limited than on other forms of engagement. Although some studies (for example Connell, Spencer, & Aber, 1994; Skinner, Wellborn, & Connell, 1990) found a correlation between achievement and a combined measure of emotional and behavioural engagement, the unique contribution of emotional engagement on academic outcomes cannot be examined (due to the use of the combined measure) (Fredricks et al., 2004). According to Fredricks et al. (2004) research on the relationship between achievement and specific constructs combined under the term emotional engagement show varying correlations (e.g. Pintrich & De Groot, 1990).

Fredricks et al. (2004) state research has not fully capitalised on the potential of engagement as a multidimensional construct. As such, many engagement studies only include one or two types but typically do not include all three dimensions. The majority of studies simply test the impact on one dimension of engagement on one outcome. Very little is known about the influence of multiple classroom antecedents on the three dimensions simultaneously; the contextual factors or combinations of factors exerting the most influence on each type; the coherence among contextual factors affecting engagement; or the interactions among the different types of engagement. Fredricks et al. (2004) propose that it is likely that emotional engagement leads to increased behavioural and cognitive engagement, which both mediate subsequent achievement. Emotional engagement interacts with behavioural engagement and cognitive engagement in academic learning (Wang, Willett, & Eccles, 2011). Wang et al. (2011) states that this interaction is particularly concerning as low levels of each dimension are associated with unsuccessful school outcomes. Furthermore, low behavioural engagement and cognitive engagement is also related to emotional withdrawal from school-related activities. Wang et al. (2011, p. 466) states that "over time, behavioural participation, emotional identification, and cognitive engagement exert reciprocal influence. Ultimately, the degree to which students engage in school behaviourally, emotionally, and cognitively influences their academic success, which in turn, may influence changes in all three aspects of school engagement."

Given the above, it is likely that emotional engagement will lead to increased behavioural and cognitive engagement. Furthermore, its effect on other dimensions of learning performance (for example: transfer) will be mediated through cognitive engagement and behavioural engagement. That is, as students' emotional reactions to the learning task and environment become more positive (i.e. increase) they are likely to increase the extent to which they spend time attending to and expending mental effort on learning tasks encountered (cognitive engagement) and increase students' active responses to the learning tasks presented (behavioural engagement) and, consequently, increase learning performance. The focus of this study is, however, on the linkages between trainer-instructor competencies and the variables included in the elaborated De Goede models. It is thus not the primary focus of this study to investigate the influence of behavioural and emotional engagement on other learning competencies comprising learning performance. These variables should be considered for future research on the learning potential model.

2.4.3.2 Meta-cognition

Van Heerden (2013) included meta-cognition in her elaboration of the De Goede model. Meta-cognition involves an individual's thinking about their thinking. Flavell (1976) defines metacognition as an individual's knowledge concerning their own cognitive processes or anything related to them. Meta-cognition is described by Tobias and Everson (1996, as cited in Van Heerden, 2013) as the ability of an individual to monitor, evaluate, and make plans for their learning. Meta-cognition concerns knowledge, awareness and control of the processes by which learners learn. A learner with meta-cognition has the ability to recognise, evaluate, reconstruct existing ideas, and have strategies for figuring out what they need to do (Georghiades, 2004; Anderson, 2002).

Although meta-cognition is considered to be a multi-dimensional construct, Van Heerden (2013) argued that only the one component, *regulation of cognition*, is considered to be a learning competency. Regulation of cognition refers to the processes that facilitate the control aspect of learning (Shraw, 1998). Van Heerden (2012) based her conceptualisation of this competency on the work of Schraw (1998). Accordingly, she stated that cognitive regulation includes the regulatory skills (a) planning, (b) monitoring, and (c) evaluating. The selection of appropriate strategies and the allocation of resources that affect performance constitute *planning*. Planning assists learners in analysing the problem, retrieving relevant domain-specific skills, and properly sequencing problem-solving strategies. The individual's awareness of comprehension and task performance is referred to as *monitoring*. Learners that employ monitoring closely follow their plan and track the extent to which the plan is successfully solving the problem. *Evaluating* involves conducting an assessment of the product and efficiency of learning.

Van Heerden (2013) notes that equipping affirmative development candidates with meta-cognitive skills will provide them with the tools to gain the specific skills at which the learning intervention is targeted as well as empowering them with the means to allow learning across subject areas and domains. This is especially relevant in the fast-paced business environment where technology and processes are constantly changing. Meta-cognitive skills will equip affirmative development candidates with the tools to continue learning and gaining skills outside of formal learning environments.

Van Heerden (2013) postulates that affirmative action candidates with high levels of *cognitive regulation* will be more likely to be successful in training and development interventions than those who do not possess those skills. She hypothesised that *meta-cognitive regulation* will not directly influence *learning performance during evaluation, but* do so through the mediating effects of *transfer*. She also proposed that *meta-cognitive regulation* positively affects *time cognitively engaged.*

2.4.3.3 Academic self-leadership

Self-leadership is the process through which individuals inspire themselves to achieve the self-direction and motivation necessary to perform (Manz & Sims, 2001; Manz & Neck, 1999; Manz, 1986). It is an enabling process whereby individuals gain a better understanding of themselves, and through this improved understanding they are able to better direct the course of their lives. Self-leadership is usually conceptualised as a learned behaviour rather than a fixed trait (Manz, 1986). Self-leadership allows individuals to control their own behaviour, to influence and lead themselves through the use of specific behavioural and cognitive strategies (Manz & Neck, 2004). Burger (2012) defined *academic self-leadership* in the context of the learning domain. She confined academic leadership to the influencing, self-direction, and motivation geared towards the academic domain and learning. Individuals with academic self-leadership qualities have a clear vision of achieving academic success, their thoughts and behaviour pointed towards making this vision a reality.

Burger (2012) states that self-leadership is facilitated through three strategies: behaviour focused strategies, natural reward strategies, and constructive thought patterns. The self regulation of behaviour through the use of self-assessment, self-reward and self-discipline is known as *behaviour-focused strategies*. It involves the identification of specific behaviours to conduct a self-analysis in order to identify long-term goals, the identification and self-application of motivational rewards, the reduction of habitual self-punishment patterns and the practice of desired behaviours (Manz, 1992). These strategies should ultimately foster positive, desirable behaviours whilst discouraging ineffective behaviours.

The strategy which involves seeking out work activities that are inherently enjoyable is referred to as a n*atural reward strategy*. Natural reward strategies involve focusing attention on the more pleasant or gratifying aspects of a given job or task rather than on the unpleasant or difficult aspects. It is concerned with positive perceptions and experiences associated with tasks that are to be accomplished, such as a commitment to, belief in, and enjoyment of the work for its own value (Manz, 1992). These strategies can be facilitated by modifying perceptions or behaviours associated with task performance.

Creating and maintaining functional patterns of habitual thinking are referred to as *constructive thought pattern strategies*. These strategies focus on establishing and altering thought patterns in desirable ways. Specific thought-oriented strategies include the evaluation and challenging of irrational beliefs and assumptions, mental imagery of successful future performance and positive self-talk.

According to Manz (1986, 1992) self-leadership strategies facilitate a perception of control and responsibility which positively affects performance outcomes. The positive relationship between self-leadership and performance has been demonstrated in multiple studies (Dolbier, Soderstroom & Steinhardt, 2001; Neck, Neck, Manz & Godwin, 1999; Bandura & Schunk, 1981).

Various studies have noted the improvement of self-leadership behaviours after individuals have completed a training programme. Business executives have embraced self-leadership concepts through training programmes designed to increase self-leadership skills and behaviours in the workplace (e.g. Neck & Manz, 1996; Stewart Carson & Cardy, 1996). Furthermore, Neck and Manz (1996) found that individuals who received self-leadership training experienced increased mental performance, positive affect, job satisfaction, and decreased negative affect relative to those who did not receive the training.

Although it is possible to develop self-leadership, it seems that targeted interventions are required to develop these skills and behaviours. The development of self-leadership skills can be explicitly included in the curriculum of an affirmative development programme. Trainer-instructors can also provide positive reinforcement for specific effective self-leadership behaviours (e.g. by providing praise), they can model affective and appropriate self-leadership behaviours, and use negative reinforcement to inhibit ineffective self-leadership behaviours.

2.4.4 Learning competency potential

The extent to which a learner can successfully transfer existing knowledge onto novel problems, automate, cognitively engage with the learning material for extended periods of time, plan, monitor and evaluate their engagement with the learning material, and influence, self-direct, and self-motivate, is not random. Performance on these five learning competencies is dependent on a complex nomological network of structurally inter-related person-centred characteristics and learning competencies. The learning competencies therefore directly and/or indirectly exert effects on each other and they are affected directly and/or indirectly by a structurally inter-related network of person-centred and situation-centred learning competency potential latent variables. A discussion of the competency potential variables included in the De Goede (2007), Burger (2012) and Van Heerden (2013) models follows.

2.4.4.1 Abstract thinking capacity

Abstract thinking capacity can be best described with reference to Cattell's two-factor model of intelligence, consisting of fluid (Gf) and crystallised (Gc) intelligence (De Goede, 2007; De Goede & Theron, 2010). Cattell's (1971) concept of fluid intelligence (Gf) is comparable to Spearman's general intelligence factor (g), while crystallised intelligence can be likened to the group factors or primary abilities referred to by Eysenck (1986, as cited in De Goede & Theron, 2010). According to De Goede and Theron (2010) the two-factor model of fluid and crystallised intelligence proposed by Cattell, viewed in conjunction with the learning competency transfer of knowledge, provides an explanation as to why individuals differ in terms of abilities.

Cattell (1971) stated that Gf is a fundamental, innate intelligence and can be related to various kinds of problem-solving. It is related to how adept an individual is in perceiving complex relations, forms and concepts, and engages in abstarct reasoning. It is also applied in the development of new abilities and the acquisition of new knowledge (Cattell, 1971). Furthermore, fluid intelligence is independent of experience and education. In contrast, crystallised intelligence (Gc) relates to the acquired abilities and knowledge which stems from schooling, becoming competent with one's culture, and mastering one's specific circumstances. It appears to have a scholastic and cultural foundation (Jensen, 1998). Fluid intelligence, or Gf, can thus be likened to abstract reasoning capacity.

Abstract reasoning capacity appears to play an essential role in learning and in dealing with novel problems (De Goede & Theron, 2010). Abstract reasoning capacity would thus either contribute or inhibit an individual's capacity to make sense of the learning task by creating meaningful structure through *transfer of knowledge*.

Malleability of abstract reasoning capacity

Taylor (1994) states that abstract reasoning capacity is mostly genetically determined, implying that it is relatively free from the (post-birth) influence of culture and opportunities. This competency potential seems to be relatively fixed and therefore does not offer a portal through which the trainer-instructor could affect classroom learning performance and through that, ultimately, learning performance during evaluation and action learning. This also implies that a certain capacity sets an upper limit to learning performance (Taylor, 1994).

2.4.4.2 Information processing capacity

A learner is faced with novel and intellectually challenging tasks in the learning context. Information processing firstly refers to the point where a learner uses executive processes to process pieces of information or stimuli provided in the task and selects a strategy to follow, and, secondly, to use non-executive processes to actually carry out the strategy (Sternberg, 1984). Alternatively stated, *information processing capacity* refers to an individual's memory capacity to store and retrieve newly gained and existing information and knowledge (Van Heerden, 2013). Taylor (1997) posits that three broad information processing capacity parameters exist; either contributing or impinging an individual's ability to solve a problem. The first parameter refers to the speed with which information of moderate difficulty is processed. The second parameter refers to the accuracy with which information of moderate difficulty is processed. The third parameter refers to the cognitive flexibility with which an appropriate problem solving approach is selected.

De Goede and Theron (2010) state that within the context of learning, individuals who can process information more efficiently and effectively (i.e. quickly, accurately, and flexibly) will be able to acquire more information, learn faster and perform better.

Malleability of information processing capacity

Taylor (1994) states that information processing capacity is mostly genetically determined, implying that it is relatively free from the (post birth) influence of culture and opportunities. This again implies that a certain capacity sets an upper limit to learning performance (Taylor, 1994).

2.4.4.3 Conscientiousness

Conscientiousness is part of the Big Five model of personality (Barrick & Mount, 2005). The Big Five framework has been accepted in the literature as a description of the structure of personality and consists of: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience. *Conscientiousness* deals with an individual's level of organisation, persistence, and goal directed behaviour. Individuals scoring high on conscientiousness tend to be strong-willed, responsible, neat and well-organised.

Conscientiousness appears to be particularly relevant in the work and school domain as a predictors of success. Conscientious individuals are considered to be industrious, systematic, dutiful, achievement orientated, striving and hardworking. It also includes aspects such as ambition, energy, control of inclinations, diligence, carefulness, and being practical. It also expresses an orientation and internal goal driven behaviour known as the will to succeed. In contrast, individuals low in conscientiousness tend to be lazy, lack the orientation to succeed, and do not possess the self-discipline to meet their own standards.

Research has found a consistent relationship with conscientiousness and academic achievement. O'Connor and Paunonen (2007) found that of the Big Five personality traits, conscientiousness is the best predictor of a variety of academic outcomes including exams, essays, continuous assessment, and supervised dissertation. Barrick and Mount (1991) also found conscientiousness to be related to educational achievement and job performance across all occupations studied. In their review of the literature, Burger (2012) and Van Heerden (2013) also found conscientiousness to be related to cognitive engagement and learning motivation. Dean, Conte and Blankenhorn (2006) state that in the context of training and education, conscientiousness will serve a student well in planning, forecasting, seeking out additional learning assistance, and following through with academic goals.

Malleability of conscientiousness

Conscientiousness is a personality trait. According to John and Srivastava (1999) personality refers to a set of more or less stable characteristics, as assessed and judged by others, that distinguish one individual from another. Similarly, Bidjerano and Dai (2007) define personality traits as stable individual difference characteristics explaining an individual's disposition to particular patterns of behaviour, cognitions and emotions.

There is considerable debate about the stability of personality traits in the literature. Numerous studies have found personality characteristics to be relatively stable across time and situation (e.g. Costa & McCrae, 1988; Conley, 1985; Block, 1981). Mischel (2004), however, states that the stability of personality traits has been difficult to prove. The classical approach to personality assumes that personality traits are expressed directly in behaviour. As such, a specific standing on a latent personality trait should deliver consistent behaviours across many different situations. Although the characteristics of the situation could also causally influence behaviour, the influence is exerted independent of personal characteristics. Individuals high on conscientiousness are expected to consistently behave in a conscientious manner in all situations and individuals high on extraversion are expected to behave in an extraverted manner across many situations. According to Mischel (2004), it is often found that an individual’s behaviour and standing on almost any psychological dimension varies considerably across diverse situations, consequently producing low correlations.

This variability of behaviour across situations could be explained by the influence of extraneous variables and measurement error (Mischel, 2004). According to this view, the nature of the situation can be regarded as one of the extraneous variables creating noise and needs to be controlled as a nuisance variable. Alternatively, the nature of the situation could be treated as a necessary and integral component of personality theory. This view postulates that the interaction between personality and situational characteristics are integral to understanding and predicting behavioural variability across situations. Furthermore, it seems that the individual's subjective interpretation of the situation rather than the objective situation is regarded as important. Individuals would therefore only be expected to behave consistently across situations if the situations are judged similarly. This view advocates more complex *if-then* situation-behaviour relationships (Mischel, 2004) than the classical approach to personality.

The situation-behaviour personality view seems to suggest that the characteristics of the situation could be manipulated to produce certain behaviours. For example, it would be possible to alter the characteristics of the situation in such a manner that individuals low on conscientiousness would judge the situation as one that requires the display of highly conscientious behaviour. Similarly, it would be possible to manipulate the situation in such a manner that individuals high with conscientiousness would also judge the situation to require the display of highly conscientious behaviour. As stated before, subjective evaluations are more important than the objective situation in producing the behaviour. This seems to be a rather complex avenue (dependent on a complex if-then situation-person relationship) for the trainer-instructor to pursue to optimise student learning – although possibly a very fruitful one. Future research should investigate whether the trainer-instructor can influence student conscientiousness and how this can be achieved.

2.4.4.4 Learning motivation

Research has repeatedly shown that learning will occur only when trainees have both the ability *and* the motivation to acquire and apply new skills (Wexley & Latham, 1981). Motivation to learn has been found to explain variance in learning, over and above cognitive ability (Colquitt, LePine, & Noe, 2000). It appears that both cognitive abilities and motivation are required to succeed in learning tasks. Subsequently, Burger (2012) argued that *learning motivation* should be added to the De Goede (2007) learning potential structural model.

Nunes (2003) states motivation involves an individual's choice to invest energy in one particular set of behaviours. Motivation is described as forces acting on an individual that instigate and direct behaviour (Gibson, Ivancevich, Donnelly, & Konopaske, 2009). Brophy (1983) states motivation is a force or energy with stimulating properties directing individuals to act in particular ways. According to him, motivation to learn is both a state and a trait. The transient and contextualised properties that arise, direct, and stimulate learners to take action and to learn is called state motivation. In contrast, trait motivation refers to a more enduring affect for learning independent of class context. State motivation can be influenced by students' attitudes toward a course. Attitudes towards a course (and towards the act of learning) will depend on the valence completion of the course (which in turn depends on the instrumentality of completing the course in achieving salient outcomes linked to successful completion of the course) and the valence of those outcomes and the subjective probability that effort directed at the course will translate to success (Estes & Polnick, 2012; Gibson et al., 2009). These latent variables that form part of the dynamics of learning motivation can be influenced by the trainer-instructor (Zhang & Oetzel, 2006; Christophel, 1990; Wlodkowski, 1985). Ames and Archer (1988) state that learning motivation is characterised by long-term quality involvement in learning and commitment to the process of learning. It involves a desire that energises and directs goal-oriented behaviour. According to Brewster and Fager (2000) learning motivation refers to a student's willingness, need, desire, and compulsion to participate and be succesful in the learning process. In her study, Burger (2012) adopted the definition of Ryman and Biersner (1975) to define *learning motivation.* They defined learning motivation as the *desire of learners to learn the learning material*.

Various studies have found support for the relationship between learning motivation and learning performance (Ralls & Klein, 1991; Hicks & Klimoski, 1987). Motivated trainees have been found to take a more active role in training, to get more from the experience, and are more ready to learn than less motivated individuals (Nunes, 2003). Individuals who enjoy the learning tasks or material, but are not motivated to learn, will not learn much because they are not prepared to learn.

Burger (2012) reports various studies in which motivation to learn have been found to have a strong positive relationship with various learning outcomes (e.g. Martocchio & Webster, 1992; Tannenbaum, Mathieu, Salas, & Cannon-Bowers, 1991; Noe & Schmitt, 1986). *Learning motivation* has been associated with programme completion (Mathieu & Zajac, 1990) and has been cited as an important factor indirectly affecting *transfer of knowledge* (Tannenbaum et al., 1991), most likely through its effect on *time cognitively engaged*. Burger (2012) states that:

> …motivation influences [the] direction of attentional effort, the proportion of total attentional effort directed at a task and the extent to which attentional effort toward the task is maintained over time. *Learning motivation* determines the *extent to which* an individual directs his or her energy towards the learning task in an attempt to form structure and ultimately transfers existing knowledge to the current task.

Ryman and Biersner (1975) found that learning motivation affects the amount of effort exerted during a training session and serves to mobilise intention to learn into action. Motivation to learn also increases individual attention which, in turn, increases student receptivity (Nunes, 2003).

Singh et al. (2002) propose that motivation and academic engagement may have a reciprocal relationship. They state that motivation influences engagement in academic endeavours, which in turn, further enhances motivation. This influence would probably be indirect via learning performance during evaluation that affects self-efficacy that affects the probability that a certain amount of effort will lead to a certain level of performance as a facet of learning motivation. Hidi (1990), however, states that regardless of other factors, students may invest or withdraw from learning depending on their interest in the subject matter. Interest in specific subjects is also related to learning subject matter. This suggests that interest in the subject matter should be a competency potential latent variable in its own right that affects learning motivation. It is likely that interest in the subject matter would determine the intrinsic motivation of successful transfer. The focus of this study is to determine how the trainer instructor influences the variables included in the De Goede (2007), Burger (2012), and Van Heerden (2013) model, and not to add additional variables. Interest in the subject matter should be considered for inclusion in the learning potential model in future studies.

Expectancy, valence and instrumentality of learning performance

Burger (2012) included the expectancy model in her hypothesised structural model of learning performance as the theory provides a useful heuristic for integrating research on *learning motivation* that affects *transfer of knowledge*. According to Vroom (1964) an individual's motivation is a product of expectancy, instrumentality and valence and this theory helps to provide insight into the motivations of individuals to achieve goals. Vroom's theory was extended by Porter and Lawler (1968) with their hypothesis that performance is a function of the interactions among instrumentality, valence, expectancy, ability, and role perceptions. The inclusion of role perceptions as an additional measure of performance distinguishes these two theories from one another (Heneman & Schwab, 1972). The expectancy model presents a useful means for understanding transfer of knowledge because of its interactive perspective on motivation; perception and motivation are affected by both individual and work-environment factors which must be interpreted by the individual and translated into choices among various behavioural options (Burger, 2012).

Burger (2012) defined *expectancy of learning performance* as a momentary belief concerning the likelihood that a particular learning act will be followed by a particular learning outcome. When an individual chooses between alternatives which involve uncertain outcomes, their behaviour is affected by the degree to which they believe these outcomes to be probable. Self-efficacy is related to expectancy (Vancouver & Kendall, 2006). The higher an individual's belief that they are capable of learning the higher their expectancy of successful classroom learning performance and successful learning performance during evaluation should be.

Burger (2012) hypothesised that *expectancy of learning performance* will positively influence *learning motivation*[7] and that *academic self-efficacy* will positively influence *expectancy of learning performance*. These hypothesised paths were included in the elaborated De Goede model, but not empirically tested in Burger's reduced elaborated model.

Burger (2012) defined *valence of learning outcomes* as affective orientations towards learning outcomes. When an individual prefers to attain an outcome rather than not attaining it, an outcome is said to have a positive valence (Vroom, 1964). When an individual is indifferent to attaining or not attaining an outcome, the outcome is said to have zero valence. An outcome has negative valence if an individual prefers to not attain the outcome rather than to attain it. Valence, in essence, refers to an individual's affective orientation (i.e. value) toward particular outcomes. If the outcome of a performance task has positive valence for an individual then that individual should be more motivated to perform the task. The higher the valence of the outcome, the more motivated the individual will usually be to perform in a

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[7] It is questionable whether this deserves the status of a hypothesis in that motivation is defined as the multiplicative combination of expectancy and valence of salient outcomes summed over all salient outcomes (Vroom, 1964; Porter and Lawler, 1968; Gibson et al., 2009). For this reason, expectancy, valence, and instrumentality of learning performance is excluded from the hypothesised model in Figure 6.

manner that will bring about the outcome. Valence is a function of an individual's needs, goals, values and sources of motivation (Vroom, 1964).

Burger (2012) cited various studies attesting to the validity of valence in learning. Multon, Brown, and Lent (1991) found task valence to be an effective predictor in a variety of academic outcomes. Baumganel, Reynolds and Paihan (1984) also found that managers who held positive valences of training outcomes were more likely to apply skills learned in training and therefore transfer their knowledge. Trainees who value outcomes linked to learning have been shown to have increased motivation levels (Colquitt & Simmering, 1998). Valence has also been found to be strongly related to motivation to learn (r = .61) and transfer of knowledge (r = .70) (Colquitt et al., 2000).

Burger (2012) hypothesised that valence of learning outcomes will positively influence learning motivation[8]. The hypothesised path was included in the elaborated model, but not empirically tested in Burger's reduced elaborated model.

Burger (2012) defined the *instrumentality of learning outcome,* as a goal-directed belief regarding learning, such that attaining a short-term learning goal (e.g. doing well in school) is a necessary step to achieving a long-term learning goal (e.g. being accepted into university). As with valence, instrumentality can also range from positive to negative (Vroom, 1964). When the attainment of the second outcome is certain if the first outcome is achieved, positive instrumentality occurs. When there is no likely relationship between the attainment of the first outcome and the attainment of the second, zero instrumentality occurs. Negative instrumentality occurs when the attainment of the second outcome is certain without the first and impossible with the first.

Research conducted by Eccles and Wigfield (1995) suggest that perceiving a current task as instrumental in attaining one's future goals enhances student motivation as well as subsequent performance. Thus, the importance and relevance attached to current tasks would be limited to their short-term appeal without a future orientation (Vick & Packard,

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[8] It is again questionable whether this deserves the status of a hypothesis in that motivation is defined as the multiplicative combination of expectancy and valence of salient outcomes summed over all salient outcomes (Vroom, 1964; Porter & Lawler, 1968).

2008). Relevant proximal sub-goals are likely to be established and perceived as instrumental once a distal goal is established.

Burger (2012) hypothesised that instrumentality of learning outcomes will positively influence learning motivation[9]. The hypothesised path was included in the elaborated model, but not empirically tested in Burger's reduced elaborated model. These outcomes will be excluded for the purpose of this study as well.

Malleability of learning motivation

Some students appear to be naturally enthusiasitc about learning and can sustain their motivation by themselves while others students may need their learning movation to be stimulated by the environment. It is apparent in the literature that a mulitude of factors are able to increase (and decrease) student learning motivation. Ericksen (1978, as cited in Halawah, 2011) states effective classroom learning depends on the trainer-instructor's ability to maintain the interest that brough students to the course in the first place. Interest in the learning content, a desire to achieve, self-confidence, academic self-efficacy, patience and persistence all affect a student's motivation to work and learn (Davis, 1999). More specifically, researchers have identified several behaviours trainer-instructors can engage in to enhance student motivation, such as providing supportive feedback, assigning tasks with the appropriate difficulty level, creating an atmosphere that is open and positive, helping students feel that they are valued members of a learning community, and helping students find personal meaning and value in the material. In effect the trainer-instructor can affect learner motivation only by affecting the latent variables that form the constituent parts of learning motivation.

From the above it is clear that motivation results from a complex and dynamic interplay between individual (dispositional) and situational (contextual) variables (Bandura, 1997; Pintrich & Schunk, 1996). Some elements of the learning motivation of students emerge from the academic self-perceptions students bring to the classroom, and others results from the direct and indirect interaction students have with their instructors in school (Pintrich &

[9] Again the concern arises that a tautology is stated. The valence of first-level outcomes, by definition, depends on the instrumentality of those outcomes in achieving second-level outcomes and the valence of those second-level outcomes.

Schunk, 1996). Furthermore, two types of motivation can be indentified in the literature. Pintrich and Schunk (2002) defines intrinsic motivation as the motivation to engage in an activity for its own sake, whereas extrinsic motivation refers to the motivation to engage in an activity as a means to an end. A student's learning motivation is a product of both intrinsic and extrinsic learning motivation. Instructors can thus employ various means to affect either the intrinsic or extrinsic motivation of their students.

Learning motivation appears to be malleable and subject to the influence of the trainer-instructor. As such, l*earning motivation* appears to be an important portal through which the trainer-instructor can influence the level of competence achieved on the competencies comprising classroom learning performance as well as subsequent learning performance during evaluation and action learning.

2.4.4.5 Academic self-efficacy

Self-efficacy is rooted in social cognitive theory of Albert Bandura (Meyer-Adams, Potts, Koob, Dorsey, & Rosales, 2011). According to social cognitive theory behaviour, cognition and the environment all influence each other in a dynamic fashion called triadic reciprocal causation (Bandura, 1977). Bandura (1997) states that perceived self-efficacy is the most influential among the mechanisms of human agency. It refers to an individual's belief in their ability to accomplish the course of action needed to meet situational demands. That is, it refers to the individual's perception of their own ability to organise their behaviour to do things in such a way as to be satisfied with the outcome. The focus is on the individual's future performance capabilities. Self-efficacy exerts its influence through cognitive, motivational, affective, and selection processes (Meyer-Adams et al., 2011). It is not a measure of the skills a person possesses but rather involves the beliefs they have about what they can accomplish under different sets of conditions with whatever skills they possess (Bandura, 1997).

Once again, given the unique socio-political history of South Africa, self-efficacy appears to be a potentially significant variable to consider in the development of members of previously disadvantaged groups. Much research has been conducted on the effects of discrimination on the self-esteem and related concepts of targeted groups in South Africa and around the world. Although not consistently so, research indicates that discriminated groups often have lower levels of self-esteem than non-discriminated groups (Crosby & Clayton, 2001; Hanson, 1996; Orpen & Nkohande, 1977). Affirmative development programmes focusing on the development of knowledge, skills, and competencies are necessary but not sufficient for addressing inequalities of the past. Affirmative development is a dynamic process involving an individual's ability, motivation and the way they are managed. Horwitz, Bowmaker-Falconer, and Searll (1995) state that South African organisations are presented with the problem of negative expectations associated with racial and gender stereotypes. Racial stereotypes often contribute to the underperformance of certain groups as well as the creation of an us-versus-them environment. Human (1991) notes this often results in the internalisation of inferiority and marginalisation. Consequently, members from the previously disadvantaged group are likely to have lower levels of self-efficacy and self-confidence than individuals not of the previously disadvantaged group. A major challenge of affirmative development programmes is to increase the self-confidence and self-efficacy of affirmative development candidates in order to maximise their development. Maurer and Palmer (1999) note the fact that whether or not an individual believes they can develop may play a large role in whether or not they develop. In addition, they note that the more an individual feels a sense of confidence in their ability to improve and develop their skills, the more likely they are to have a positive attitude toward development activities, to be interested in them, to intend to participate, to actually improve their skills and to, subsequently, learn from the activity. Lastly, individuals who believe they have control over their own learning and can master their coursework tend to achieve success in their learning pursuits.

The concept of self-efficacy has been assessed on different levels of specificity. Three levels of self-efficacy can be distinguished (Bandura, 1977; Woodruff & Cashman, 1993). It was originally defined by Bandura (1977) as *task* specific and thus refers to an individual's self-efficacy related to the performance of a specific task. Self-efficacy related to an individual's performance within an entire definable domain of tasks is referred to as *domain* efficacy. Examples of this include academic or learning self-efficacy. Lastly, self-efficacy related to an individual's overall self-confidence in dealing with multiple life domains is referred to as *general* self-efficacy. In her study, Burger (2012) included domain-specific self-efficacy, called *academic self-efficacy,* related to learning. She notes that self-efficacy theory proposes that more specific judgments will be more closely related to an individual's actual engagement and learning than general self-efficacy measures. Consequently, this study also utilises this concept.

Self-efficacy that is tied directly to activities requisite for learning situations is referred to as *academic self-efficacy* or *learning self-efficacy* (Potosky & Ramakrishna, 2002; Fisk & Warr, 1996). Girasoli and Hannafin (2008) state that *academic self-efficacy* refers to an individual's capability to learn or perform effectively, such as to solve a specific type of math problem. The concept has also been defined by Lackaye, Margalit, Ziv, and Ziman (2006) as the perceived capability of an individual to manage learning behaviour, master academic subjects and fulfil academic expectations. In light of the above definitions, Burger (2012) defined *academic self-efficacy* as the *belief that a person can successfully execute the actions needed to produce a desired academic outcome.* It involves an individual's beliefs about their capability to effectively learn or perform academic tasks.

Burger (2012) aptly motivated the inclusion of academic self-efficacy into the learning potential structural model. She convincingly cited numerous studies attesting to the relationship between self-efficacy and learning. Only a few of these will be reviewed. Research has repeatedly shown that self-efficacy plays a significant role in performance (Konradt & Andressen, 2009; Neck et al., 1999; Bandura, 1977) and, specifically, in learning and training performance (Bandura, 1997; Goldstein & Ford, 2002). Self-efficacy has been found to be an important mediator and determinant of education-psychological variables and performance outcomes (Schunk, 1991). Gist, Stevens and Bavetta (1991) found that self-efficacy influences the extent to which skill acquisition and retention occurs in learning situations which, it turn, can increase self-efficacy as self-efficacy is related to differences in skill-level (Gist & Michell, 1992). Other studies indicated that self-efficacy was significantly and postively related to learning both early and later on in training (Lee & Klein, 2002); and that learning success was dependent upon student self-efficacy (Wadsworth, Husman, Duggan, & Pennington, 2007); and that self-efficacy is positively and significantly related to academic performance and academic persistence (Multon et al., 1991). Self-efficacy has also been found to contribute strongly to the prediction of grades in postgraduate business students (Lane, Lane, & Kyprinou, 2004). Zimmerman, Bandura, and Martinez-Pons (1992) state the influence of self-efficacy within an academic context is pervasive as a significant predictor of academic performance.

Self-efficacy is believed to be an important factor for successful transfer of training (Marx, 1982). A magnitude of research has demonstrated the relationship between perceived self-efficacy and performance in a wide range of behavioural domains, including educational achievement and career development (Meyer-Adams et al., 2011). Self-efficacy has been positively related to higher levels of achievement and learning, cognitive engagement, self-regulatory strategies, higher levels of effort and increased persistence on difficult tasks in both experimental and correlational studies involving students from a variety of age groups (Linnenbrink & Pintrich 2002).

Burger (2012) cites various studies demonstrating that individuals who believe that they are capable of learning may be more motivated to learn. Bandura (1977, 1997) and Deci and Ryan (1985) found that students' self-efficacy influence school performance by impacting on motivation. Pajares (1996) states that numerous studies show that self-efficacy influences learning motivation, learning and achievement and that students' self-efficacy beliefs play a significant role in motivating them to learn. Self-efficacy beliefs influence aspirations and commitment to them, the quality of analytic and strategic thinking, the level of motivation and determination in the face of obstacles and setbacks, resilience to adversity and casual attributions for successes and failures (Bandura, 1995, 1997; Zimmerman & Schunk, 1989). Bandura and Locke (2003) also found that self-efficacy enhances motivation and performance achievements. This is supported by Hammond and Feinstein (2005) who found that individuals with high self-efficacy have greater motivation to participate in learning, whereas those who were low in self-efficacy hold fears that de-motivated them from taking courses. According to Burger (2012) and Van Heerden (2013) learning potential structural model, academic self-efficacy affect learning motivation, which affects time cognitively engaged, which, in turn, affects transfer and automisation.

Malleability of academic self-efficacy

Bandura suggested that four sources are used in the development of self-efficacy: enactive mastery (personal attainments), vicarious experience (modelling), verbal persuasion, and physiological arousal (e.g. anxiety). Although all these experiences influence efficacy perceptions, the cognitive appraisal and integration of these experiences by the individual ultimately determine self-efficacy (Bandura, 1982). Student efficacy beliefs can be enhanced if an individual attempts to complete a task and does so successfully. By successfully completing a task and seeing positive results, the individual can deduce that they are competent enough to accomplish the task. Students who judge their own past academic results as being successful often develop a high sense of confidence about their abilities while those who view their academic outcomes as unsuccessful are likely to experience feelings of doubts and uncertainty about their own effectiveness.

Vicarious experience relates to the self-evaluation individuals derive from observing and comparing themselves to a social model or comparable other. When students observe a given model successfully handling a certain situation of completing a specific task, they are likely to feel that they too can meet a similar challenge. An individual might think that "if my fellow student can accomplish a task, then surely I can do it too".

The most effective way a trainer-instructor can enhance student self-efficacy beliefs is through verbal persuasion. The conceptions students develop about their skills and capacities in an academic area are likely to be influenced by the verbal and tacit output they receive from others. Verbal and non-verbal messages can be particularly influential when they are emitted from a person that the student considers to be credible and believable. By providing the student with supportive feedback, the instructor can enhance student self-confidence, especially when accompanied by conditions and instructions that help bring about success (Evans, 1989).

Considerable empirical evidence exists to support the contention that the trainer-instructor's behaviour enhances trainee self-efficacy expectations, including research on Pygmalion effects, leadership, and lecturer delivery (Towler & Dipboye, 2001). Learning self-efficacy is critical to motivation because it directly affects how individuals approach the mastery of new challenges in different learning situations (Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001). Patrick, Kaplan & Ryan (2007) state learners feel confident about their learning skills when they perceive support and respect in their classroom. Emotional support provided by instructors is related to students' academic self-concept (Felner, Aber, Primavera, & Cauce, 1985) and expectancies for success (Goodenow, 1993). Furthermore, Patrick and Ryan (2005, as cited in Patrick et al., 2007) found that perceptions that the teacher promotes mutual respect are related to increased academic efficacy. Dierdorff, Brown, and Surface (2010) report that multiple studies have found that self-efficacy affect performance in training situations in general and that self-efficacy is open to influence by characteristics of training design.

2.4.4.6 Meta-cognitive knowledge

Van Heerden (2013) included meta-cognitive knowledge in her elaboration of the De Goede Model. *Meta-cognitive knowledge* is defined as an individual's explicit knowledge of their cognitive strengths and weaknesses (Veenman, van Hout-Wolters, & Afflerbach, 2006). It has also been defined as how much an individual understands about the way they learn (Sperling, Howard, & Staley, 2004). Similarly, Schraw (1998) refers to *meta-cognitive knowledge* as what individuals know about their own cognition or about cognition in general.

Van Heerden (2013) reports that, according to the literature *meta-cognitive knowledge* is divisible into three distinct areas, namely: (a) declarative knowledge, (b) procedural knowledge, and (c) conditional knowledge. *Declarative knowledge* refers to knowledge about self and about strategies (Schraw & Dennison, 1994), to knowledge of one's general processing abilities (Sperling et al., 2004), or to knowing about the characteristics of the self, the task, and the strategies relevant to the task (Schmitt & Sha, 2009). *Procedural knowledge* involves knowledge about how to use strategies (Schmitt & Sha, 2009; Schraw & Dennison, 1994). Van Heerden states that individuals with a high degree of procedural knowledge perform tasks more automatically and are more likely to possess a larger repertoire of strategies, to sequence strategies effectively, and to use qualitatively different strategies to solve different problems. Knowledge about when and why to use strategies is referred to as *conditional knowledge* (Sperling et al., 2004; Schraw & Dennison, 1994). It involves knowledge of when and why to use declarative and procedural knowledge (Schraw, 1998). Furthermore, conditional knowledge is critical for the individual in determining when it is a good idea to use a specific strategy and why it is helpful at that point (Schmitt & Sha, 2009). This type of knowledge assists individuals in selectively allocating their resources and in using strategies more effectively.

Van Heerden consequently hypothesised that *meta-cognitive knowledge* positively influences *meta-cognitive regulation*. Research suggests that *meta-cognitive knowledge* and *meta-cognitive regulation* are related to each other (Schraw, 1998) and that *meta-cognitive* *knowledge* is a prerequisite for *meta-cognitive regulation* (Baker, 1989). If students cannot distinguish between what they know and do not know, they will not be able to effectively exercise control over their learning activities or to select appropriate strategies to progress in their learning (Schmidt & Ford, 2003).

Malleability of meta-cognitive knowledge

Meta-cognitive knowledge is a relatively stable phenomenon (Schmitt & Sha, 2009). In other words, individuals with the knowledge of the characteristics of text processing or useful comprehension strategies are likely to know these facts whenever asked about them. Research suggests that meta-cognitive knowledge can be taught (Thiede, Anderson, & Therriault, 2003; Nietfield & Shraw, 2002; Hamilton & Ghatala, 1994).

Cognitive strategies are techniques that trainer-instructors can design into their instruction (Hamilton & Ghatala, 1994). The trainer can design instruction in such a manner that students are inclined to employ one or more strategies to learn the material. The performance of the students is improved even though they are unaware that they are employing the strategy. Providing students with the skills to enable them to be independent learners is one of the goals of training and education. Trainer-instructors should thus focus on the cognitive strategies that enable students to learn, remember and think about the content.

According to McKeachie (1988) very few instructors explicitly teach strategies for monitoring learning as they assume that these skills have already been learnt during high school, yet many students are unaware of the metacognitive process and the importance thereof to learning. High school students entering college usually rely on rote memorisation (Nist, 1993). Rote memorisation is the antithesis to transfer of knowledge and automisation. In the event of rote memorisation, learning material that is learnt is of relative little value when the learner is subsequently confronted with novel learning problems to which the prior learning material could have suggested solutions via fluid intelligence if the insight had been successfully derived and automated. There thus appears to be a need to provide explicit instruction on the use of meta-cognitive strategies. This would include demonstrating the use of meta-cognitive knowledge and strategies, providing models and feedback, and making goals clear.

It is suggested that instruction on meta-cognitive strategies be incorporated in the curriculum of an affirmative development programme as it can significantly contribute to the success of students. It is likely, but not always feasible, for trainer-instructors to teach meta-cognitive knowledge and skills to students in a content specific course or module (e.g. strategic planning) or during a training course in general. It would probably be more effective to present students with a specific course on meta-cognitive skills and, subsequently, allow them to utilise these skills in all their courses. Teaching meta-cognitive knowledge and skills will thus be excluded for the purpose of this study as the focus of this study is more on variables trainer-instructors can manipulate irrespective of course-content.

2.4.4.7 Goal orientation

Meece, Blumenfeld, and Hoyle (1988) note that various sets of contrasting goal orientations have been proposed to explain differences in students' achievement behaviour, namely mastery versus ability focused (Ames & Ames, 1984); learning versus performance (Dweck & Elliot, 1983, as cited in Meece et al., 1988); and task-involved versus ego-involved (Nicholls, Patashnick, & Nolen, 1985). These goals can be differentiated on the basis of whether learning is perceived and valued as an end in itself or as a means to a goal external to the task. Individual needs and competencies and/or the demands of the situation will determine which achievement goals students will pursue, which in turn, influence students' choice of achievement tasks, attributions for academic success, and selection of learning or problem-solving strategies (Meece et al., 1988). Meece and colleagues (1988) state that students' goal orientations are important mediators and determinants of behavioural, cognitive, and affective achievement outcomes. Van Heerden (2013) also notes that research has established a consistent pattern that learning goals facilitate the use of deep processing (i.e. time cognitively engaged) and meta-cognitive strategies (meta-cognitive regulation).

Goal orientation refers to an individual’s dispositional goal preference in achievement situations (Payne, Youngcourt, & Beaubien, 2007; Chiaburo & Marinova, 2005). Farr, Hoffman, and Ringenbach (1993) state that goal orientaion is a mental framework that determines how individuals interpret and respond to achievement situations. According to Maehr (1989 as cited in Elliot, Murayama, & Pekrun, 2011) an achievement goal is defined as the purpose for engaging in achievement behaviour.

Goal orientation was initially conceptualised as a two-dimensional construct distinguishing between a mastery goal orientation and a performance goal orientation. A mastery goal orientation, also known as a learning goal or task goal orientation, refers to the aim of task learning, improving one's skills, and competence development. The focus is thus on personal improvement and gaining understanding or skills, with learning being seen as an end in itself (Ames, 1992a). Meece et al. (1988) state that mastery goals allow a sense of accomplishment to be derived from the inherent qualities of the task such as its challenge, interest, or enjoyment. Considerable evidence also exists that relate mastery goals to learners' use of cognitive and self-regulatory strategies (Pintrich, 2000, as cited in Patrick et al., 2007).

A performance goal orientation (also known as ego- or social-oriented) involves experiencing learning as a means to an end (Ames, 1992a). Students derive a sense of accomplishment by demonstrating superior ability, avoiding negative ability judgments, or receiving external reinforcement, regardless of the learning involved. Performance goals thus position learners to focus on their ability and self-worth, to determine their ability by outperforming others in competitions, surpassing others in achievements or grades, and receiving public recognition for their superior performance.

VandeWalle (1997) and Elliot and Church (1997) suggested that performance goal orientation should in fact be sub-divided into two distinct dimensions as the concept is defined as a desire to gain favourable judgements and a desire to avoid unfavourable judgements about one's ability. It implies a trichotomous achievement goal model (Elliot & Harackiewicz, 1996), in which the performance goal construct is bifurcated resulting in three separate goals: mastery, performance-approach, and performance-avoidance. VandeWalle (1997) defined *performance goal orientation* as an individual's desire to prove their competence and to gain favourable judgements about it. Performance approach goals involve striving toward the attainment of normative competence (Elliot & Church, 1997). Performance-avoidance goals involve an individual behaving with the purpose of avoiding normative incompetence, or alternatively stated, to avoid disproving their own competence and to avoid negative judgements about it (Elliot & Church, 1997; VandeWalle, 1997). Empirical results show strong support for the trichotomous model as factor-analysis validated the independence of the three goal structures (Elliot & Church, 1997; Middleton & Midgley, 1997; Skaalvik, 1997) and the goal orientations have been linked to different antecedents and consequences (Elliot, 1999). Day, Yeo and Radosevich (2003, as cited in Van Heerden, 2013) who meta-analysed 127 studies, found a three-factor model bifurcating performance goals into separate approach and avoidance dimensions explained 7% more variance in academic performance than a two-factor model.

Elliot (1999) modified the goal orientation model to a 2x2 achievement goal model in which the mastery goal construct is also bifurcated by approach-avoidance. A fourth goal is thus added to the trichotomous model, namely mastery-avoidance. In the mastery-avoidance orientation, competence is defined in terms of the absolute requirements of the task or in terms of one's pattern of attainment, and regulatory attention is focused on incompetence (Elliot & McGregor, 2001). Elliot (1999) and Elliot and Thrash (2001) also revised the achievement goal construct by defining it in terms of competence alone. "Purpose" was removed from their definition of goal orientation as it denoted both the reason for which something exists or is done and an intended or desired aim. Elliot and Fryer (2008) explicitly separated the reason and aim aspects of purpose and defined achievement goals in terms of aim alone, specifically, the competence-based aim used to guide behaviour.

Elliot and McGregor (2001) also differentiated competence, and therefore achievement goals, in terms how it is defined and how it is valenced. Competence is valenced in that it is either conceptualized as a positive, desirable possibility (i.e. success) or a negative, undesirable possibility (i.e. failure). The distinction between approach-based goals and avoidance based goals is central to the trichotomous and 2X2 achievement goal models. Approach-based goals focus on success and regulation is focused on attempting to move toward or maintain this positive possibility. In contrast, avoidance-based goals focus on failure, and regulation is focused on attempting to move away or keep away from this negative possibility (Elliot & McGregor, 2001). Furthermore, competence is defined in terms of the standard used in evaluation, that is, the referent used to determine if one is doing well or poorly - task and self.

Elliot and McGregor (2001) found empirical support for their 2x2 model of goal orientation. The results revealed distinct empirical profiles for each of the achievement orientations. In addition, the researchers found that the pattern for mastery-avoidance goals was more negative than for mastery approach goals and more positive than for performance avoidance goals.

In 2011, Elliot, Murayama, and Pekrun offered a 3x2 model of goal orientation, suggesting three standards used to define competence: self, other, and task. Task-based goals use the absolute demands of the task as the evaluative referent (i.e. competence is defined in terms of doing well or poorly relative to what the task itself requires). Self-based goals use one's own intrapersonal trajectory as the evaluative referent (i.e. competence is defined in terms of doing well or poorly relative to how one has done in the past or has the potential to do in the future). Other-based goals use an interpersonal evaluative referent (i.e. competence is defined in terms of doing well or poorly relative to others). Crossing these three standards (task, self, or other) used to define competence with the two ways that competence may be valenced (approach or avoidance) yields a 3x2 achievement goal model. The following goals exist according to this model: task-approach-task-based competence goals (performing the task correctly), task-avoidance-task-based incompetence goals (avoid performing the task incorrectly), self-approach-self-based competence goals (doing better than in the past), self-avoidance-self-based incompetence goals (avoid doing worse than before), other-approach-other-based competence goals (outperforming others), and other-avoidance-other-based incompetence goals (avoid doing worse than others).

Elliot and colleagues (2011) found support for their 3x2 hypothesised model. They found the 3x2 model showed better fit than the 2x2 or the trichotomous model, the dichotomous model, and a variety of other alternative models. They also found that although task-based and self-based goals emerged from the same antecedents, these goal types were linked to a different set of consequences.

Kozlowski, Gully, Brown, Salas, Smith and Nason(2001) note that goal orientation was originally conceptualised as a single bi-polar trait. Consequently, individuals were either striving to improve their skills or striving to perform well relative to others. Individuals could thus not be motivated by both goal-orientations simulatenously. Button, Mathieu, and Zajac (1996) contend that individuals can simultaneously strive to improve their skills as well as strive to perform well relative to others as mastery goal orientation and performance goal orientation are two separate traits. It is, however, possible for an individual to favour one type of goal over the other. In her elaboration of the De Goede model, Van Heerden (2013) adopted the ideas of Dweck and Leggett (1988) and Elliot (1994, as cited in Vandewalle, 1997) and considered goal-orientation to consist of (a) learning goal orientation (LGO) and performance goal orientation (PGO).

Although the more recent extended models of achievement goal orientation are supported by empirical data, suggesting that the use of these models explain more variance in achievement goal orientation, its antecedents and consequences, the extensions have not been applied to the literature on classroom goal structures. The majority of the literature on classroom goal structures is based either on a dichotomous or a trichotomous conceptualisation of achievement goals. Classroom goal structure offers trainer-instructors a means through which student goal orientation can be influenced. Furthermore, the bifurcation of performance into performance-approach and performance-avoidance goals also seems to be advantageous as the two orientations are associated with different processes and outcomes, whereas mastery goal orientation has, for the most part, been associated with positive outcomes. As such, the trichotomous model of achievement goal orientation proposed by Elliot and Church (1997) will be adopted in this study.

A performance-avoidance goal orientation has been associated with negative learning processes and outcomes such as low self-determination, disorganised studying, an unwillingness to seek help, test anxiety, low academic self-efficacy, poor performance, and reduced intrinsic motivation (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot, McGergor, & Gable, 1999; Middleton & Midgley, 1997; Skaalvik, 1997). Individuals with a performance-avoidance goal orientation will view achievement settings as threatening and consequently attempt to remove themselves from that context (Elliot & Harackiewicz, 1996). If this is not a viable option, the possibility of potential failure is likely to result in anxiety, withdrawal of affective and cognitive resources, disrupting concentration and task involvement, and orientating the individual toward the presence of failure-relevant information, all of which ultimately undermine intrinsic motivation.

Performance goals have been associated with positive motivational indices including increased effort, persistence, and intrinsic motivation (Elliot & Church, 1997; Middleton & Midgley, 1997; Skaalvik, 1997; Elliot & Harackiewicz, 1996). However, the findings for performance-approach goals are much less consistent and have been associated with negative processes and outcomes. Test anxiety, extrinsic motivation, and an unwillingness to seek help with schoolwork have been related to performance-approach goals (Elliot et al., 1999; Middleton & Midgley, 1997).

Mastery goals have been associated with various positive outcomes such as intrinsic motivation, self-efficacy, motivation to learn, self-regulated learning, and deep learning, but not performance (Halvari, Skjeskol, & Bagøien, 2001; Towler & Dipboye, 2001).

Van Heerden (2013) noted three ways in which performance and mastery goal orientation individuals differ. Firstly, an individual's perception of crystallised intelligence will determine their goal preference. Individuals that adopt a mastery goal orientation believe crystallised intelligence is malleable, and that intelligence and performance can be improved by increased effort. In contrast, individuals who adopt a performance goal orientation most likely believe that intelligence and performance is fixed (Van Hooft & Noordzij, 2009; Payne et al., 2007; Vrugt, Langereis, & Hoogstraten, 1997).

The second manner in which mastery goal and performance goal orientated indiviuals differ is with regard to their response to task difficulty and failure (Van Heerden, 2013). Mastery goal orientation individuals have adaptive response patterns (Bell & Kozlowski, 2002). These individuals, due to their belief that success requires effort and collaboration, and that effort is a definite means to success, respond to setbacks and failures by viewing them as challenges to be mastered through effort. Poor performance and failure compels them to increase effort and persistence and to analyse and change their strategies. They do not attribute failure to personal inadequacies. They prefer challenging and difficult tasks as they believe it will require effort and exploration and consequently result in self-improvement (Kozlowski et al., 2001). Numerous studies have found that students with mastery goals persist longer, exhibit an adaptive attribution pattern, express positive affect toward the task, and use a set of learning strategies likely to result in conceptual understanding (Elliot & Dweck, 1988; Nolen, 1986, as cited in Meece at al., 1988; Ames, 1984).

In contrast, performance goal oriented individuals believe that success requires high ability and exerting effort is perceived negatively as it is indicative of low ability (Van Heerden, 2013). Performance goal oriented individuals attribute poor success or facing obstacles or failure to low ability. In the face of a failure or setback, they will experience negative affect such as aversion to the task, anxiety, or boredom. Ames (1984) and Nicholls (1984) found that ego-oriented students tend to be concerned with how others will evaluate them. This emphasis on one's own ego can negatively affect task choice, persistence, and performance (Elliot & Dweck, 1988). Failure will be attributed to personal inadequacies. Poor performance and failure will be regarded as a predictor of future failures, resulting in the withdrawal of effort. They avoid challenging achievement situations as they prefer easy situations that ensure positive judgements of their abilities (Kozlowski et al., 2001).

Lastly, mastery and performance goal oriented individuals differ with regard to their evaluation criteria in assessing performance (Van Heerden, 2013). Mastery goal oriented learners assess their performance according to the extent to which they have mastered new skills or tasks. Performance goal oriented individuals assess their performance according to how they perform compared to others.

In her model of learning potential, Van Heerden (2013) empirically tested the effects of mastery (or learning) goal orientation on student learning performance. This decision was based on the findings that mastery goal orientation is the only goal orientation that has consistently been associated with positive learning processes and outcomes. This study concurs with the view that mastery goal orientation is the most optimal goal orientation for learning.

Malleability of goal-orientation

In their extensive review of conceptual and methodological issues regarding the goal orientation literature, DeShon and Gillespie (2005) noted that there is an absence of consensus regarding the stability of goal-orientation. Despite a vast amount of literature on the construct, it remains unclear whether goal orientation should be treated as a disposition that expresses itself in a consistent pattern of functioning across various situations, or whether it should be treated as a short-term, continuous, concrete way of thinking, acting and feeling. After a in-depth examination of this issue, they concluded that the stability of the construct depends on the breadth of inference the researcher is attempting to support. If the interest of the researchers lie in predicting or understanding an individual's behaviour at a particular time in a particulat context, goal orientated behaviour is best treated as a situationally specific state that is unstable over time. For the purpose of this inferrential focus, an individual's behaviour can be interpreted as being directed towards reducing discrepancies on goals that currently have high activation levels using actions that have the highest expectancy of achieving active goals in a particular situation. In contrast, when the focus falls on broad inferences across time and situations, goal orientation can be viewed as a more stable trait, less susceptible to the influence of the situation (DeShon and Gillespie, 2005). They also state that goal-orientation is susceptable to the influence of the situation and that the extent to which it is susceptable depends on the time period. As discussed earlier, Mischel (2004) viewed behaviour as a function of the personality and the situation. Goal-orientation should thus be interpreted as a disposition similar to personality and the natural expression of this disposition is dependent on the characteristics of the situation. In the affirmative development training context, for example, an individual with a mastery goal orientation that interprets a situation as threatening or considers academic achievement to be instrumental to the achievement of a high valence outcome will display a performance orientation rather than a mastery orientation.

Research has indicated that changes in student goal orientations as they progress through school are influenced by the socialising experiences of a particular context (Gernigon & Le Bars, 2000; Xiang & Lee, 1998; Anderman & Midgley, 1997). Wiesman (2012) states that instructors can have a profound influence on student motivation by promoting goal oriented behaviours.

2.4.3.8 Hypothesis with regards to the learning potential structural model

Based on the hypothesised models and empirical findings of De Goede (2007), Burger (2012) and Van Heerden (2013) the following paths are suggested.

Both Burger (2012) and Van Heerden (2013) found support for the path between *academic self-efficacy* and *learning motivation*. Burger (2012) found support for the path between *academic self-efficacy* and *academic self-leadership*. Van Heerden (2013) found no support for the relationship between academic self-efficacy and *learning goal orientation*. In light of these findings it is argued that *academic self-efficacy* positively influences *learning motivation* and *academic self-leadership*.

Both Burger (2012) and Van Heerden (2013) found support for the path between *learning motivation* and *time cognitively engaged*. Van Heerden (2013) found support for the path between learning motivation and meta-cognitive regulation. Burger (2012) found support for the relationship between *learning motivation* and *academic self-leadership*. In light of these findings it is hypothesised that *learning motivation* positively influences meta-cognitive regulation, *time cognitively engaged*, and *academic self-leadership*.

Burger (2012) found support for the path between *academic self-leadership* and *time cognitively engaged*. No support was obtained for the path between academic self-leadership and academic self-efficacy (Burger, 2012). It is consequently hypothesised that academic self-leadership positively influences time cognitively engaged.

Both Burger (2012) and Van Heerden (2013) found support for the path between *conscientiousness* and learning motivation. Burger (2012) found support for the path between conscientiousness and *academic self-leadership*. Burger (2012) found support for the path between *conscientiousness* and *time cognitively engaged*, although Van Heerden (2013) found no support for this relationship. In light of Burger's (2012) findings and the persuasiveness of the theoretical argument, it is hypothesised that *conscientiousness* positively influences learning motivation, *academic self-leadership* and *time cognitively engaged.*

Burger (2012) found support for the path between *time cognitively engaged* and *learning performance during evaluation*, although Van Heerden (2013) found no support for this relationship. This path will be retained. No support was obtained for the path between *time cognitively engaged* and academic self-efficacy (Burger, 2012). Time cognitively engaged is hypothesised to positively influence *learning performance during evaluation*.

Van Heerden (2013) found support for the path between *meta-cognitive knowledge* and *meta-cognitive regulation*. Support was found for the relationship between *meta-cognitive knowledge* and *learning goal orientation* as well as between *meta-cognitive knowledge* and *academic self-efficacy*. It is hypothesised that *meta-cognitive knowledge* positively influences *meta-cognitive regulation*, academic self-efficacy and *learning goal orientation*.

Van Heerden (2013) found support for the causal path between *meta-cognitive regulation* and *time cognitively engaged*. Furthermore, the relationship between *meta-cognitive knowledge* and *learning performance during evaluation* was hypothesised to be mediated by *meta-cognitive regulation*. This is because the individual's *meta-cognitive knowledge* is put into motion via the behaviour of *meta-cognitive regulation* and it is *meta-cognitive regulation* that then ultimately positively influences *learning performance*. It is consequently hypothesised that meta-cognitive regulation positively influences time cognitively engaged.

Van Heerden found support for the path between learning goal orientation and learning motivation. It is hypothesised that learning goal orientation positively influences learning motivation.

Both Burger (2012) and Van Heerden (2013) found support for the feedback loop between learning performance during evaluation and academic self-efficacy. Burger found support for the feedback loop between learning performance during evaluation and learning motivation, although Van Heerden did not. This path will be retained. As such, it is hypothesised that there exists a positive feedback loop between learning performance during evaluation and self-efficacy and learning performance during evaluation and learning motivation.

Hypothesis 1: In the proposed learning potential structural model it is hypothesised that academic-self efficacy positively influences learning motivation and academic self-leadership; that learning motivation positively influence meta-cognitive regulation, time cognitively engaged, and academic self-leadership; that academic self-leadership positively influences time cognitively engaged; that conscientiousness positively influences learning motivation, academic self-leadership and time cognitively engaged; that time cognitively engaged positively influences transfer of learning and transfer of knowledge; that meta-cognitive knowledge is positively related to meta-cognitive regulation, academic self-efficacy and learning goal orientation; that meta-cognitive regulation positively influences time cognitively engaged; that learning goal orientation positively influences learning motivation; that transfer of knowledge positively influences learning performance during evaluation; that abstract reasoning capacity positively influences transfer of learning; that automisation positively influences transfer of learning; and that a positive feedback loop exists between *learning performance during evaluation and self-efficacy and learning performance during evaluation and learning motivation.*

2.5 Training outcome latent variables: How trainers influence learning performance

Numerous researchers have noted that leadership theories are applicable to instruction (Walumbwa, Wu & Ojode, 2004; Harvey, Royal, & Stout, 2003; Pounder, 2003; Kuchinke, 1999; Cheng, 1994; Baba & Ace, 1989). According to Kuchinke (1999), instruction and organisational leadership are not identical, but there are sufficient parallels and overlap between the two to warrant further investigation. Both instruction and organisational leadership consists of complex interactions involving communication, control and the coordination of activities (Barnard, 1938 as cited in Harrison, 2011; Kuchinke, 1999). Power differentials related to reward, coercion, expertise and referent bases of power are prevalent in both leadership situations and classroom instruction (Raven & French, 1958). House and Podsakoff (1994) further highlight the similarities between instruction and organisational leadership and, consequently, help bridge the two domains. According to these researchers instructors influence students, shape their future development, focus their attention on specific tasks, and induct them into the profession in a similar manner in which the organisational leaders influence, initiate, focus attention, set direction and coordinate activities toward a goal.

The learning organisation perspective provides a further rationale for investigating the similarities between organisational leadership and instructional leadership (Harrison, 2011). According to this perspective leaders elicit cognitive as well as affective responses from followers by acting as role models, fostering commitment and pride, challenging the status quo, and showing concern for the developmental needs of followers (Kuchinke, 1999). Darling, Darling, and Elliot (1999, as cited in Harrison) found that learning organisation leaders serve as mentors and coaches, fostering work performance as well as learning in ways similar to educational instruction.

The trainer-instructor is a leader in the classroom; more specifically, the trainer-instructor is a thought or idea leader. Prince and Rogers (2012, para. 6) defines a though leader as "an individual… that prospects, clients, referral sources, intermediaries and even competitors recognise as one of the foremost authorities in selected areas of specialisation, resulting in

[them] being the go-to individual...for said expertise." This definition seems to emphasise the competence and recognised brilliance of the thought leader in specific fields (e.g. marketing, finance, entrepreneurship, human resource management, etc.). The trainer-instructor thus needs to be regarded, recognised and respected by their students (and other stakeholders) for their expertise in specific fields. They should be knowledgeable, resourceful, and capable individuals from which affirmative development students can learn the competencies they require to succeed in learning and in their jobs.

The above definition alludes to the fact that the thought leader has significant influence on others through their ideas. The thought leader is able to exert their influence through (the credibility created by) their expertise and transform the thoughts and feelings of their followers. More specifically, the trainer-instructor as a thought-leader transforms the thoughts and feelings of the affirmative development students. By communicating their ideas, role modelling appropriate behaviour, teaching and coaching, and providing guidance and instruction they are able to influence the cognitive and affective responses of their students towards learning.

The core expectations of a teacher leader are: exemplary classroom instruction, sound pedagogical knowledge, an understanding of the theory of learning and of effective classroom practice and research-based knowledge about teaching and learning (Sherrill, 1999). Darling-Hammond, Bullmaster, and Cobb (1995) emphasised the fact that teacher leaders are open to new ways of doing things and model appropriate learning behaviour with a view to improving students' educational experience.

Crowther (1997) conducted a study of teacher leadership in a socially disadvantaged setting. According to Crowther, teacher leaders are "individuals acclaimed not only for their pedagogical excellence, but also for their influence in stimulating change and creating improvement in the schools and socio-economically disadvantaged communities in which they work" (p. 6). The study thus looked at teacher leadership as manifested in a socio-economically deprived context and found that teacher leaders display leadership qualities that are broadly transformational in nature.

Bolkon and Goodboy (2009) note that instructors who display transformational leadership behaviours can positively influence student behaviours, perceptions, and learning outcomes by providing support and encouragement and building trust. Lee (2001) identified eight conditions for distance educators' success resembling transformational leadership. These were recognition of followers' needs, articulation of purpose and guidance, identification of structure, innovation, participation and support, and the use of adequate resources.

Given the fact that the affirmative development trainer-instructor can be considered to be a thought leader in the classroom, this study will draw on both the educational and organisational literature to identify training outcome latent variables that influence the learning performance of affirmative development students. It must, however, be mentioned that considerable research on the effect of organisational leadership theories exists, especially transformational leadership on student outcomes (e.g. Harrison, 2011; Bolkon & Goodboy, 2009; Wallumba & Ojode, 2000 as cited in Pounder, 2006; Ojode, Wallumba & Kuchinke, 1999, as cited in Pounder, 2006). These studies have either adapted subordinate outcomes of transformational leadership to the classroom context (e.g. student willingness to put in extra effort, classroom leadership effectiveness, and student satisfaction with classroom leadership) or utilised traditional student outcomes found in the educational literature (e.g. cognitive learning, affective learning, student perceptions of instructor credibility, state motivation, student participation and communication satisfaction). The latter is often selected as these variables represent several ways to examine student success in the classroom and have been associated with effective teaching behaviour (Goodboy & Myers, 2008). No literature could be found linking organisational leadership theories to an integrated model of student learning such as the De Goede (2007), Burger (2012), or Van Heerden (2013). As such, the trainer outcome latent variables will be specifically selected/ developed with the student learning competency potential variables in mind rather than arbitrarily choosing or "forcing" existing outcomes found in the literature on the model.

2.5.1 Inspiring professional vision

Learning motivation refers to students' desire to learn the learning material. It is seen as a realistic goal for instructors to develop and sustain the learning motivation of their students. This will be based, in part, on students finding the learning activities meaningful and valuable, their ability successfully navigate these activities, and to value the benefit derived from them. Motivation to learn is most enhanced when the sources of motivation are intrinsic and personally meaningful to the students, that is, when it stimulates their needs, interests, curiosity and enjoyment. Instructors need to determine what will arouse students to action, direct them to engage in or exhibit certain behaviours, and assist them in maintaining their arousal.

A very limited amount of research focuses specifically on the antecedents of adult student motivation. Differences do, however, exist in the antecedents of child-, adolescent-, and adult motivation. One possibility is that these differences are attributable to differences in life and career stages. The life and career stage of each age group is characterised by specific developmental tasks and the mastering of these tasks could be a potential motivator. For example, adolescents are extremely socially conscious and their developmental tasks focus on their quest for identity (Schreuder & Coetzee, 2006). Their self-esteem is at its lowest point during the teenage and adolescent years (Powell, 2004) and teenagers want and need social approval (Strauch, 2003). A big motivator in the classroom might include experiencing acceptance as a member of the class community. Other differences include adults being more likely to develop mastery goals that are internally driven, whereas adolescents tend to create goals that conform to the standards of their peers; and adults being less concerned about external evaluations and more concerned with the internal benefits derived from goal setting (Burley, Turner, & Vitulli, 1999). Wiesman (2012) states teenagers are emotionally, physically and psychologically different to adults and, as a result, perceptions of effective motivational techniques might differ. He further states that what constitutes an effective motivational technique for an adult might not work for an adolescent student.

Affirmative development candidates are likely to be either experiencing their early life/career stage or midlife/career stage. The life tasks typically associated with early adulthood include challenges concerning achieving independence and responsibility, establishing one's identity, finding a place in and contributing to society and becoming established in an occupation and in family (Schreuder & Coetzee, 2006). During this phase individuals have to aspire and fulfil their goals and aspirations and find a niche in society. Levinson and colleagues (as cited in Schreuder & Coetzee, 2006) state that becoming one's own man and "making it" becomes important. Furthermore, during this stage, an individual experiences a strong need for competence, and a need to develop occupational identity and become self-reliant and autonomous (Scandura, 2002). During the midlife/career stage individuals are faced with the challenges of up-skilling themselves, and achieving their goals.

When asking the question, "What will arouse adult learners to action, direct them to engage in certain behaviours, and assist them in maintaing their excitement and direction?" three motivational theories provide possible explanations, namely: behaviourist, cognitive, and humanist (Wiseman & Hunt, 2008). When considering the developmental tasks to be accomplished by adults, humanistic and cognitive theories are especially relevant in answering this question.

Cognitive theory is grounded in the belief that individual behaviour is influenced by the way individuals see themselves and their environment (Wiseman & Hunt, 2008). Expectations and beliefs are also considered as two important personal factors. As discussed earlier, expectancy theory suggests that students are motivated to engage in the learning of tasks to the extent to which they expect to succeed at tasks and the degree to which they value achievement on tasks or other potential outcomes that may come as a result of task achievement. Recent theories have suggested broader conceptualisations of the value component of expectancy X value theory that have greater application value to the classroom. These theories emphasise attainment value, utility value, and intrinsic value. Attainment value is determined by how learning fulfils a person's needs. It concerns the relevance of learning and learning activities to an individual's actual or ideal self-concept. Students would engage in these activities and develop competencies that are consistent with their real and desired concept of themselves. Utility value focuses on the usefulness of learning activities as a means to achieving goals that might not be related to the activity or tasks themselves. Intrinsic value is the immediate enjoyment an individual derives from completing a task.

Expectancy theory seems to suggest two challenges face the instructor when attemtping to motivate students (Wiseman & Hunt, 2008). Firstly, the instructor has to create legitimate learning experiences where students can find success, and the success they achieve must be on activities they regard as valuable. Alternatively, individuals should see the value in other outcomes that are associated with task attainment. Success and seeing the value in what is attained, or at least in some other outcomes that will be forthcoming, are key to student motivation. Being successful in learning will have little positive motivational impact if students cannot see the value of task attainment in the long run. As a thought leader in the classroom, the trainer-instructor attempts to affect the behaviour of students by influencing the components of the motivational process. That is, the trainer-instructor should try, via academic self-efficacy, to influence the components pertaining to the probability of an expected level of performance given a certain amount of effort as well as the valence attached to performance. The trainer-instructor should also try to affect the motivational components relating to the probability that a certain level of performance will lead to certain outcomes, as well as the valence that students attach to certain outcomes.

Humanistic theories regard motivation as an attempt to fullfill the total potential of the human being whilst stressing the personal growth, freedom of choice, and positive qualities of students (Wiseman & Hunt, 2008). The humanstic perspective views students in their totality – emotional, physical, interpersonal, and intellectual qualities – to explain choices and behaviour. According to Maslow's hierachy of needs, students' needs can be categorised as either deficiency needs or growth needs. Deficiency needs refer to all the lower levels of the hierachy including: survival, safety, belonging and self-esteem. Growth needs are at the higher levels of the hierachy and include intellectual achievement, aesthetic appreciation, and self-actualisation. These needs are never fully satisfied and growth needs expand and evolve as individuals experience them. The highest need of all, self-actualisation, refers to the full development or use of one's potential. Although Maslow originally theorised that higher level needs can only be activiated when lower level needs have been satisfied, recent literature has shown that these needs are not necessarily hierachical. Maslow further believed that the environment helped by making growth needs and choices positively attractive (Snowman & McCown, 2009).

Maslow's hierachy of needs seems to imply that the instructor can motivate a student by creating an environment in which the student feels safe (safety), accepted (belonging and love) and respected (esteem). However, the instructor can also attempt to stimulate the student's need for self-actualisation. The need for self-actualisation seems to speak directly to the developmental tasks faced by adults in their early and midcareer and life stages. Adult students' need for competence, their need to develop an occupational identity, their need to become self-reliant and autonomous, and their need to fulfil their goals and aspirations can all be linked to the need for self-actualisation.

Given the need for self-actualisation and the salience of establishing a career to the fulfilment of the developmental tasks, instructors will be able to stimulate this need by creating a professional vision for their students.

According to Frontiera and Leidl (2010), vision is a crucial tool for trainers to motivate their students. A vision can be defined as an end-state, a description of the future, or broad overarching value-based goal representing an idealised future (Ilies, Judge, & Wagner, 2006). According to Frontiera and Leidl (2010, p. 72) vision is "the reflection of human possibility – the ideal of a grand achievement that inspires forward movement and growth." A vision of what could be is something students can strive for. It will generate energy whilst stimulating progress. They use the example of athletes reflecting on a vision of success at a championship. This dream will act as a guiding light for the athlete, energising them and directing their behaviour. Vision is a tool that can stimulate action and it allows humans to keep advancing.

Organisational theories have commented and claimed, numerous times, that effective leaders motivate their followers (Locke, 1991). According to Bass' model of leadership, leader behaviour leads to (Bass, 1985, p. 23) "heightened motivation [in followers] to attain designated outcomes which, in turn, leads to performance." According to path-goal theory, it is the strategic function of the leader to enhance the psychological state of followers which then results in motivation to perform (House & Dessler, 1974). House (1977) states that leaders stimulate change by articulating a clear vision and creating a strong bond with followers that lead to the acceptance of the vision. Shamir, House, and Arthur (1993) proposed that charismatic leaders are adept at achieving this as they raise follower self-esteem, collective identity, and the intrinsic value of work.

Successful trainer-instructors establish a clear vision of what they want to accomplish, what they want their students to accomplish, and what their students can accomplish. In the context of affirmative development, the trainer should create a professional vision for their students – a positive image in which they see themselves as professional, successful job incumbents living out their potential. As such, *inspiring professional vision* is constitutively defined as *a positive professional vision in the mind of the trainee that inspires effort and a desire to learn.*

The motivating power of a vision can also be explained in terms of cognitive theory. By creating an inspiring vision for affirmative development trainees, instructors will be able to increase the attainment value of learning activities and experiences. Trainees will be able to see the relevance of the learning activities in striving to accomplish this attainable vision. They will be motivated to engage in learning activities and develop competencies that are consistent with their real and their desired conception of themselves. The vision will increase the utility value of the tasks as trainees will be able to see the usefulness of both the learning activities and the affirmative development programme to achieve this goal/vision, even though it is not directly related to the task itself. They will understand that the affirmative training programme and the encompassing learning activities will have considerable utility value for those wanting to become successful professionals. Envisioning themselves as future professionals capable of success and competent enough that they will be able to make a difference in an organisation and society, will motivate trainees to accomplish learning tasks.

Many studies have investigated the differences in motivational patterns of Black and White students. There seems to exist some support for the motivational effect of positive future vision. Hwang, Echols, and Vrongistinos (2002) found that Black college students' academic behaviours and choices were motivated by the positive career, social and societal outcomes that awaited them if they were academically successful.

Although research on the effect of a motivating vision on student outcomes is limited in educational literature, a number of studies in the organisational and leadership literature have reported the positive effects of an inspiring vision on employee outcomes. Kantabutra (2010) notes that overall, positive findings between visionary leadership and individual follower performance, attitudes and perceptions have been found. Kirkpartick and Locke (1996) found that positive visions were related to increased trust, leader-follower goal congruence, and inspiration. Entrepreneurial vision that possessed certain characteristics (e.g. brief, clear and future-oriented), were well communicated and focused on growth, and were associated with higher levels of business venture growth (Baum, Locke, & Kirkpatrick, 1998). A lofty, stilumalating and idealised vision of the future advocated by a leader leads to the empowerment of subordinates to particpate in the transformation of the organsiation (Conger, Kanungo, & Menon, 2000). Burke (1986, as cited in Conger et al., 2000) found that leaders empower by proving clarity of direction that encompasses a higher cause. The feeling of making a difference for the organsiation is a critical component of empowerment. An inspiring vision thus seems to be associated with positive outcomes in general.

When trying to comprehend how a vision operates in order to motivate individuals, Wofford and Goodin (1994) provide a useful explanation. They argue that a vision provides a shema for followers and leads to subordinate goals. Alternatively stated, a vision provides followers with a cognitive road map that structures their activities. Ilies and colleagues (2006) state visionary leaders could reasonably evoke high level learning tendencies in followers, such that their abilities will be further developed and they will subsequently demonstrate greater performance on tasks. The feelings of inspiration that are invoked by the leader's vision encourage followers to follow a learning approach that builds skills and competencies that would enable greater subsequent performance. In other words, the followers are motivated by the vision to learn and develop themselves.

Hypothesis 2: Inspiring professional vision is hypothesised to positively influence learning motivation.

2.5.2 Learning climate

Classroom climate has been a popular concept in educational literature for the past few decades (Pierce, 1994). Some climates are supportive and lively, resulting in highly motivated and disciplined students. Others are quiet, depressing, and boring, leading to students that lack interest, feel unchallenged, and are undisciplined. Previous research found empirical support for the relationship between student outcomes and positive classroom climates (Patrick et al., 2007; Fraser, 1987; Walberg, 1969).

According to Pierce (1994), the concept of classroom climate became popular in the late 1930's. Researchers discovered that the environment and its interaction with personal characteristics were important determinants of individual behaviour . Mischel's (1994) view that the interaction between personality and situational characteristics are key in understanding and predicting behavioural variability across situations became the dominant view of academic motivation. Multiple theories have since surfaced focussing on features of the environment that influence intra-individual factors (Urdan & Schoenfelder, 2006). Consequently, the interaction between individuals within the social context of the classroom became a popular topic in the educational literature. The characteristics of the classroom social context will influence the manner in which the behaviour characterising the underlying person latent trait is expressed.

The classroom climate (Fraser, Aldridge, & Adolphe, 2011; Johnson & Johnson, 1983) has also been called the social climate (Allodi, 2010), learning environment (Fraser et al., 2010), or classroom social-psychological environments (Fraser, 1998, Haertel, Walberg, & Haertel, 1981). The concept of classroom climate or learning climate has been defined in various ways. Goodlad (1984, as cited in Pierce, 1994) defined classroom climate as the physical, emotional and aesthetic characteristics of the classroom that tend to enhance attitudes toward learning. Schmuck and Schmuck (1978, as cited in Zedan, 2010) defined classroom climate as the sum of all group processes that occur during teacher-student and student-student interactions. The processes include interpersonal relationships, emotional intonations, structural aspects of teaching and the classroom, teacher attitudes towards students, teacher expectations of students, discipline, level of teacher control, and demographic characteristics of students. Urdan and Schoenfelder (2006) define classroom climate as the general class atmosphere including attitudes towards learning, norms of social interaction, acceptance of ideas and mistakes, and learning structures set by the teacher.

In the organisational literature organisational climate is usually an aggregated psychological climate. James, Joyce, and Slocum (1988) and James (1982) conceptualised psychological climate as a “set of perceptions that reflect how work environments, including organisational attributes, are cognitively appraised and represented in terms of their meaning to and significance for individuals” (James et al., 1988, p. 129). According to these researchers, if employees in an organisation share similar perceptions of a psychological climate dimension, it is permissible to aggregate these individual perceptions into an indicator of organisational climate. In other words, these researchers argue that organisational climate is the property of individuals and refers to how individuals in an organisation generally perceive the organisation. However, if employees differ substantially in the way they perceive organisational characteristics, then an organisational climate does not exist as some agreement is a necessary requirement (Glick, 1985).

Another issue with regard to classroom climate is the differentiation between climate and culture. Climate refers to surface level manifestations of underlying values and assumptions (Denison, 1996), whereas culture constitutes a "deeper, less consciously held set of meanings than most of what has been called organisational climate" (Reichers & Schneider, 1990, p. 24). This view of climate is also endorsed in this study.

The function of a classroom is primarily to cultivate learning. As such, the classroom climate and its constituent dimensions should promote learning. Every facet of the classroom needs to emphasise student learning. A large number of rating scales have been developed to identify the situational variables influencing student motivation. The most widely used classroom climate measures in literature appear to be the My Class Inventory developed by Sink and Spencer (2005), the Classroom Environment Scale developed by Trickett and Moos (1973) and the Learning Environment Inventory. The Hardvard Project Physics (1968, as cited in Pierce, 1994) commissioned the development of the Learning Environment Inventory (LEI) which identified 10 dimensions relevant to classrooms: cohesiveness, diversity, satisfaction, formality, difficulty, apathy, democracy, cliqueness, disorganisation, and competitiveness. The Classroom Environment Scale (CES) is a 90 item scale comprised of nine dimensions, namely: involvement, affiliation, teacher support, task orientation, competition, order and procedure, clarity of rules and regulations, teacher control, and innovation. The My Class Inventory consists of five dimensions, namely satisfaction, friction/conflict, competitiveness, cohesiveness and difficulty (Sink & Spencer, 2007). The What is Happening in the Class (WIHIC) questionnaire is another widely used measure in literature (Pickett & Fraser, 2010). This instrument measures the following dimensions: student cohesiveness, teacher support, involvement, investigation, task orientation, cooperation, and equity.

The US Ministry of Education, Culture and Sport (1993, as cited in Zedan, 2010) found teacher-student relationships, mutual relationships among students, discipline, classroom affiliation, a feeling of unity and solidarity, aesthetics and hygiene, crowdedness, facilities, and teaching aids and equipment to be the most important determinants of climate. In contrast, Zidkiyahu (1988, as cited in Zedan, 1988) found that teacher support for students, the support of students for their classmates at the social, emotional and cognitive levels, egalitarian attitudes of teachers towards their students and of the students towards each other, and the existence of a clear set of rules and regulations for both teachers and students to ensure organisation, order, security and justice, were the most desirable components for classroom climates.

Steele, House, and Kerins (1971) conceptualised and measured classroom climate in a very interesting manner. They attempted to measure educationally meaningful classroom climate dimensions through student observations of classroom activities characterising the class as a means to obtain a more objective form of data than self-report information. They defined instructional climate as comprising of four dimensions: lower thought processes, higher thought processes, classroom climate and classroom focus. Lower thought processes consisted of memory, translation and interpretation factors. Higher thought processes consisted of application, analysis, synthesis and evaluation. Classroom focus involved discusssion, test/grade stress, and lecture factors. Lastly, classroom climate consisted of enthusiasm, independence, divergence, humor, teacher talk, and homework.

Wiseman and Hunt (2008) state that teachers are able to enrich teaching and learning by establishing motivating climates. Positive climates make students feel comfortable and students experience the environment as supportive of learning and teaching, appropriately organised, and safe. These researchers state that this postive learning climate is established by a combination of four factors: self-regulated students, teacher characteristics, climate variables, and instructional variables. The climate variables involve (1) order and safety – students see the learning environment as physically and psychologically safe; (2) success – achievement on meaningful and appropriately challenging tasks is essential, opportunities for students success are maximised; 3) task comprehension – students understand what they are learning and why they are learning it; and (4) challenge – success occurs in moderately difficult or challenging tasks.

According to Anderson (1970) climate perceptions usually involve the following dimensions: interpersonal relationships among students, interpersonal relationships among students and instructor, relationships between students and the subject studied and method of learning, and students' perceptions of the structural characteristics of the class. When scrutinising the tools and dimensions discussed, recurring dimensions can be identified.

Student cohesiveness/affiliation and/or teacher support appears in almost every tool. Teacher support is defined as learners' perceptions that their instructor cares about and will help them (Trickett & Moos, 1973). Teacher support can be categorised in terms of two distinct, but highly correlated factors: emotional support and academic support (Patrick et al., 2007). Emotional support provided by the instructor involves perceptions that the teacher likes and cares about the individual students. Academic support refers to perceptions that the instructor cares about students' learning, wants to help them learn, and wants them to do their best.

Patrick et al. (2007) report that the literature indicates that when students feel emotionally supported by their teachers, they are likely to engage more fully in their academic work, expend more effort, ask for help, use self-regulated learning strategies, and are also likely to have higher achievement. They state this is likely due to the fact that learners who feel their instructor cares about them are encouraged to invest more and desire to comply with the instructor's wishes and decreases concerns that diminish their thinking about tasks and learning. This is due to the relationship between perceived relatedness and support, promoting intrinsic motivation and emphasising mastery goals. As such, teacher emotional and academic support is selected as the first two dimension of learning climate.

According to Blanton (2002), a classroom climate that facilitates learning is characterised by structure, fairness, well developed lessons and a caring and non-threatening atmosphere. Structure involves the establishment of guidelines for academic performance as well as behaviour. This will communicate the instructor's expectations to students as well as the consequences they will face if expectations are not met. Fairness involves respect and equitable treatment of all students. Instructors should not display any form of bias. Well developed lesson plans involve fully understanding the learning material and anticipating student problems. A caring non-threating environment is characterised by dealing quickly and professionally with problems and not holding grudges.

Cohesiveness and affiliation facilitate a sense of belonging and makes a student feel safe in their learning environment. Cohesiveness and affiliation is promoted through the existence of mutual respect. Mutual respect refers to the perception that the instructor expects all learners to value one another and their contributions, requires learners to be considerate of others' feelings, and prohibits learners from making fun of each other. Ryan and Patrick (2001, as cited in Patrick et al., 2007) found that respectful environments are associated with cognitive engagement, including increased use of self-regulated learning strategies. This is due to the fact that psychological comfort resulting from respect reduces individuals' concern of being mocked, thus enabling more processing to go toward the task (Patrick et al., 2007). Learners are also more likely to engage in learning activities and suggest and explain their ideas without being inhibited by concerns about what others might think or say if they are incorrect. Psychological safety thus goes beyond interpersonal mutual respect and trust, as it describes a climate characterised by mutual respect and trust and one in which people are comfortable enough to be themselves.

Psychological safety was originally used as an individual- and team-level concept. Brown and Leigh (1996) defined the construct as an employee's sense of being one's self without fear of negative consequences to self-image, status or career. They found a relationship between perceived psychological safety climate and job involvement, effort, and performance. Similarly, Edmondson (1999) defined team psychological safety as a shared belief that a team is a safe enough space for taking interpersonal risks. He found strong support for a relationship between team psychological safety and team learning behaviour, which in turn was related to team performance.

Maslow's hierachy of needs, discussed earlier, offers an important perspective to the discussion of the impact of the classroom environment on student motivation (Wiseman & Hunt, 2008). Classrooms in which students feel safe – physically and psychologically – make students feel like they are cared for and belong, this contributes to higher motivational levels. The concept of membership is important when discussing the classroom climate and learning motivation. When students are assigned to a class they need to be psychological members and not only physical members. This is reflected in the concept of psychological membership which is the degree to which students feel personally accepted, respected, included and supported. When students experience this sense of belonging they are more likely to adopt the goals valued in the learning environment (e.g. mastery goals). The social and psychological bonding that occurs when students feel they are true members of the classroom influences their level of motivation, engagement and learning.

Psychological safety should facilitate student learning as it reduces concerns about other's (the instructor and other students) reactions that have the potential for embarrassment. Learning behaviours often involve an element of personal risk (Edmondson, 2004). A student seeking assistance from their trainer-instructor - a person who is in a position to judge their skills and performance - involves interpersonal risk. In a psychologically safe environment, students would be less concerned with being judged as incompetent when seeking and asking for help from their trainer-instructor. If they respect and feel respected by the class and feel confident that other students and the trainer-instructor will not hold their errors or actions against them, the benefits of taking this interpersonal risk is given more weight. Similarly, when students seek feedback on their work from the trainer-instructor they put themselves at risk of being criticised and even humiliated. A psychologically safe environment reduces such concerns and is likely to encourage learning behaviours such as seeking feedback from others. Edmondson found that psychological safety facilitates learning behaviours such as speaking up about mistakes and testing work assumptions. This is due to the fact that a psychologically safe climate allows individuals to voice their mistakes and to believe that they will be regarded as people who have contributed to eliminating errors and enabling working assumptions that help to build a more robust system, and not as individuals who have 'crossed the line' (Edmondson, 2004). Psychological safety has also been associated with ease and reduced risk in presenting new ideas in a safe climate (Edmondson, 1999; West, 1990), better team learning (Edmondson, 1999), higher levels of job involvement, exertion of greater effort (Brown & Leigh, 1996), and smoother collaboration in solving problems.

Another important aspect of feeling psychologically safe, is the knowledge that one will be treated fairly and justly. Equitable treatment of all students is essentional to establishing a climate of safety. Instructors should not display any form of gender and cultural bias to any students and/or favouratism toward any student. If students perceive an instructor to show preferrential treament to certain students, elements of respect and fairness will be destroyed (Blanton, 2002). Equity is defined by Pickett and Fraser (2010, p. 322) as "the extent to which students are treated equally by the teacher." If students perceive the environment as an equitable one, they will be more likely to contibute as they would not fear being treated differently or being singled out by the instructor. The distributive justice research shows that people are more focused on relational- than instrumental considerations in their assessements of allocation decisions made by authority figures as individuals are more attentive to the tone and quality of social processes and are more willing to comply with these when they feel valued (Tyler & Lind, 1992). As such, for the purpose of this study, psychological safety and fairness will be considered as the second dimension of classroom climate.

A theory that can also be applied to the environment and relates to Maslow's hierachy of needs, is self-determination theory (Wiseman & Hunt, 2008). Self-determination theory is primarily a cognitive theory, but it incorporates humanstic views of motivation. Self-determination is the process of deciding how to react on one's environment. According to this theory, having choices and making decisions are intrinsically motivating. Individuals can only be content if they had opportunities to make decisions. Three innate psychological needs exist within individuals: competence, autonomy, and relatedness. Competence refers to students' ability to function effectively in the environment. Autonomy refers to the students' independence and their ability to alter the environment when necessary. Relatedness involves the feeling of being connected to others in one's social environment and feeling worthy of love and respect. These three needs are all linked to the students adjustment to, membership in, and eventual success in the learning environment. Relatedness is comparable to Maslow's need for belonging. Higher levels of motivation, as influenced by membership, occur when students experience belonging, autonomy, and competence.

The motivating effect of autonomy (or the need for self-determination) has been reported widely in the literature (Deci & Ryan, 1987; Markland, 1999). As stated earlier, it is also a crucial element in self-determination theory. Autonomy is concerned with helping individuals feel they have a choice when engaging in behaviour. In autonomy supported environments, students have options, the pressure to engage in behaviour is minimised, and individuals are encouraged to initiate action themselves. For example, a student can be encouraged to participate in the process of setting learning goals and to choose how, when, and where they participate.

Autonomy is the capacity to choose and to have choices, rather than permitting reinforcement contingencies, drives, or any other forces or pressures to be the determinants of an individual's actions (Schroff & Vogel, 2009). Reeve, Nix, and Hamm (2003) state individuals are autonomous when they act out of choice rather than obligation or coercion. These choices are based on an awareness of their desires, as well as a flexible interpretation of external events, and can be termed voluntary. When individuals are autonomous, they use available information to make choices and regulate themselves in order to achieve self-selected goals. Whether extrinsically or intrinsically motivated, behaviour based on choice is self-determined and emanates from an integrated sense of self that underlies the autonomy orientation (Ryan & Deci, 2004). As such, autonomy is selected as the third dimension of classroom climate. A motivationally supportive environment thus provides support for autonomy (Shroff & Vogel, 2009).

Self-determination theory identifies a continuum that moves from extrinsic motivation to intrinsic motivation (Wiseman & Hunt, 2008). One defining characteristic of intrinsic motivation is high personal interest in the task or activity (Linnenbrink & Pintrich, 2002). A distinction can be made between personal interest and situational interest (Hidi & Harackiewicz, 2002). Personal interest refers to an individual's interest in a particular topic or domain and is somewhat stable over preferences as well as aspects of the task. Situational interest, on the other hand, refers to features of the learning context and may be short term or long term. Situational interest consists of two factors: catch and hold (Mitchell, 1993). Catch factors stimulate students through innovative or novel instructional techniques. Hold factors empower students by making the content meaningful and useful to learners or by encouraging students' involvement in the task.

Involvement also emerged as a recurring dimension in the climate tools discussed. It refers to the extent to which students have attentive interest, participate in discussions, do additional work, and enjoy the class (Pickett & Fraser, 2010). Involvement thus often includes or leads to interaction. An increased sense of interest contributes toward developing a sense of relatedness as it is characterised by involvement in a particular social context (Ryan, 1994). For example, technology supported learning activities may allow for and promote the development of interest.

Within the educational context, interest can integrate a student's experiences outside the school in the learning process, encourage students to use prior knowledge in pursuing new knowledge, and motivate them to engage in learning tasks at hand (Dewey, as cited in Shroff & Vogel, 2003). These arguments are supported by research findings and clarify the function of interest in education. Interest is generally defined as a positive psychological state that is based on or emerges from person-activity interaction. In learning, this psychological state is assumed to derive from learner-content interaction.

A construct related to interest is curiosity. Curiosity is related to social engagement as exploratory behaviour is a powerful contributor to individual well-being that can interfere with social relatedness (Shroff & Vogel, 2009). Curiosity involves the desire to know, explore, discover and understand. According to Litman and Spielberger (2003) it is defined as the desire to acquire new knowledge and new sensory experiences that motivate exploratory behaviour. Csikszentmihalyi (1990) states that curiosity evokes scepticism of newly given information; stimulate exploration to search for different perspectives - especially novel perspectives - and incites the mind to reformulate a problem in order for it to be solved. Although two forms of curiosity exist – trait and state – this study is specifically interested in state curiosity, that is, individual differences in response to curiosity arousing situations (Naylor, 1981).

Patrick et al. (2007) referred to two types of interaction in their measure of classroom climate: task related interaction and student interaction. Student interaction refers to students suggesting ideas and approaches during the instruction session, explaining their thoughts or reasoning and discussing alternatives with others during small group activities, and sharing ideas or informally giving help during individual seatwork. It plays an important role in promoting conceptual understanding. Understanding and achievement is facilitated when students explain content to others during lessons and group activities (Fuchs, Fuchs, Hamlett & Karns, 1998). In contrast, task related interaction refers to learners' perceptions of the extent to which instructors encourage learners to interact and exchange ideas with each other during a session. Interaction presents learners with the opportunity to explain, assess, and refine their ideas; to evaluate other possibilities; and to provide and receive help (Webb & Palincsar, 1996). According to Clark et al. (2003) students are encouraged to use adaptive strategies that involve metacognitive reflection and thoughtfulness when they are encouraged to explain their understandings and listen to others explain theirs. Research also shows that student participation and involvement enhances learning, increases motivation, develops higher level cognitive skills and leads to better academic outcomes (Bendapudi, 2010).

Involvement and interaction often cultivates a feeling of interest and curiosity within students. Students can become interested in the learning material when interacting with it in a meaningful manner. Interaction can also be a symptom of interest. That is, because the student is interested in the learning material, they interact with it. Linnenbrink and Pintrich (2002) report that personal interest has been positively associated with achievement, use of deeper cognitive strategies, and has been associated with increased attention and persistence. Situational interest has also been positively correlated to achievement, engagement, persistence, and strategy use. Instructors can increase academic achievement, study skills and engagement, by tapping into students' interests and promoting catch- and, especially, hold factors. As such, interest and involvement will be included as the fourth aspect of classroom climate.

Learning climate is constitutively defined for the purpose of this study as the general atmosphere in the classroom related to teacher emotional support, teacher academic support, psychological safety and fairness, autonomy, and involvement and interest that is conducive to student learning.

Leadership has long been identified as a determining factor in the establishment of climate perceptions (Scott & Bruce, 1994; Kozlowski & Doherty, 1989). Rentsch (1990) even referred to organisational leaders as meaning managers and Naumann and Bennett (2000)) referred to them as climate engineers. Based on the work of Bandura (1986), Dragoni (2005) proposed that leaders influence individual climate perceptions through a social learning process during which followers repeatedly observe and interact with their leader to meaningfully interpret work group practices. The behaviours and practices leaders engage in transmit signals to followers about what is expected and valued (Guzzo & Noonan, 1994). Repeated and consistent engagement in their practices over time (i.e. a pattern of behaviour) direct followers' attention to the leaders preferred expectations, resulting in the formation of individual climate perceptions that reflect these expectations. Additionally, leaders continuously interact with followers to shape their psychological climate. They model the behaviour they deem appropriate, provide direct and indirect feedback on whether or not followers have met expectations, and reward individuals who exhibit expected behaviours.

Similarly, the trainer-instructor as a thought leader in the classroom is continuously observed by, and interacting with, trainees. The behaviour the trainer-instructor exhibits signals expected and valued classroom behaviour to trainees. If the trainer-instructor consistently displays behaviour reflecting *support, psychological safety and fairness, autonomy, and involvement and interest* they transmit the importance of these behaviours in the classroom to trainees through role modelling, continual guidance, and reinforcement.

The trainer-instructor is responsible for regulating the academic environment, including the material covered, approaches to learning presented, and the manner in which individuals communicate within the classroom (Urdan & Schoenfelder, 2006). Students' perceptions of teaching styles and the classroom environment guide how they learn and their attitudes towards school and academics (Wentzel, 1997). Students' perceptions of the learning environment influence their beliefs about themselves and their work which, in turn, influences the nature and extent of their engagement in learning tasks (Patrick et al., 2007). The perceptions of learners regarding dimensions of their classroom social environment, such as affiliation, cohesion, fairness, mutual respect and support from teachers and learners, are consistently associated with adaptive motivational beliefs and achievement behaviours (e.g., Ryan & Patrick, 2001; Goh, Young, & Fraser, 1995). Classrooms that have positive climates make students feel comfortable, promote self-efficacy and adaptive engagement patterns, foster feelings of belonging, and increase student motivation, enjoyment, interest and performance (Curby et al., 2009; Woolley, Kol, & Bowen, 2009; Newberry & Davis, 2008; Davis, 2003; Patrick, Turner, Meyer, & Midgley, 2003; Marks, 2000). Negative classroom climates are characterised by hostility, competitiveness, unsupportiveness, anxiety, unease, and scepticism, which could potentially results in intellectual and cognitive depression (Zedan, 2010).

Van De Weghe (2006) examined various classroom and school-level factors that influenced engaged learning. He stated that the relationships teachers form with students are crucial. Students who have positive relationships with teachers are more likely to be behaviourally and emotionally engaged. In classrooms where teachers created a respectful and socially supportive environment, pressed students for understanding, and supported autonomy, students utilsed strategic learning strategies and had higher behavioural engagement and affect. He states that teachers should balance intellectual and social concerns in order for them to optimise student learning. A highly academically focused environment with a negative social environment is likely to result in poor motivation, emotional disengagement, and students being more apprehensive towards making mistakes. Similarly, instructors who are focused on only the social dimension, but neglect intellectual dimensions, are less likely to facilitate cognitive engagement.

According to VanDeWeghe (2006) a democratic classroom context is an important contributor to engaged learning. Autonomy supportive environments are charcterised by choice, shared decision-making, and the absence of external controls. Controlling environments usually results in decreased student interest, diminished preference for challenge, and decreased persistence. Students need to experience a sense of autonomy where they desire to complete tasks for personal reasons rather than doing it because their actions are controlled by others. The need for autonomy is most likely to be met where students have choice, shared decision-making, and relative freedom from external controls.

A learning environment in which the instructor is supportive, autonomy is encouraged, the environment kindles student interest and involvent, and students are comfortable being themselves is likely to to be intrinsically motivating. This is in line with self-determination theory that postulates that individuals are motivated when their three innate psychological needs (competence, autonomy, and relatedness) are met. As discussed, interest and involvement is likely to address student's needs for competence as it presents students with opportunities to explain, assess, and refine their ideas; to evaluate other possibilities; and to provide and receive help. The autonomy dimension of climate addresses students' need for autonomy. Teacher support (academic and emotional) addresses a student's need for relatedness as the student feels that the instructor cares about them and their learning. Lastly, psychological safety and fairness possibly contributes and supports teacher support and interest and involvement. Students are more likely to actively show interest and involvement when they perceive the environment to be supportive and non-threatening. Involvement and interest would most probably be withheld if students demonstrate involvement and interest by participating in class discussion or asking questions and then be ridiculed or humiliated for their actions. Similarly, teacher emotional and academic support would be experienced as more sincere if the instructor promoted an environment/climate in which everyone is expected to value one another, be considerate of each other's feelings, and are prohibited from making fun of each other. The reverse is also true: an environment characterised by psychological safety would support and reinforce teacher emotional and academic support.

Hypothesis 3: Learning climate is hypothesised to positively influence learning motivation.

Furthermore, it is hypothesised that learning climate moderates the strength of the effect of learning motivation on time cognitively engaged. If a highly motived student is exposed to a learning environment that is not conducive to learning (i.e. characterised by low student interest and involvement, low instructor support, low psychological safety and low autonomy) the effect of their desire to learn on their time spent attending to and expending effort in the learning tasks will be decreased as a negative learning climate *diffuses* or weakens this effect. Similarly, when a student with a low desire to learn finds themselves in a classroom with a climate that is conducive to learning, the effect of their learning motivation on their time spent attending to and expending effort in the learning tasks will be strengthened. The effect of learning motivation on time cognitively engaged is thus dependent on the learning climate.

Hypotheses 4: Learning climate moderates the effect of learning motivation on time cognitively engaged

2.5.3 Classroom goal structure

Climate perceptions are likely precursors of state goal orientation (Dragoni, 2005). Instructors play a major role in the emphasis placed on the type of learning and goals students should adopt. Achievement goal theorists suggest that the structures of the classroom in which the student is involved shape their individual orientation (Gano-Overway & Ewing, 2004). Research has shown that students' perceptions of the motivational climate are related to their dispositional goal orientations (Ntoumanis & Biddle, 1998; Cury et al., 1996; Ames & Archer, 1988). Students' goal orientation can and do change as they progress through school.

The perceived motivational climate created by the instructor may represent a long term socialisation influence that can alter goal orientations over time.

Urdan (2004) states that although learners adopt personal achievement goals, they also adopt classroom achievement goals as each learning environment has a pre-existing goal structure. Urdan (2004) referred to this concept as classroom goal structure, whereas others refer to it as mastery or performance climates (Halvari et al., 2001). Murayama and Elliot (2009, p. 432) define *classroom goal structure* as "competence-relevant environmental emphases made salient through general classroom practices and the specific messages that teachers communicate to their students." According to Wolters (2004) g*oal structure* describes the type of achievement goal emphasised by the prevailing instructional practices and policies within a classroom, school, or other learning environment. This includes the types of tasks assigned; the grading procedures; the degree of autonomy students are provided; and the way students are grouped and are thought to affect the achievement goals students adopt, and thus embody the classroom goal structure.

In accordance with the two goal orientations, two distinct perceived classroom goal structures exist within the classroom setting (Ames, 1992b): mastery goal structure (or task-involving climates) and performance goal structure (or ego-involving climates). A mastery goal structure is described by an instructor's promotion of learning and support, and learners' perception of a helping atmosphere where effort is important for improvement. It involves several underlying dimensions such as a focus on trying hard and improving skills, cooperating with others to learn skills, and reinforcing the important contribution of all individuals (Newton, Duda, & Yin, 2000). Similarly, Midgley, Kaplan, Middleton, Urdan, and Roeser (1998) describe a mastery goal structure as an environment in which the instructional practices, policies, and norms convey to students that learning is important, that all students are valued, that trying hard is important, and that all students can be successful if they work hard at learning.

In contrast, a performance climate may be characterised by an instructor's promotion of competition and normative comparison of students, as well as learners' perception of intra-student rivalry, normative praise, and unequal recognition, the view that mistakes are punished, and learners' worries about making mistakes (Halvari et al., 2001). A performance goal structure describes an environment that signals to students that success means getting extrinsic rewards, demonstrating high ability, and doing better than others (Midgley et al., 1998). It involves a focus on demonstrating high ability, which leads to unequal recognition, a focus on punishment for making mistakes, and the creation of intra-team rivalry.

Midgley and colleagues (2000, as cited in Murayama & Elliot, 2009) applied a trichotomous model of personal achievement goals to the classroom context. This was achieved by differentiating the performance goal structure in terms of approach and avoidance and, consequently, resulted in three separate classroom goal structures namely, mastery, performance-approach, and performance-avoidance goal structure. A mastery goal structure is a context in which the classroom environment focuses on engaging in academic work to develop competence, especially task and intrapersonal competence. A performance-approach goal structure focuses on engaging in academic work to demonstrate competence, especially normative competence. Lastly, a performance-avoidance goal structure is an environment that focuses on engaging in academic work to avoid demonstrating incompetence, especially normative incompetence.

Classroom goal orientation will be conceptualised according to Midgley and colleagues (as cited in Murayama and Elliot, 2009) trichotomous model of personal achievement goals. Three separate classroom goal structures can be identified: performance-approach classroom goal structure, performance-avoidance classroom goal structure, and mastery classroom goal structure.

A mastery goal structure has been associated with positive outcomes such as self-efficacy; effort, use of effective learning strategies, not cheating, intrinsic motivation, academic self-concept, lower levels of help avoidance, adaptive coping responses after failure, motivation, positive affect, academic performance, satisfaction with learning, and less effort withdrawal (Murayama & Elliot, 2009; Lau & Nie, 2008; Wolters, 2004; Nolen, 2003; Urdan & Midgley, 2003; Murdock, Hale, & Weber, 2001; Kaplan & Midgley, 1999; Ryan, Gheen, & Midgley, 1998); Ames & Archer, 1988). This is probably due to the fact that environments characterised by support, respect, and widespread student interaction encourage a focus on mastery goals as learners are more likely to focus on understanding content rather than focusing on how they are being perceived by others (Patrick et al., 2007). The perception of a supportive instructor has been repeatedly found to be related to the enjoyment of, and a desire for, personal improvement, which are significant aspects of mastery goals.

In contrast, performance goal structure has been associated with maladaptive behaviours, for example, self-handicapping, cheating, procrastinating, disruptiveness, help-avoidance, and negative affect regarding school (Murdock, Miller, & Kohlhardt, 2004; Wolters, 2004; Kaplan, Gheen, & Midgley, 2002; Anderman, 1999; Anderman, Griesinger, & Westerfield, 1998; Ryan et al., 1998; Urdan, Midgley, & Anderman, 1998).

Teachers can positively influence student behaviours and perceptions by using transformational leadership (Bolkan & Goodboy, 2009; Leithwood & Jantzi, 2005). They are regarded as role models who inspire their students and stimulate their intellectual curiosity. As such, Dragoni's (2005) explanation of how and why a leader impacts on their followers' state of organisation can be applied to the instructor in the classroom. Her work was also earlier applied to the effect of the trainer-instructor on learning climate. Leaders transmit their achievement priority by engaging in behaviours and practices that support, reinforce and imply their preferred achievement orientation. Consistently displaying these behaviours will direct followers' attentions to the leader's preferred achievement priority resulting in individual climate perceptions that embody the leader's achievement priority. Furthermore, the practices in which the group engage in provide the leader with the opportunity to continuously interact with their followers to shape the psychological climate. During these on-going interactions, leaders are able to model appropriate behaviour, provide continual guidance through direct and indirect feedback, and reward individuals for adopting a psychological climate that reflects the leader's achievement orientation. Similarly, trainer-instructors will signal the appropriate goal orientation to their students by modelling the required behaviours, providing continual guidance and reinforcing appropriate behaviour.

Leaders who believe in the importance of employee development implement management practices conveying their commitment to learning. In their interactions with their followers, they model the importance of learning from mistakes and provide constructive feedback on how to improve. Research indicates that these practices foster the perception of a climate that values and expects learning (Dragoni, 2005). Individuals in this psychological climate for learning perceive their work as challenging because they are encouraged to work on developmental assignments. They view their co-workers as sources of social support, challenge and feedback (VanVelsor, McCauley, & Moxley, 1998) and regard satisfaction obtained from continuous improvement to be significant (McCauley, 2001). These characteristics of a psychological climate for learning effectively cue and induce a state of learning orientation. As leaders, trainer-instructors who believe in the importance of true learning and development can promote a mastery goal structure by modelling behaviours that should lead to the achievement of mastery goals.

When followers are encouraged to engage in on-going implicit competitions with one another to win extrinsic rewards, the leader is said to prioritise the demonstration of ability (Dragoni, 2005). The performance of each follower is explicitly and continuously evaluated in comparison to their peers and those that outperform others are rewarded. In order to obtain more favourable appraisals, the leader encourages their followers to promote their abilities, that is, to engage in impression management. There is also a constant monitoring and evaluation of work. Followers who hold a psychological climate for performance perceive their performance as being continuously evaluated and compared with others in the determination of rewards. They also perceive the ranking of followers' performance to be highly visible. Instructors who adopt this orientation will promote a performance approach orientation. Students will be encouraged to base their goals on demonstrating normative competence, that is, to outperform their follow students. It is likely that this climate will mostly emphasise good grades and not the mastery of the learning content.

Lastly, leaders adopting an avoidance of failure orientation, focus on events that challenge the appearance of competence (Dragoni, 2005). The leaders want to avoid mistakes, errors and substandard performance. They also emphasise the monitoring of performance but with the purpose of detecting mistakes. They use punishment to deter followers from making mistakes and they engage in defensive tactics to protect and repair their image and the image of their group. Resultantly, followers perceive that the avoidance of committing and admitting mistakes are valued behaviours. When instructors adopt and endorse such behaviours, they are creating a performance-avoidance climate in which students will be mainly concerned with avoiding the image of incompetence.

Dragoni (2005) also presents a psychological explanation on how an individual comes to adopt the group goal structure. Kopelman, Brief, and Guzzo (1990, as cited in Dragoni, 2005) state that psychological climate represents informational cues to followers regarding a path to achieve valued rewards in the group. Individuals will align their state goal orientation with the achievement focus inherent in the work group climate as this satisfies their need to achieve and maintain harmony with their environment. Due to this drive to achieve and maintain harmony with their environment, individuals adapt their perceptual, motivational, and behaviour responses to complement the shared group climate. They consequently adopt a corresponding state goal orientation endorsed by the group climate. Thus, in the context of learning, students will align their state goal orientation with the classroom goal structure in order to achieve and maintain homeostatic balance with their environment.

Literature indicates that a perceived mastery climate is most strongly positively correlated with mastery goals, whereas a perceived performance climate is most strongly positively correlated with performance-approach and performance-avoidance goals (Ommundsen, 2006; Skjesol & Halvari, 2005). An instructor that promotes competition will most likely result in learners who adopt corresponding performance goals (Urdan, 2004). Similarly, an instructor emphasising the development of understanding and personal mastery will most likely result in learners adopting corresponding mastery goals. Learners are likely to adopt a parallel goal orientation in keeping with what exists in their classrooms. Furthermore, Urdan and Midgley (2003) found that if learners moved into a different class, they would be likely to adopt the goal orientation of that classroom, despite their experience in previous classrooms. According to Treasure and Roberts (1995), continuous evaluation fostered in the climate may make it difficult for an individual to maintain their dispositional goal orientation when it is in opposition to the perceptions of the motivational climate. Consequently, when perceptions of a mastery climate focus a performance oriented individual’s attention on mastery involvement over successive experiences, it may lead to changes in how the student personally defines their successes and failures in the achievement context.

Research has found that a perceived performance-goal orientation within a classroom leads to the adoption of self-handicapping strategies, whereas mastery-oriented classrooms leads to a decrease in utilising self-handicapping strategies and an increase in seeking help when needed (Walker & Greene, 2009). Spray (2000) found that the perceived instructional climate (e.g. mastery or performance goal structure) is more influential than an individual's goal orientation (mastery versus performance orientation).

A mastery classroom goal structure is closely related with learners' motivation to learn which, in turn, is related to the goals students set themselves. This motivation is then transformed into the ability to master the challenges (mastery motivation) and is connected to performance (Christophersen et al., 2010). Moreover, students perceptions of the classroom climate may have significant effects on their cognitive strategies (Ames, 1992a; Ames and Archer, 1988). Murayama and Elliot (2009) note that personal achievement goals have seen far more research than classroom goal structures, but that the existing research clearly indicates the importance of classroom goal structure in achievement outcomes.

An individual's goal orientation influences their perception of the classroom environment (Lyke & Young, 2006). It is thus possible for the same classroom environment to differentially influence students depending on their initial goal orientation. The researchers found that students with a mastery goal orientation were likely to perceive the classroom environment as mastery oriented and that students with a performance orientation were likely to perceive a performance climate. It thus appears that classroom goal structure may be in the eye of the beholder. This was corroborated in the longitudinal study of Gano-Overway and Ewing (2004). These researchers found that goal orientations were only correlated with perceptions of motivational climate at low or moderate levels ($r=.24$ - $.38$, $p>.001$). Thus, perceptions of climate were not completely influenced by the goal orientations of students. The researchers found that the correlation between individual goal orientation and the corresponding motivational climate increased over time, indicating that the motivational climate might have some influence on goal orientations. Support for this finding was gained after controlling for initial goal orientations, as the motivational climate still positively predicted goal orientation at the later stage. Cury and colleagues (1996) also found support for the hypothesis that climate had a shaping effect on goal-orientation. Furthermore, a mastery climate has been found to predict an increase in mastery orientation, whereas a performance climate is positively related to an increase in a performance climate. The influence of the motivational climate in the Gano-Overway and Ewing (2004) study is particularly encouraging as the classes in the study only met twice a week for a total of 2.5 hours. This seems to suggest that instructors can have an impact on students' goal orientations in a relatively short time.

Incompatibility between goal orientation and the perception of climate results in individuals experiencing a change in their orientation (Gano-Overway & Ewing, 2004). Students who strongly identify with a goal orientation, are subject to a more pronounced influence by the particular climate. For example, high performance oriented students who perceived a low performance climate seemed to experience a greater change in their performance orientation scores across a semester than low performance oriented students. Students who were low in performance or mastery orientations were not subject to as great an influence by their perceptions of the climate as their counterparts. Lyke and Young (2006) found that students tend to perceive the classroom environment either as mastery oriented or performance oriented. As such, it is possible that students who were low in mastery orientation were high in performance orientation. Being placed in a high mastery goal climate might have been incompatible with the goal profile of the student, resulting in a slower change in mastery orientation.

The dynamics underlying the relationship between goal orientation and classroom goal structure becomes a critical consideration. Murayama and Elliot (2009) cite that research on the manner in which personal achievement goals and classroom goal structures combine to predict achievement-level outcomes is fairly limited. For this reason they conducted a study to examine the effect of goal orientation and classroom goal structure on intrinsic motivation and academic self-concept. Three models were tested: a direct effects, indirect effects, and interaction effects model.

In the direct effects model both goal orientation and classroom goal structure have a direct effect on the outcome variables. According to Murayama and Elliot (2009) several studies in the literature have utilised this model by either (1) examining the influence of classroom goal structures on its own, either with or without measuring personal achievement goals; (2) measuring personal achievement goals but conducting separate sets of analyses for classroom goal structures and personal achievement goals; (3) or assessing both goal structures and personal goals and examining their independent influence. They state that the majority of these studies have clearly documented a direct effect of classroom goal structures on achievement-relevant outcomes, and many studies have shown that classroom goal structures explain additional variance over and above personal achievement goals. Murayama and Elliot's (2009) direct effects model predicted that mastery goal structures would be direct positive predictors of intrinsic motivation and academic self-concept, whereas performance-based goal structures were hypothesised to be direct negative predictors of the outcome variables. Furthermore, it was hypothesised that personal mastery goals were positively related to the outcome variables; personal performance-approach goals were hypothesised to be positive predictors of intrinsic motivation and academic self-concept; and personal performance-avoidance goals were hypothesised to be negative predictors of both outcomes.

The indirect effects model postulates that classroom goal structures indirectly influence achievement-relevant outcomes through their impact on the adoption of personal achievement goals (Murayama & Elliot, 2009). Alternatively stated, achievement goals mediate the relationship between classroom goal structures and achievement-level outcomes. According to this model, goal structures give rise to the adoption of personal achievement goals, and personal achievement goals then exert a proximal influence on outcomes. Several studies in the literature have examined the indirect effects model (1) investigating whether personal goals serve as mediators of direct effects of goal structures on outcomes; (2) investigating the sequence of paths from goal structures to personal goals to outcomes; or by (3) focussing exclusively on the path from goal structure to personal goal. Murayama and Elliot (2009) state the majority of studies obtained support for the indirect effect model. Support has been obtained for the path between classroom goal structures and personal achievement goals, the path between personal achievement goals and achievement-relevant outcomes (controlling for classroom goal structures) as well as tests of mediation. Murayama and Elliot hypothesised that goal structures would give rise to the adoption of their corresponding personal achievement goals. Furthermore, personal achievement goals were hypothesised to mediate the relationship between perceived goal structures and achievement-relevant outcomes.

The interaction effects model posits that classroom goal structures moderate the influence of personal achievement goals on achievement-relevant outcomes. According to the interaction effects model, the influence of personal achievement goal pursual varies as a function of the type of goal structure in place within the classroom. Murayama and Elliot state that only three studies directly tested the interaction effects model (Wolters, 2004; Linnenbrink, 2005; Lau & Nie, 2008). Wolters (2004) performed a series of regression analyses testing the interaction between perceived classroom goal structure and personal achievement goal effects. The data delivered few significant interactions and the effects that were obtained were quite small. Linnenbrink examined the interaction between (manipulated) goal structures and personal achievement goals (prior to the goal structure manipulation) and found no significant interactions. Lastly, Lau and Nie (2008) examined the interaction between perceived classroom goals and personal achievement goals. The results indicated that strong performance-approach goal structures reinforced (or exacerbated) the associations between personal performance avoidance goals and student outcomes.

Murayama and Elliot (2009) presented no specific hypothesis with regards to the interaction effects model, but rather focused on two general hypotheses, a match hypothesis and a mismatch hypothesis. The match hypothesis posits that when there is congruence between personal characteristics and characteristics of the social environment optimal outcomes are expected. Various achievement goal theorists have hypothesised that personal achievement goals (mastery or performance based) have the most optimal impact on achievement-relevant outcomes when they match an individual's higher level goals, achievement dispositions, and/or achievement environment (Lau & Nie, 2008; Linnenbrink, 2005; Durik & Harackiewicz, 2003; Harackiewicz & Elliot, 1998; Elliot & Harackiewicz, 1994; Harackiewicz & Elliot, 1993).

When personal performance-approach goals are matched with a performance-approach classroom goal structure, the most optimal influence on achievement-relevant outcomes is likely to occur (Murayama & Elliot, 2009). According to the matching hypothesis, a match between the person and the environment will result in adaptive outcomes (Edwards, Cable, Williamson, Lambert, & Shipp, 2006). Murayama and Elliot (2009) state, that when personal performance-avoidance goals correspond with a performance-avoidance classroom goal structure, the negative implications of pursuing avoidance-based personal goals will be exacerbated. The mismatch hypothesis should thus be stated in terms of accentuation rather than positivity as congruence intensifies the basic pattern and does not necessarily results in the optimal pattern.

Lau and Nie (2008) explicitly differentiate between the two possible effects of a matching hypothesis: a reinforcing interaction and an exacerbating interaction. The former refers to instances where classroom goal structures strengthen a desirable relation at the individual level, for example, when a mastery classroom goal structure strengthens the desirable relation between personal mastery goals and a specific outcome. In the context of career psychology, Holland (1997, as cited in Lau & Nie, 2008) postulated that individuals will view an occupational environment as reinforcing and satisfying when features of the environment resemble their own personal characteristics.

The exacerbating effect refers to a reinforcing interaction in which the classroom goal structures strengthen an undesirable relation at the individual level. This applies to the example provided by Murayama and Elliot (2009) above regarding personal performance-avoidance goals and avoidance behaviour. Ingram and Luxton (2005, as cited in Lau & Nie, 2008) state this type of interaction is consistent with the vulnerability-stress hypothesis in psychopathology. According to the vulnerability-stress hypothesis, the probability of developing a given disorder depends on the interaction between the degree of personal vulnerability (personal characteristics that predispose individuals to a psychological disorder) and the level of stress (an environmental factor that disrupts the normal functioning of an individual) experienced by the individual. When applied in the context of achievement goals, this hypothesis suggests that individuals who pursue performance-avoidance goals would be vulnerable to a goal context that emphasises demonstrating competence and social comparison of ability, which is then likely to result in maladaptive outcomes. As such, the person-environment fit or matching hypothesis cannot be applied to performance-avoidance goals, as this hypothesis typically implies an enhancing effect.

A mismatch hypothesis is not simply the reverse of the proposed match hypothesis and the different mismatches between goal structures and personal goals have different implications (Murayama & Elliot, 2009). Nau & Lie (2008) refer to the mismatch hypothesis as the counterbalancing hypothesis. The first implication of a personal goal-classroom goal structure mismatch is a vitiation effect in which the beneficial influence of personal goals is reduced (Murayama & Elliot, 2009). Alternatively stated, when classroom goal structures weaken a desirable relation at the individual level, a dampening effect results, and the positive potential of an individual is dampened (or not fully realized) due to goal incongruence (Nau & Lie, 2008). This would occur, for example, if a student with a personal mastery goal orientation was placed in a classroom with a performance goal structure. The mismatch may result in their mastery goal orientation having a weaker positive influence on achievement-related outcomes. Similarly, if a student with a personal performance-approach is placed in a classroom with a mastery goal structure, their goal orientation could result in weaker positive influence on outcomes.

The second implication of a personal goal-classroom goal structure mismatch could be a mitigation effect in which the adverse influence of personal goals is reduced (Murayama & Elliot, 2009). Alternatively stated, a buffering effect occurs as the classroom goal structures weaken an undesirable relation at the individual level (Nau & Lie, 2008). For instance, if a student with a personal performance-avoidance goal orientation is placed in a classroom with a mastery goal structure, the problematic effect on achievement-outcome goals could be buffered. A third implication of a personal goal-classroom goal structure mismatch is an exacerbation effect, in which the adverse influence of personal goals is increased. This would occur if a student with a personal performance-avoidance goal orientation is placed in a classroom with a performance-approach goal structure.

The three models are compatible (Murayama & Elliot, 2009). For example, the indirect effect model reveals no information on whether classroom goal structures have a direct effect on outcomes and it is quite likely that both direct and indirect effects can be obtained with the same goal structures and personal goals. Similarly, it is likely that a classroom goal structure both moderates the effect of personal achievement goals and has a direct effect on achievement-relevant related outcomes. Due to the compatibility of the model, Murayama and Elliot (2009) conducted research to investigate all three models within the same study as it represents a more thorough and complete analysis than focusing on any of the three models in isolation. This more comprehensive approach holds promise for discovering the complex dynamics underlying the relationship between personal achievement goals and classroom goal structures on achievement-relevant outcomes.

The direct effect model indicated that mastery goal structure had a direct positive effect on intrinsic motivation and that performance-approach goal structure was a direct negative predictor of intrinsic motivation and academic self-concept (Murayama & Elliot, 2009). These results were obtained independently of the influence of personal achievement goals. Personal mastery goals had a direct positive effect on intrinsic motivation, whereas personal performance-approach positively predictor intrinsic motivation and academic self-concept, and personal performance-avoidance goals negatively predicted both outcomes. The researchers caution that although there is accumulated evidence supporting the direct influence of goal structures on outcomes, it remains unclear how goal structure can influence motivation and outcomes without the mediational role of personal achievement goals.

The indirect effect model indicated that mastery goal structure positively predicted the adoption of personal mastery goals. However, performance-approach goal structure was not related to achievement goal adoption. The results showed that personal mastery goals partially mediated the relationship between mastery goal structure and intrinsic motivation and fully mediated the relationship between mastery goal structure and academic self-concept (Murayama & Elliot, 2009).

The match and mismatch hypothesis of the interaction effect model were supported by the data (Murayama & Elliot, 2009). Performance-approach goal structure moderated the relationship between personal performance-approach goals and outcomes: In classrooms with a strong performance-approach goal structure, personal performance-approach goals positively predicted intrinsic motivation and academic self-concept. No interaction effect was observed between personal performance-avoidance goals and performance-avoidance goal structures. Consequently, uncertainty remains regarding whether the match hypothesis should be stated in terms of accentuation or positivity.

The match effect was obtained solely for the performance-approach goals. Performance-approach goals have been associated with positive outcomes, null results, and negative outcomes. Murayama and Elliot (2009) believe this varied pattern of findings is likely due to the role of classroom goal structure. They suggest that personal performance-approach goals are adaptive in competitive contexts. In addition, they postulate that performance-approach goals are based on both adaptive (approach) and maladaptive (avoidance) motivation. Thus, whether performance-approach goals promote or disrupt adaptive self-regulation depends on the underlying motivation that is operative in a given situation. In a classroom with a performance-approach goal structure, competition and normative competence will be emphasised. This will stimulate the need for achievement in students who are inclined toward normative accomplishment and this underlying approach motivation would then fuel the persistent and effort filled pursuit of performance-approach goals.

Two different types of mismatch effects were observed. The first, personal goal-classroom goal structure mismatch, undermined the positive relationship between personal goals and achievement-outcomes and intensified an adverse relation between them. Personal performance-approach goals positively predicted intrinsic motivation in classrooms with a weak mastery goal structure, but were unrelated to intrinsic motivation in classrooms with a strong mastery goal structure. This is probably due to the fact that students pursuing performance-approach goals in a mastery-oriented environment are likely to be frustrated as the definition of competence in a mastery environment is different from the normative definition of competency being pursued. Performance-approach goal students might be regarded as self-centred by their fellow-student in a mastery environment. The strategies typically utilised by performance-approach goal students (e.g. rote memorisation and the avoidance of help seeking) may be an awkward fit for the mastery-based classroom.

Personal performance-avoidance goals were also a negative predictor of academic self-concept in general, but this relationship was particularly strong in strong performance-approach goal structure classrooms (Murayama & Elliot, 2009). This indicates performance-avoidance goal oriented students experience additional pressure in environments that emphasise social comparison. In a performance-approach environment normative feedback is used as a tool by student to assess their ability. When performance-avoidance goal oriented students find themselves in performance-approach classroom goal structures they are confronted with feedback they are trying to avoid – feedback on whether they are failing. This argument is in line with Middleton, Kaplan and Midgley (2004) who found that the effects of performance goals are moderated by factors such as students’ perceived competence. Although encouraging self-improvement may be positive for all students, encouraging comparisons among one another may be positive for higher achieving students but negative for lower achievers.

Murayama and Elliot (2009) emphasised the fact that results of one model should be interpreted within the context of the other models. For example, the interaction effects model suggests that the performance-approach goal structures is the ideal classroom goal structure and needs to be promoted by trainer-instructors. However, when interpreted in the context of the direct effect model that indicates that performance-approach goal structures have a negative overall effect on intrinsic motivation and academic self-concept, it is apparent that the answer is not that clear cut.

Achievement goal research has often neglected to investigate how performance and mastery goals can combine to influence student outcomes (Alkharusi, 2010). Many studies have found either no correlation or a weak correlation between mastery and performance goals (Midgley et al., 1998), suggesting that students may hold mastery and performance goals simultaneously and to varying degrees. As a consequence, some theorists have suggested the multiple goal perspective postulating that holding both mastery and performance goals are most adaptive (Barron & Harackiewicz, 2001). The multiple goals perspective has not been accepted by all theorists, due to the fact that mastery goals are associated with the most adaptive patterns of behaviour, whereas performance-approach goals have been associated with negative effects (Kaplan & Middleton, 2002).

In response to this debate, Linnenbrink (2005) examined the effects of three classroom goal structures and personal goal orientations (mastery, performance-approach, and performance-avoidance) on motivation, emotional wellbeing, help-seeking, cognitive engagement, and academic achievement. Statistically significant effects were obtained for the effect of classroom goal structure on help-seeking behaviour and academic performance, with the mastery-performance classroom goal structure showing the most beneficial pattern. Mastery goals had positive effects on students' academic self-efficacy, interest in the subject, utility of the subject in the lives, adaptive help seeking, self-regulation, affect and academic achievement. In contrast, personal performance-approach goals had a negative impact on academic achievement and test anxiety and were unrelated to the remaining outcomes.

The discussion of classroom goal structure seems to indicate that the mastery goal structure is the only goal structure consistently related to positive learning behaviours and outcomes. Research on performance-approach goal structures has delivered mixed results – positive, negative, and insignificant. Although Linnenbrink's (2005) research suggests that a mastery-performance-approach goal structure is most beneficial, the results have not been replicated nor have the dynamics underlying this phenomenon been uncovered. Furthermore, a performance-avoidance goal structure has been consistently associated with negative learning outcomes. As such, a mastery classroom goal structure is the only classroom goal structure hypothesised to positively influence learning.

The issue still remains whether classroom goal structure moderates the relationship between goal orientation and learning motivation or whether goal orientation mediates the relationship between classroom goal structure and learning motivation. Murayama and Elliot (2009) found support for the claim that mastery goal structure positively predicts the adoption of personal mastery goals and that personal mastery goals partially mediate the relationship between mastery goal structure and intrinsic motivation. Halvari, Skjesol and Bagøien (2011) found support for the mediating effect of goal orientation on classroom goal structure and achievement-outcome. Wolters (2004) found that students who viewed the instructional practices in their classroom as more mastery structured tended to report a greater mastery orientation, and students who perceived their classroom's instructional practices as stressing performance-approach goals tended to more strongly adopt similar goals for themselves. Due to the correlational nature of the research, however, no causality could be inferred.

An argument against the mediating effect of mastery goal orientation on the relationship between classroom goal structure and learning motivation can be made based on the results of Wolters (2004). Wolters stated that no inference could be made (in his research) with regard to the causal influence between classroom goal structure and personal goal orientation. Also, he found that average mastery and performance-approach goal structures were not strong or consistent predictors of students' personal goal orientations when the individual-level effects were accounted for. It was only performance-approach goals that explained either of the average goal structures reported in a classroom.

Despite Wolters (2004) findings, previous research does provide supporting evidence for the direct effect of classroom goal structure on personal goal orientation as well as for the mediating effect of personal mastery goal orientation between mastery goal structure and learning motivation. As discussed earlier, classroom goal structure has a shaping effect on goal-orientation and both classroom goal structure and personal goal orientation are associated with learning motivation. Personal goal orientation thus appears to be the mechanism through which classroom goal structure influences learning motivation. For example, a classroom with a strong mastery goal structure is likely to result in higher levels of personal mastery goal orientation amongst students as the behaviours and practices of the trainer-instructor transmit signals to students about what is expected and valued. Repeated and consistent engagement in their mastery classroom goal structure practices over time directs student attention to the trainer-instructor's preferred expectations, resulting in the formation of personal goal orientations that reflect these expectations. The higher personal mastery goal orientation will, in turn, result in higher learning motivation. That is, mastery classroom goal structure impacts positively on the students' level of personal mastery goal orientation, which, in turn, contributes to higher levels of learning motivation. It is consequently hypothesised that mastery goal orientation mediates the relationship between classroom mastery goal structure and learning motivation. Although not explicitly tested, this hypothesis was included in the model as:

Hypothesis 4: Mastery goal orientation is hypothesised to positively influence learning motivation.

Limited support seems to exist for the moderating effect of classroom goal structure on the relationship between goal orientation and learning motivation – although there are only three studies on the issue. Lau and Nie (2008) found support for their additive hypothesis. An additive hypothesis is a main effect hypothesis in which classroom goal structures and personal goals have additive contributions to the prediction of student outcomes. Under this hypothesis, for example, classroom mastery goal structures would predict outcomes at the classroom level and personal mastery goals would predict student-level outcomes, but classroom mastery goal structures do not moderate the relations between personal mastery goals and student-level outcomes. The additive hypothesis was supported by the finding that classroom performance goal structures did not moderate the predictive relations of either personal mastery goals or performance-approach goals to any of the outcome variables. It was also supported by the finding that classroom mastery goal structures did not interact with any of the three personal goals in predicting any of the outcome variables. This indicated that classroom mastery goal structures operated in an additive manner towards personal goals to predict achievement and motivational outcomes. Similarly, in her quasi-experimental study, Linnenbrink (2005) found that classroom goal conditions did not interact with either personal mastery goals or personal performance-approach goals. Although Murayama and Elliot (2009) found support for the moderating effect of performance-approach goal structure on the relationship between personal performance-approach goals and outcomes, no interaction effect was observed between personal performance-avoidance goals and performance-avoidance goal structures. The researchers did, however, remain silent with regard to the moderating effect of classroom goal structure on the relationship between personal goal orientation and achievement-outcome.

Despite the results found by Lau & Nie (2008) and Linnenbrink (2005) the person-environment hypothesis makes substantive sense. When students with a mastery goal orientation are placed in a classroom with a mastery goal structure, the desirable relationship between personal mastery goal orientation and learning motivation should be strengthened. These students will regard the classroom environment as reinforcing and satisfying as the features of the classroom resemble their own personal goal preference. Holland (1997) states that when there is person-environment fit, it should result in stable behaviour as individuals would receive a substantial amount of selective reinforcement.

Hypothesis 5: Classroom mastery goal structure is hypothesised to moderate the effect of mastery goal orientation on learning motivation.

Students' perception of classroom goal structure has been found to be moderately positively correlated with use of deep cognitive strategies and slightly positively correlated with the use of rehearsal (Lyke & Young, 2006). Students' perceptions of classroom performance structure were not related to use of either cognitive strategy. This implies that classrooms that are perceived to have a mastery climate may engender more cognitive activity in general, including both deep and surface strategies, compared to less mastery goal climates. Instructors who provide students with the opportunity for challenge, choice, control, and collaboration are likely to have a positive influence on student motivation and learning (Lyke & Young, 2006). In the hypothesised trainer-instructor competency model, mastery goal structure will moderate the strength of the relationship of mastery goal orientation on learning motivation. The enhanced (or reduced) motivation will then result in student cognitive engagement.

2.5.4 Accurate role perception

For many decades, learning was regarded as something that "happens" to a student. An environmental stimulus or event occurs, the student responds, and second stimulus appears, as so forth (Shuell, 1988). After various repetitions of the stimulus-response pattern, associations are formed among the stimuli and responses, and the student "learns" specific behaviour. The student is seen as playing a relatively minor and more-or-less passive role in the learning process. A similar view considers teaching only in terms of activities carried out by the teacher and learning occurring as a result of these teacher activities (Shuell, 1988). These views place more emphasis on the teachers presenting the material to the students than the role of the student in doing something with the material presented by the teacher. The former does not guarantee the latter.

Learning psychologists have since discovered that what the student does during learning plays a critical role in determining the nature and extent to which they learn. The learner thus mediates the relationship between stimulus and response. Doyle (1977) suggests that student cognitions mediate the relationship between teacher behaviour and student outcomes. The current affirmative development trainer-instructor performance competency model subscribes to this view, as is illustrated by the inclusion of cognitive variables (e.g. transfer, automisation, information processing capacity, and abstract reasoning capacity) as components of student learning performance.

Shuell (1986) states that learning is an active, constructive, cumulative and goal oriented process. The active component refers to the fact that the student is required to do certain things whilst processing incoming information in order to learn the material in a meaningful manner. The constructive component refers to the fact that new information must be elaborated on, and related to, other information in order for the student to retain simple information and understand complex material. Learning is cumulative. This means that all new learning builds upon or employs the student's prior knowledge in ways that will determine how much is learned. It is goal oriented in that learning is most likely to be successful if the learner is aware of the goal toward which they are working and posseses expectations that are appropriate to attaining the desired outcome.

The relationship between teaching and learning is reciprocal and interactive in nature. Sternberg (1986) states that this process is a marriage between cognition and instruction. The goal of teaching is to faciliate learning. The teacher can create a professional vision and a positive classroom climate for the student to enhance motivation; the teacher can provide feedback to increase student self-efficacy; the teacher can create a classroom goal structure that facilitates the adoption of a mastery goal orientation; and the teacher can present well-structured learning material. If the student simply passively receives the information, however, no learning will take place. In order for the student to learn from instruction, various psychological processes must be engaged, and certain intergal learning functions must be performed by the student and the instructor (Shuell, 1988). Although learning functions can be initiated either by the instructor or the student, the student must actually carry out these functions. It is clear from this description, that learning is, to a large extent, the result of what happens in the mind of the student.

In order for students to take an active role in the teaching-learning situation, they need to have an accurate perception of their role in the learning process. Role clarity and role ambiguity are concepts that are related to possessing an accurate role perception. Keller (1975) states that in the organisational literature, a role is defined as a set of norms or expectations applied to the incumbent of a particular position by the role incumbent and the various other role players with whom the incumbent must deal to fulfil the obligations of their position. Role ambiguity occurs when an individual has a poor understanding of role expectations (Chang & Goldman, 1990). Role ambiguity could be the result of poor and restricted communication flow. Reserved feedback from role senders can cause ambiguity as role senders are often unwilling to criticise the role incumbent in order to maintain friendly relations. Organisational, interpersonal or personal factors can also result in role ambiguity which, in turn, have specific consequences such as dissatisfaction, behavioural withdrawal, decreased group productivity, increased defensiveness, and increased tension (Lyons, 1971).

According to Lyons (1971) role clarity can be defined in two ways. Objective role clarity refers to the presence or absence of adequate role-relevant information due either to restriction of this information or to variations of the quality of the information. Subjective role clarity involves the feeling that an individual has of having sufficient or insufficient role-relevant information. Both types of role clarity have been associated with satisfaction and reduced tension. In a study of the roles of graduate students in ten academic departments, Baird (1969) found that role stress and psychological withdrawal increased, and morale decreased, when professors appeared to be unclear or conflicted with regards to role clarity.

Expectancy theory views performance as a function of motivation (valence, instrumentality, and expectancy), ability, and role perceptions (Porter & Lawler, 1968). These researchers defined 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" (p.24). According to Porter and Lawler, the evaluation of these behaviours by a supervisor, however, is dependent upon the supervisor's role perceptions for the job. This implies that it is the accuracy of role perceptions, rather than the individual's role perceptions per se, that is of the greatest importance. Role perceptions thus appear to moderate the effect of ability on performance. Role perception has been found to be a critical determinant in sales performance. In their meta-analysis of salesman performance, Churchill, Ford, Hartley and Walker (1985) found role perceptions were the most effective predictor of all predictors in sales performance.

Marton (1981; 1988, as cited in Eklund-Myrskog, 1997) states that a conception is a fundamental way a person understand phenomena in the surrounding world. Several studies have indicated that student conceptions of learning or beliefs about what constitutes learning are strongly correlated with their approaches to study as well as being an influential factor on learning outcomes (Devlin, 2002). This is due to the fact that students' conception influences the way a task and its demands are interpreted and the way the learner goes about a task (Trigwell & Prosser, 1996).

Individual students have varying views on learning. Saljo (1979, as cited in Devlin, 2002) identified five conceptions of learning and Marton, Dall'Alba, and Beaty (1993) added an additional view. The conceptions are: (1) learning as increasing quantitive knowledge; (2) learning as memorising; (3) learning as acquiring facts, and/or procedures to be used when required; (4) learning as understanding or the abstraction of meaning; (5) learning as an interpretive process aimed at understanding reality; and (6) learning as changing a person. Taylor (1994, as cited in Devlin, 2002) states these conceptions are hierachically related, with each conception subsuming those that precede it. According to Biggs and Moore (1993) these conceptions can be grouped into two groups: quantitative (1-3) and qualitative (4-6). Quantitive conceptions focus on learning of isolated items and with the quantity of such items that have been learnt. In constrast, qualitative conceptions focus on the meaning of those facts (4), on ways of seeing the world (5), and on a philosophy of life (6).

Given the salience of role perception in determining performance, it is likely that the student's perception of their role in the learning process will have a marked influence on their learning performance in the classroom and during evaluation. Zirbel (2006) states that students often enter classrooms with a preconceived idea of what a lecturer should be like. They consider good lecturers to be individuals that provide them with clearly, logically and concisely formulated explanations of how the world works. Students should of course follow the instructor's arguments but they should, in fact, do a great deal more. Students are required to think critically about what the instructor is saying. Learning requires deeply thinking about the learning material and this might often result in frustration or confusion before the student eventually makes sense of the learning material. Following clearly phrased arguments might not only be easier and less work, it superficially appears to be clearer and more logical. If students are to achieve deep learning, a state of confusion is almost unavoidable. Students often perceive the instructor's role to be that of a "spoon feeder". Being spoon fed might alleviate hunger, but it does not teach students how to feed themselves, which is, of course, what would be most beneficial.

Devlin (2002) states that in order to take personal responsibility for learning, students must have knowledge of their own cognitions and of their own learning. [10] The influence of the conceptions that students hold regarding learning are important when the issue of responsibility is explored. Students that view learning as the accumulation and repetition of facts will interpret "taking responsibility for learning" quite differently to students that view learning as a deep understanding that leads to personal growth.

[10] This implies true learning will only take place when meta-cognition is high. This assertion seems to be supported by Van Heerden (2013) who hypothesised in her elaborated learning potential structural model that meta-cognitive knowledge is causally related to meta-cognitive regulation, which is causally related to time cognitively engaged, which is causally related to transfer of learning. This suggests that the effect of meta-cognition on transfer will not be direct, but indirect as the effect of meta-cognition on transfer of learning will be mediated by time cognitively engaged.

Students also often expect the teacher to know the answers to everything or expect them to provide them with the answers (Zirbel, 2006). This expectation or approach is not always in the best interest of the students. Deep learning involves students being able to obtain the solution to a problem independently and reaching their own conclusions based on sound theory. When students are simply provided with the "correct" solution, they often accept and adopt it as is. This often circumvents the process of learning, of thinking through the problem. Superficially thinking about a problem, only partially understanding it, and then accepting the final solution presented by the instructor, requires much less effort and does not involve deep learning.

The above argument does not imply that the instructor should not provide clear explanations or refrain from assisting students when they are faced with learning problems or difficulties. Rather, the trainer-instructor can play an integral role in shaping the role perceptions of their students toward learning by modelling appropriate methods of problem solving. By modelling the appropriate problem-solving approach, the student gains insight into the type of attitude they should adopt toward the problem as well as the cognitive processes involved in solving the problem. The modelled approach can subsequently be practiced, adapted, and internalised by the student to facilitate transfer of learning. In addition, feedback from the trainer-instructor on students' attempts to find a solution can assist in cultivating the appropriate orientation to problem-solving. When the trainer-instructor assists the student in identifying errors in their problem-solving approach, the errors can be corrected, mental models can be adapted, and transfer of learning will be facilitated.

The evaluation of an employee's behaviour on the job is dependent upon their manager's role perceptions for the job. It is the accuracy of role perception of the employee that will ultimately impact their job performance (Porter & Lawler, 1968). The accuracy of students' perception of learning will impact their learning performance. The trainer-instructor, as thought-leader in the classroom, will have a significant impact on the extent to which students have an accurate perception of learning and their role in the learning process. The words, the actions, and the example set by the trainer-instructor will signal to students which interpretation of learning should be adopted and internalised.

If students perceive their role in the learning process to be primarily concerned with passive listening and memorisation, learning and understanding will not take place. Similarly, if students have the ability to learn and understand the learning material, are motivated to learn, but hold misconceptions regarding their role and responsibility in the learning process, true learning will not take place. Effort and resources will be "wasted" on a misguided perception of what needs to be done. Students that have a desire to learn, but hold the skewed perception that learning is mere memorisation and regurgitation of facts, are likely to spend time and expend effort in surface-level cognitive processing. Surface level processing involves cognitive strategies that aim to reproduce the learning material with limited reflection and storing new information into short-term memory mainly through repeatedly reading the learning material. In contrast, when students have a desire to learn and have an accurate perception of learning (and their role in the learning process) time and effort will be invested in deep cognitive processing. Deep cognitive processing strategies are characterised by mental effort, integrating concepts, achieving greater understanding of ideas and the facilitation of long-term retention of the information. The influence of learning motivation on time cognitively engaged[11] is thus dependent on the extent to which the student accurately perceives their role in learning. It is therefore critical that students have accurate beliefs regarding the kinds of activities and behaviours that they should engage in to learn successfully. If this is not the case, motivation and effort will be invested in activities and behaviours that result in superficial learning.

Hypothesis 6: Accurate role perception is hypothesised to moderate the relationship of learning motivation and time cognitively engaged.

Morris (1961) states that students are either responsible or they are held responsible. The former involves doing the work without constant prodding and reminders and the latter involves only completing work when forced to do so. According to Maslow (1976) self-actualised individuals will take responsibility and each time they take responsibility it is a self-actualising act. Anderson and Prawat (1983) note that responsibility is very close to the concept of accountability and control. Individuals who are more in control are more willing to accept responsibility for their own behaviour, which in the classroom refers to self regulation

[11] Deep cognitive processing is implied in the definition of time cognitively engaged

and self-control. Responsible individuals are not satisfied with following the path of least resistance; they will seek out challenges; and will not retreat from challenges they are presented with.

Bacon (1993) conducted a study to assess adolescent students' perception of their responsibility of learning. When considering various responsibilities, 71% of students indicated their responsibility was to do the work; 54% indicated they were responsible for obeying rules, 37% indicate they were responsible for paying attention, 27% indicated their responsibilities included making an effort; and 27% indicated they were responsible for learning or studying. He concluded that although some students felt responsible for learning, they were being held responsible rather than being responsible. Moreover, students did not see any clear association between the work they learned and the future.

In their study of college students' causal attributions related to their success and failure, Schmelzer, Schemlzer, Fidler, and Brozo (1987) found these students held their own persistence and active study as the most common reason for their academic success. However, when students failed they were more likely to attribute the cause to their lecturer. Similarly, Killen (1994) investigated student perceptions of factors influencing academic success and failure and compared these perceptions to those of lecturers of the same university. The results showed that none of the ten factors students perceived to be the most influential in terms of their success at university where factors in their control. Seven of the ten factors students considered to be the most influential in influencing failure were factors within student control. Factors such as self-motviation, lack of self-discipline, and insufficient effort were often cited.

It appears that adults take responsibility for education themselves (D'A Slevin & Lavery, 1991). This is primarily the result of vocational or work-oriented needs or the response to personal living-learning motives. Despite this, these researchers state that the instructor's role should be directed toward encouraging the student to increasingly accept responsibility for their own learning.

Suprisingly little research has been conducted on the relationship of accurate student role perceptions with regard to educational outcomes. In fact, no study could be obtained relating accurate role perceptions with other educational variables. This is suprising considering the increasingly popular view of the teacher as a leader in the classroom, the application of organisational theories to the educational environment and the popularity of role ambiguity, role clarity, and role conflict in the organisational literature. For the purpose of this study, an accurate role perception is defined as students *having clear and accurate beliefs of the activities, behaviours and responsibilities required by them in the learning process to learn successfully.*

As mentioned earlier, responsibility is very close to the concept of accountability and control. Individuals who are more in control are more willing to accept responsibility for their own behaviour, which in the classroom refers to self-regulation and self-control. Academic self-leadership refers to the process through which individuals influence themselves to achieve the self-direction and motivation necessary to perform academically. The two concepts seem to "speak" to each other. This being said, an individual possessing a strong sense of academic self-leadership will not necessarily have an accurate perception of learning. Academic self-leadership might lead to a more active and goal-oriented approach to learning, but does not implicitly include an accurate interpretation of learning. Students with high levels of academic self-leadership can still interpret learning as mere memorisation and be driven to excel academically. Academic self-leadership will most likely increase learning motivation, but this increase in learning motivation will only translate into successful learning if the student's role perception in the learning process (and their perception of learning) is accurate.

Accurate role perception is likely to influence the effect of time cognitively engaged on transfer of learning. Transfer of learning involves the adaptation of knowledge and skill to address problems somewhat different to those already encountered - a crucial aspect of learning. If *transfer of knowledge* is to take place, the student must attempt to "create meaningful structure of the learning problem by adapting existing knowledge and through applying continuous intellectual pressure on the problem" (Burger, 2012, p. 37). Students who exert more effort and spend more time attending to tasks have a higher probability of learning and achieving higher levels of academic achievement as they are more likely to ultimately transfer their knowledge in order to learn. When students have a clear understanding of their role in the learning process (i.e. that their prime responsibility is to create meaningful structure in the learning material) it is more probable that the energy and time invested in the learning task will result in transfer of learning. The relationship between time cognitively engaged and *transfer of learning* is dependent on an accurate role perception. Students who apply continuous "intellectual pressure" on a learning problem and utilise deep cognitive processing strategies will be more effective in the adaptation of knowledge and skills to address novel learning problems. In contrast, students that have a distorted perception of their role in the learning process (for example, seeing their teacher as being primarily responsible for their learning) will be less successful in adapting their knowledge and skills to novel learning problems as they engage in surface-level cognitive strategies.

Hypothesis 7: Accurate role perception is hypothesised to moderate the influence of time cognitively engaged on transfer of knowledge.

An integral part of learning is the transfer of existing knowledge and skills on to novel learning material in an attempt to create meaningful structure in the learning material. Transfer of knowledge is determined by a person's abstract reasoning capacity. Abstract reasoning capacity plays an important role in dealing with novel kinds of problems and learning (De Goede, 2007). It is abstract reasoning ability that is responsible for the development of the first specific abilities. Once these specific, crystallised abilities have been developed, these abilities assist, through a process of transfer of skill, in the emergence of yet more specific skills (Burger, 2012). Crystallised ability can thus be defined as the specialised insight and knowledge that results from the use of abstract reasoning capacity via transfer of knowledge.

The extent to which students have an accurate role perception will determine the strenght of the influence of abstract reasoning capacity on transfer of learning. If students have an accurate role perception they understand that in order to learn the material in a meaningful manner, they are required to do certain things whilst processing the incoming information; that the new information must be elaborated and related to other information in order to retain simple information and understand complex material; and that all new learning builds upon prior knowledge. If students have an accurate role perception, the extent to which existing knowledge and skills are adapted to solve novel learning material in an attempt to create meaningful structure in the learning material will be strengthened due to the fact that they perceive learning as an active, constructive and cumulative process. When students perceive the extent of their role in learning to that of memorisation, regurgitation and limited reflection, the adaptation and application of existing knowledge and skills to novel learning problems will be hampered and meaningful structure will not be created in the learning material. Alternatively stated, having an accurate role perception will determine the extent to which the students use their abstract reasoning capacity to transfer existing knowledge and skills on to novel learning material in an attempt to create meaningful structure.

Hypothesis 8: Accurate role perception is hypothesised to moderate the influence of abstract reasoning capacity on transfer of knowledge.

2.5.5 Structure in the learning material

The ultimate goal of teaching is student learning. Learning involves an active process of creating meaningful structure. Learning essentially involved students having a deep understanding of the learning material (Zirbel, 2006). Deep understanding means that concepts are meaningfully represented in the student's mind and well connected (i.e. the learning material has been integrated into meaningful knowledge structure). Deep understanding of a subject thus involves the ability to recall many connected concepts at once, where every single concept has a deep meaning in itself. Deep thinking then involves being able to make linkages between the webs of concepts and being able to construct new concepts based on what the student already knows. It is essential that the most basic concepts are well understood and well connected. If consequent arguments are based on a shaky understanding of concepts, it will result in poorly connecting further concepts – giving the learner a feeling of having a somewhat superficial understanding of the learning material. When the learner is able to make sense of the learning material they are able to make the connections between different concepts.

The above description implies that learning involves the creation of cognitive structure. Structure involves the arrangement of and relations between the parts or elements of something complex. Deep learning involves exactly that: students are required to create their own structure of the learning material constituting of a whole and its constituent parts.

Instructors are required to assist students in learning. Trainer-instructors should facilitate transfer in that they present the learning material in a format that makes it easier to find meaningful structure in the material. One essential way in which the instructor accomplishes this is to provide logical structure to the learning material. Instructors are responsible for delivering the learning material in a comprehensive and objective manner. The teacher is assumed to be an expert in the particular field or subject they are teaching (Zirbel, 2006). Experts are assumed to have more knowledge, but that knowledge is also connected in a logical and meaningful manner. This usually implies that they have a greater overview of the field and can see the connections among various concepts. Furthermore, instruction involves providing students with information from a variety of sources. Instructors are required to highlight important differences, similarities, other important elements of the learning material, and possibly their interpretation thereof. The student might not have the necessary overview of the topic and might not know which facts are more relevant than others. Stressing or repeating relevant aspects of the learning material will assist the students in logically following, and building a coherent picture of, the particular theme discussed. The students are then required to create their own meaningful perspective of the learning material and its constituent elements based on what has been taught. The teacher thus initiates the process of learning in the students' minds by creating a structure within which they can make sense of the learning material.

The question of how one would evaluate the extent to which the instructor creates the structure within which the student can make sense of the learning material naturally arises. In reality one would like to measure and evaluate the process through which this structure is created in the mind of the student as facilitated by the instructor. This is, however, an extremely abstract and non-observable process. Research indicates that cognitive processes are not in and of themselves open to any sort of introspection. People seem to have very poor insight into their own cognition. Nisbett and Wilson (1977) state that people can be (a) unaware of the existence of a stimulus that importantly influences a response; (b) unaware of the existence of the response and (c) unaware that the stimulus has affected the response. It appears that objectively (or even subjectively) measuring the process through which the instructor creates the necessary structure for student learning to take place would be extremely difficult to measure as students might not be able to report (or accurately report) on this cognitive process.

It is proposed that the creation of structure in the learning material should be regarded as a subjective experience of the student, rather than a process that can objectively be assessed. This subjective experience involves the trainer-instructor presenting and articulating the learning material. Students receive and interpret the information. The manner in which the material is presented and articulated by the trainer-instructor either facilitates or inhibits learning. The student should experience the feeling that something makes sense. The student should be able to put together different parts of information and combine information with what they already know, that is, they should be able to make sense of the learning material and be able to make meaningful associations.

Structure in the learning material is constitutively defined for the purpose of this study as *a meaningful structure within which the constituent parts of the learning material are presented as a meaningfully integrated.* It must be emphasised once again that the trainer-instructor cannot be held responsible for what happens in the mind of the students, but that they are responsible for effectively facilitating the process of learning (specifically transfer) in the minds of students.

Ultimately students should be able to use the learned material and apply it to novel situations. In order to achieve this, students need to have an automated, deep understanding of the learning material. Transferring this deep understanding onto novel learning problems is difficult and challenging and does not occur without much effort and time. However, when students have a deep understanding of the material in all its complexity (as a whole and its constituent parts) the adaptation of knowledge and skill to address problems somewhat different from those already encountered (i.e. transfer of knowledge) is made easier. When instructors create a meaningful structure within which the learning material can be understood, it facilitates deep understanding, which, in turn, facilitates transfer of learning.

2.6 Trainer competencies

Trainer-instructor performance consists of competencies and the outcomes the trainer aims to affect or achieve. As the outcomes that the trainer-instructor attempts to affect have been identified, the question now becomes: what competencies affect these outcomes?

The learning outcomes students attempt to achieve will only be achieved if students display certain learning competencies in the classroom. Whether these learning behaviours will be displayed in the classroom is, in turn, dependent on the presence or absence of person-centred characteristics (student learning competency potential variables). These learning competency variables comprise either more malleable attainments or stable dispositions which are more difficult to modify. This line of reasoning suggests that the trainer cannot directly impact the student learning outcome variables, but that the trainer can affect the level of the malleable person-centred learning competency potential variables and the malleable situation-centred learning competency potential variables through specific trainer-instructor competencies, which determine the learning behaviours displayed in class, which in turn affect the learning outcomes the learner achieves.

Although research in the field of training performance has grown tremendously and a multitude of models currently exists, it is evident that there is a need for an integrated model of training performance – a model that integrates student learning performance and train-instructor job performance. To select the appropriate trainer-instructor competencies required to successfully perform on the job, the trainer-instructor outcome latent variables discussed above will be considered as well as the malleable competency potential latent variables. Instead of selecting a wide array of trainer competencies that frequently occur in the literature (but are not necessarily related to the outcomes required by the affirmative development trainer-instructor), only competencies that are hypothesised to affect the relevant outcomes will be discussed. The outcomes to be achieved by the trainer-instructor will serve as a compass for the selection of appropriate trainer-instructor competencies.

2.6.1 Providing inspirational motivation

Teacher leadership is an important concept and reflects what behaviour instructors use to facilitate the accomplishment of student’s personal goals (Treslan, 2006). Pounder (2006, 2008) and Bolkan and Goodboy (2009) support the view that instructors function as leaders in their classrooms. Furthermore, it appears that leadership models developed in a business setting are applicable to the study of teacher behaviour (Leithwood & Jantzi, 2005; Chory & McCroskey, 1999; Baba & Ace, 1989). Chory and McCroskey (1999) postulated that the classroom can and should be considered an organisation and as such, concepts relating to organsiations can be extended to the classroom. The application of management principles to classroom settings where instructors replace managers and students replace followers in the leadership dyad has since been applied.

Numerous models can be used to examine leadership style, yet effective classroom leadership behaviours are generally investigated under the model of transformational leadership (Pounder, 2006; Zorn & Violanti, 1993). These studies generally find that teachers can positively influence student behaviours and perceptions by using transformational leadership. Pounder (2008) found that instructors who are perceived as transformational influence a variety of outcomes such as extra effort from students, an increase in students' perceptions of leader effectiveness, and an increase in students' satisfaction with their teachers. Similarly, Harvey et al. (2003) found that very good teachers are transformational leaders. They are regarded as role models who inspire their students and stimulate their intellectual curiosity.

The theory of transformational leadership is one of the most influential leadership theories. Burns (1978) argues that transformational leadership occurs when one or more individual engages with others in such a manner that leaders and followers raise one another to higher levels of motivation and morality. According to Conger (1999, p. 149) transformational leadership is associated with "transforming the existing order of things as well as directly addressing…followers' need for meaning and development." Transformational leaders achieve this by developing a vision for the organisation, developing commitment and trust among workers, and facilitating organisational learning (Bennis & Nanus, 1985). According to Bass (1995, p. 467), transformational leaders:

> …convert followers to disciples; they develop followers into leaders. They elevate the concerns of followers on Maslow's need hierarchy from needs for safety and security to needs for achievement and self-actualization, increase their awareness and consciousness of what is really important, and move them to go beyond their own self-interest for the good of the larger entities to which they belong. The transforming leader provides followers with a cause around which they can rally.

Bass (1985) states transformational leadership consists of three dimensions: charisma, individualised consideration, and intellectual stimulation. A brief description of each dimension is provided:

1. Idealised influence/Charisma is the product of subordinates' belief in a leader and their mission as well as admiration for, trust in, and devotion to said leader. The leader provides vision and a sense of mission, instils pride, gains respect and trust, and increases optimism. The leader inspires and excites followers. Subordinates consider charismatic leaders as dynamic, hard-working, confident, attractive, competent, and successful. A sub-component of charisma is inspiration. Inspirational leaders are emotionally arousing, animating, and enlivening (Bolkan & Goodboy, 2009). Inspiration, or inspirational motivation, however, is often considered as a separate dimension of transformational leadership.
2. Inspirational motivation involves acting as a model for subordinates, communicating a vision and using symbols to focus efforts. This dimension is a measure of the ability of the leader to engender confidence in their vision and value (Pounder, 2006).
3. Individualised consideration entails treating subordinates differently according to their individual needs and capabilities. It is related to consideration for others and the mentorship of subordinates. The leader coaches and mentors, provides continuous feedback and links organisational members' needs to the organisation's mission. It is a measure of the extent to which the leader cares about the individual follower's concern and developmental needs.
4. Intellectual stimulation involves stimulating additional effort among subordinates by compelling them to reconsider ideas they have not questioned before and to reassess their old values and beliefs (Bolkan & Goodboy, 2009; Pounder, 2006). This dimension measures the extent to which followers are provided with interesting and challenging tasks and are encouraged to solve problems in their own manner.

Transformational leadership also includes the use of transactional behaviours as these two forms of leadership are not mutually exclusive. Accordingly, Bass and Avolio (1994) included transactional behaviours, namely contingent reward, and management-by-exception, both active and passive.

Bolkan and Goodboy (2009) summarised the following findings regarding transformational leadership and various outcomes in the organisational literature: Subordinates of transformational leaders have less role conflict, higher task performance, and higher satisfaction with a task than subordinates with non-transformational leaders. These subordinates show more helping behaviours as well as compliance and have more admiration for transformational leaders, a stronger sense of collective identity, and higher perceptions of task performance compared to non-transformational leaders. Lastly, transformational leaders are perceived as being more effective than non-transformational leaders and have been rated as better performing than non-transformational leaders, and subordinates.

Bolkan and Goodboy (2011) conducted a study to determine students' perceptions of teacher behaviours that communicate transformational leadership. Partipants were provided with an open-ended survey containing one of the three dimensions of transformational leadership. After reading an explanation, they were required to provide three written naratives describing how their instructors behaved in a way that reflected the decription provided. The results revealed that students perceived instructors to be charismatic through confirmation, enthusiasm, humor, caring, availability, content relevance, verbal immedicay, homophily, treating students as equals, and self-disclosure. Individualised consideration was reflected through availability, providing individual feedback, verbal immediacy, personalised content, conveying interest, special considerations, remembering student history, and promoting participation. Intellectual stimulation was communicated to students through an interactive teaching style, challenging students, encouraging independent thought, promoting participation, humour, and content relevance.

The father of transformational leadership, James McGregor Burns, was influenced by Maslow's theory of human needs (Transformational Leadership Network, 2007). As discussed earlier, Maslow's hierarchy of needs postulates that people have a range of needs and the extent to which they will effectively perform a task is affected by the extent to which these needs are met. Transformational leadership speaks to higher level needs as it requires high levels of self-esteem and self-actualisation. Bass built on the work of Burns and identified three ways in which leaders transform followers: a) increasing their awareness of task importance and value; b) getting individuals to focus on team and organisational goals rather than on their own interests; and 3) activating their higher order needs.

The three transformation methods described above directly influence follower motivation. As identified earlier, one way in which the instructor can motivate student learning is to establish an inspiring professional vision. The higher order needs of affirmative development trainees can be activated by establishing an inspiring professional vision. Similarly, if they hold an inspiring professional vision their awareness of learning task importance and value can be increased. It was hypothesised earlier that affirmative development trainees require a positive image in which they see themselves as professional, successful job incumbents living out their potential in order to be motivated.

Transformational leadership speaks directly to the creation of an inspiring vision. More specifically, inspirational motivation addresses the establishment of an inspiring professional vision as it is defined as the degree to which the leader articulates a vision that is appealing and inspiring to followers. Leaders with inspirational motivation challenge followers with high standards, communicate optimism about future goals, and provide meaning for the task at hand. In order to be motivated to act, followers require a strong sense of purpose. In the creation of a positive professional vision, a trainee's mind attempts to instil a strong sense of purpose that inspires effort and a desire to learn.

Inspirational motivation is considered by some researchers as a subcomponent of charisma, while others treat it as a dimension in its own right. The two are related as inspirational motivation refers to the communication of an inspiring vision; whereas charisma refers to modelling and living out the vision. The latter thus involves having a clear set of values and demonstrating them in all actions and being a role model for followers.

Rafferty and Griffin (2004) re-examined the theoretical model of Bass (1985) and identified five sub-dimensions of transformational leadership that demonstrate discriminant validity with each other and with outcomes. Vision was identified as an important leadership dimension encompassed by the more general construct of charisma. Bass argued that charisma is the most general and important component of transformational leadership. Meta-analytic studies seem to confirm this as charisma is most strongly associated with measures of effectiveness such as satisfaction with the leader (Lowe, Kroeck, & Sivasubramaniam, 1996). The importance of articulating a vision is frequently mentioned when discussing charisma. Rafferty and Griffin decided, consequently, to focus on vision rather than on the broader construct of charisma and idealised influenced proposed by other researchers. McClelland (1975) proposed that vision results in the internalisation of goals and values which encourages individuals to adopt behaviours due to the inherent attractiveness of the behaviour rather the attractiveness of a given leader. Rafferty and Griffin (2004, p. 332) defined vision as "the expression of an idealised picture of the future based on organisational values".

The second dimension identified by Rafferty and Griffin (2004) is inspirational communication. Charismatic leaders use inspirational appeals and emotional talks to arouse follower motivation to transcend self-interest for the good of the team. Bass (1999) suggested that vision and inspirational motivation might be combined into a single construct when he stated that both charisma and inspirational motivation are displayed when a leader envisions a desirable future; articulates how it can be reached; sets an example to be followed; sets high standards of performance; and shows determination and confidence. Rafferty and Griffin (2004) state that when considering the various definitions of inspirational leadership, the use of oral communication appears to be a recurring element. As such, they focus on inspirational communication, or the use of appeals and emotional-laden statements to arouse followers' emotions and motivation, rather than the broad construct of inspirational motivation proposed by Bass. They defined inspiration communication as (p. 332) "the expression of positive and encouraging messages about the organisation, and statements that build motivation and confidence."

The communication of a vision is considered to be an important aspect of charismatic leadership. According to Kirkpatrick and Locke (1996) there are three core aspects of charismatic leadership, namely: vision, vision implementation and charismatic communication style. Vision implies the charismatic leader has a positive, general and emotionally laden ideal related to strong values (Frese, Beimel, & Schoenborn, 2003); a vision should inspire and motivate followers to perform exceptionally well; a vision has to be communicated to generate enthusiasm and inspire followers; and a vision also has the ability to empower followers. Burke (1986) proposed leaders empower by providing clarity of direction that encompasses a higher purpose. Bennis and Nanus (1985) state the feeling of being able to make a difference is a critical component of empowerment.

Vision can be defined as a perceived pattern of communal possibilities to which others can be drawn, given the necessary enthusiasm and momentum on the part of the leader who is promulgating the vision (Morden, 1997). According to Bennis and Nanus (1985), leadership involves the capacity to create a compelling vision, translate it into action, and to sustain it. Bennis and Nanus (1985 as cited in Morden, 1997) state leaders have the ability to create a vision that others can believe in and adopt as their own. Such vision is long term in its orientation. Furthermore, leaders also have the capacity to communicate that vision and translate it into practicalities.

Charismatic and inspirational communciation is characterised by content and stylistic components (Howell & Frost, 1989). With regard to content, charisma is characterised by stressing the importance of a project, by sharing a vision related to the project, by increasing the confidence of subordinates, and by stressing a common goal. Evidence suggests charismatic and inspirational communication is related to performance. Numerous studies have shown that a leader's charisma is related to unit perfomance (Kirkpatrick & Locke, 1996; Lowe et al., 1996; House, Spangler, & Woycke, 1991; Howell & Frost, 1989). Howell and Frost (1989) conducted a study in which leaders utilised different styles and charismatic leadership was found to have the largest postive impact on satisfaction and performance of all the styles.

Kantabutra and Avery (2010) note effective visions are challenging. Being challenged motivates followers to try their best to achieve desired outcomes. Challenging visions possess a high but achievable degree of difficulty enabling followers to increase their self-esteem as they strive to achieve the vision. Furthermore, these researchers also state that powerful visions indicate a long-term perspective which can offer a clear view of a better future. Parikh and Neubauer (1993) support this view and further states that this creates a spark of excitement and nurtures a more pleasant working environment. This suggests the instructor should create a challenging, but achievable vision for affirmative development trainees in which they see a promising and better future for themselves as competent professionals. By having a challenging vision, students will enhance their self-esteem in their attempts to achieve the vision, which in turn motivates and satisfies them (Gecas & Seff, 1990; Maslow, 1943)

Instructors should motivate affirmative development students with an inspiring professional vision where they can see themselves as professional employees making a difference in an organisation. This broad, long-term ambiguous vision is then adopted by students and translated into more specific and concrete goals. Typically, the leader/instructor would communicate a single overarching vision from which many goals can flow (Locke, 2003). This vision is usually more general and distal, and less individualised compared to goals. The instructor can thus communicate a general inspiring professional vision for their students. Students can adopt this vision for themselves and derive their own individualised goals from it. Within the context of the classroom, these goals would be related to their learning. Their attainment of these learning goals would contribute and lead to the fullfillment of this vision.

When students understand the instructor's vision for them, as accomplished professionals adding value to organsiations, they will understand exactly what teaching and learning accomplishes and what it entails. Learning attempts to equip affirmative develoment employees with the tools to solve novel problems in the workplace. When students see the link between successful, authentic, and deep learning in the classroom and their competence as value-adding professionals in an organisation, each student will be able to visualise what the future holds as a rational extension of the present. That being said, a vision cannot be forced upon students. The trainer-instructor shares their vision, and as students come to comprehend this vision, they commit to it. They would actively participate in shaping and moulding it to reflect the personal vision that they have in their hearts and minds regarding their futures and their contributions to the organisation (Snyder & Graves, 1994). This shared vision will create a communality of interest among students enabling them to see meaning and coherence in the learning activities. Finding inherent meaning will increase students' desire to learn.

Inspirational motivation involves acting as a model for subordinates, communicating a vision and using symbols to focus efforts (Pounder, 2006). For the purpose of this study, elements of Rafferty and Griffin's (2004, p. 332) conceptualisation of charisma and inspirational motivation will be incorporated into the definition as these focus on the expression of the vision. Inspirational motivation will thus incorporate elements of vision and inspirational communication as both these dimensions deal with the oral expression of the vision. As such, inspirational motivation is 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.*

Beachum and Dentith (2004) associated teacher leaderships with leadership theories that emphasise the inspiration and facilitation of others; that focus on the embodiment of other's vision, values and beliefs and the organisation of mutually agreed upon goals; and that guide others in their self-development. These theories are echoed in all four dimensions of tranformational leadership. Furthermore, Ilies and colleagues (2006) state that charismatic leadership could evoke higher learning tendencies in followers such that their abilities will be futher developed and they will subsequently demonstrate greater performance on tasks. If the follower feels inspired by the greatness of the leader, the follower would be more inclined to implement a learning approach and thus build skills and competencies that would enable greater performance.

Hypothesis 9: Inspirational motivation is hypothesised to positively influence the creation of an inspiring professional vision.

2.6.2 Demonstrating individual consideration

One of the dimensions of classroom climate, as earlier defined, involves teacher support. Teacher support refers to learners' perceptions that their instructor cares about and will help them (Trickett & Moos, 1973). Various researchers have included supportive teacher behaviour in measures of teaching effectiveness.

Individualised consideration, a dimension of transformational leadership, appears to relate to teacher support. Individualised consideration involves consideration for, and the mentorship of, subordinates. It is a measure of the extent to which the leader cares about the individual follower's concerns and developmental needs. The construct incorporates elements of support and development. According to Rafferty and Griffin (2006), a theoretically significant shift has occurred in the definition of individualised consideration, away from developing subordinates, to something more akin to supportive leadership. These researchers postulate that the current mixture of supportive and developmental themes within the construct may be inappropriate as supportive and developmental leadership is associated with different outcomes.

Bass (1985) originally defined individualised consideration as leaders employing a developmental orientation and providing individualised attention to followers. He considered behaviour such as advising staff on their careers, carefully observing and recording their progress, delegating work, and encouraging staff to attend training courses, to reflect developmental leadership. Individualised attention, in contrast, involved paying attention to individual differences and motivation and resulted in leaders becoming more familiar with followers, enhanced communication, and improved information exchange.

Individualised consideration gradually experienced a shift in focus from a means to promote familiarity with followers to a means to provide support, thereby moving it more into the sphere of supportive leadership. Avolio and Bass (1995) note showing general support for followers is considered a display of individualised consideration. Supportive leadership is defined as a leader providing emotional, informational, instrumental, and appraisal support to followers. The most intuitive conceptualisation of support involves providing sympathy, caring and listening. House (1981) defined emotional support as expressing concern for, and taking account of, followers needs and preferences when making decisions.

Several researchers included a dimension akin to individualised consideration in their model of trainer effectiveness. Marsh and Bailey (1993) developed the Students' Evaluation of Educational Quality (SEEQ) instrument. Research on students' evaluations of teaching effectiveness (SETE) consists of thousands of studies and dates back to the 1920s. Marsh and Bailey (1993) note that the SEEQ appears to measure the most broadly representative set of scales and have the strongest factor analytics support of the SETE instruments. The SEEQ consists of nine dimensions, of which *individual rapport* is of particular interest in this case. *Individual rapport* refers to whether or not the instructor is friendly towards individual students.

Similarly, Boex (2000) conducted a study, at an American university, to discover the attributes of economics instructors associated with teaching effectiveness using responses from student evaluations of instructor surveys. He identified six broad instructor attributes of economic instructors as perceived by their students. In addition to the instructor attributes, his model includes a variety of student and course characteristics to control for potential sources of bias. One of the six identified instructor attributes was *interaction with students*. This element involved connecting to students as individuals and having a genuine interest in them.

Feldman (1998) coded the instructional characteristics of 22 studies into a set of categories in which most of the pedagogical attitudes, behaviours and practices found in the studies could be coded into. *Teacher's concern and respect for students or friendliness of the teacher* refers to the warmth, care and sincerity the instructor displays towards their students. It involves the instructor's respect for students, their values, and their opinions, and whether the instructor makes an effort to get to know students as individuals.

Pinder and Das (1979) included a similar behaviour in their input-output model for assessing instructor effectiveness in schools of business. Although an extremely simple model, it is still of considerable use as it clearly implies specific instructor competencies. The behaviours used by Pinder and Das show considerable overlap with the dimensions proposed by Feldman. Pinder and Das (1979) used the Student Instructional report (SIR) to develop and test an input-output model that would enable the extrication of instructor performance. SIR items classified as output items are those which describe the consequences of the instructor's efforts as well as other major inputs to the course experience. The SIR contained the item "*The instructor seemed genuinely concerned with student's progress and was actively helpful*" as an input item.

Cantano and Harvey (2011) note that a problem with existing student evaluations of teaching effectiveness is that they are not necessarily job-related and also do not capture the work performed as part of the job. These evaluations have not made use of industrial psychology for identifying, a priori, teaching job dimensions or competencies. Gatewood, Field and Barrick (2008) state that the recognised best practice is to begin by conducting a thorough analysis of the job in question. Cantano and Harvey (2001) consequently utilised the critical incident technique to identify the major dimensions associated with effective teaching and the behavioural anchors that could be used in creating a measure to assess teaching performance. The process delivered nine competencies, including *individual consideration.* They defined this dimension as showing sensitivity and empathy by accommodating the needs of others, and providing encouragement and personal attention towards others.

The Teacher Behaviours Checklist is a 28-item student inventory originally developed in 2002 by Buskist, Sikorski, Buckley, and Saville (as cited in O'Meara, 2007), and was subsequently modified in 2006 by Keeley, Smith, and Buskist (2006, as cited in O'Meara, 2007) into an evaluative instrument. The Teacher Behaviours Checklist was designed to provide behavioural anchors for characteristic personality descriptors that are often found in literature. Various behavioural categories of the instrument relate to teacher support and showing care for students. The categories include 1) *being approachable/personable*: smiles, greets students, initiates conversations, invites questions, responds respectfully to student comments; 2) *encouraging and caring for students*: provides praise for good student work, helps students who need it, offers bonus points and extra credit, and knows student names; 3) *and establishing rapport*: makes class laugh through jokes and funny stories, initiates and maintains class discussions, knows student names, interacts with students before and after class.

The behaviour proposed by Feldman (1998) and Cantano and Harvey (2011) appear to be most closely related to the learning climate dimension of teacher support. However, as discussed earlier, teacher support involves perception of both emotional and academic support. Their conceptualisation only refers to emotional support. Within the framework of transformational leadership, individualised consideration refers to emotional and developmental support. It must be mentioned that although Rafferty and Griffin (2006) present a valuable argument in propositioning for the separation of individualised consideration into two conceptually distinct dimensions, the study retains the current conceptualisation of dimension as involving support and developmental aspects. There should be a strong positive relationship between development and support as both are based on the welfare of followers. Consequently, leaders that are supportive and interested in the needs of their followers are likely to recognise their developmental needs. As such, *individual consideration* is constitutively defined as *showing care for student concerns and developmental needs.*

The quality of relationships between teachers and peers has been identified as one of the influential context factors affecting student engagement and academic achievement (Wentzel, 1997; Goodenow, 1993). Frequent positive interactions with teachers are considered to be a significant contributor to students' motivation to learn, academic achievement and psychological functioning (Wentzel, 1997; Birch & Ladd, 1996; Goodenow, 1993). Chen (2005) states that research in the USA and Hong Kong have established that teacher support plays a significant role in contributing to students' motivation to both learn and achieve. Other research results, however, have suggested academic performance is influenced by how supportive students feel their teachers are. She further notes that researchers have found that students' perceptions of teacher support are significantly related to their academic engagement, such as showing an interest in learning and being motivated to achieve academic excellence. Wentzel (1997) found that when support from parents, teachers and peers was considered concurrently, teacher support actually influenced academic-related interest directly. Wentztel also found perceived support from teachers was important to students' achievement because this care was most proximal and beneficial to their classroom learning.

Klem and Connell (2004) state that students need to feel that their instructors are engaged with them, know them and care about them. They state that studies show that students with caring and supportive interpersonal relationships in school report more positive academic attitudes and values as well as satisfaction. Similarly, Rafferty and Griffin (2006) found developmental and supportive leadership is perceived by followers as indicators of a leader's overall level of concern for their welfare in the workplace.

VanDeWeghe (2006) states students' individual needs must be met if they are to be engaged learners. Students will be more enaged when classroom contexts meet their needs for relatedness, which is likely to occur in classrooms where teachers (and peers) create a caring and supportive environment. Individual consideration appears to generate a sense of belonging which stems from positive teacher-student relationships. A positive relationship between perceptions of community, positive affect, and intrinsic motivation, as well as a direct link between the need for relatedness and engagement, has been found (VanDeWeghe, 2006).

Students that have good relationships with their teachers are more likely to feel welcome in the classroom and experience a greater sense of belonging which is related to higher motivation and achievement (Klem & Connell, 2004; McNeely, Nonnemaker, & Blum, 2002; Roeser, Midgley, & Urdan, 1996). When instructors display individual consideration behaviours it addresses the need that students have for belonging and relatedness. Instructor care and support is related to increased student engagement in learning, especially among at-risk students (Libbey, 2004; Croninger & Lee, 2001; Connell, Halpern-Felsher, Clifford, Crichlow, & Usinger, 1995). Caring behaviour displayed by the instructor is likely to result in perceptions of teacher support, which is considered to be a crucial dimension of a positive learning climate.

Hypothesis 10: Individualised consideration is hypothesised to positively influence learning climate.

2.6.3 Fostering psychological safety and fairness

Psychological safety and equity was argued to be the second dimension of classroom climate. This refers to an environment where students feel psychologically safe to express themselves and make mistakes. A psychologically safe environment is characterised by mutual respect and equity. Respectful environments are associated with cognitive engagement, increased use of self-regulated learning strategies, and increase in participation in learning activities. This is due to the fact that psychological comfort resulting from respect reduces an individual's concern of being mocked, thus enabling more processing to care for the task.

Bakker and Xanthopoulou (2009) state that psychological safety stems from social systems, with consistent and supportive co-worker interactions and organisational norms allowing for greater engagement. Leadership that fosters a supportive, trusting environment permits employees to fully invest their energy in their work role (Xu & Cooper Thomas, 2011). Trust in a leader, support from a leader, and the creation of a blame-free environment are components of a psychologically safe environment that facilitates employee engagement.

Milliken, Morrison and Hewlin (2003) found that leader behaviours are particularly salient cues that subordinates use in evaluating whether voicing unsolicited comments are personally dangerous. According to Hornstein (1986, as cited in Detert & Burris, 2007) employees often lack the courage or commitment to challenge managers who have signalled unwillingness to accept input from below. Thus, psychological safety should be enhanced when organisational leaders regularly display a personal interest and listen carefully as they signal to their employees that there is low personal risk in honest communication (Bass & Riggio, 2006; Edmondson, 2003).

In her research on the effect of psychological safety on team learning behaviour, Edmondson (1999) states that a team leader's behaviour is particularly significant. Team members are not only aware of each other's actions and responses, but pay special attention to the behaviour of the leader (Tyler & Lind, 1992). If a leader is supportive, coaching-oriented and responds in a non-defensive manner to the questions and challenges posed by the team, the team members are likely to perceive a psychologically safe environment. However, if the team leader acts in an authoritarian or disciplinary manner, the team members will be unlikely to engage in learning behaviours such as discussing errors (Edmondson, 1996, as cited in Edmondson, 1999). She further states that team leaders themselves can engage in learning behaviours in order to demonstrate the approriateness of such behaviour.

Schrader (2004) states educators can contribute to a sense of intellectual safety that creates a fertile ground for challenging facts. Similarly, students experience greater physical and psychological safety when a classroom exhibits a climate of mutual respect and caring. This leads to an increase in feelings of belongingness.

Individual differences exist with regard to what students consider as safe. Students differ in terms of their epistemological development. For instance, dualistic students might consider open discusssion among peers, the instructor's acknowledgement of uncertainty, contrasting or contradictory viewpoints, and a focus on the construction of knowledge rather than the instructor providing information as an unsafe environment. This same atmosphere considered by dualistic students as unsafe, will be interpreted by relativistic students as safe and intellectually satisfying.

Despite these individual differences in epistemological development, one could argue that all students would prosper in a learning environment where instructors did not demean students or their ideas, but rather encouraged students to be thoughtful, reflective, inclusive and respectful, and created a climate for students where they felt productive and supported. Essentially, in order to experience psychological safety, students need to be free of fear. Students should not fear their instructor, their peers, not knowing, being challenged, change, rejection, or ridicule. In a context of fear students will not be able to present and discuss their views, grapple with concepts, and challenge opinions to construct new conceptualisations.

According to Schrader (2004) intellectual safety requires a moral safety net. This moral safety net can be created by instructors who care about their students, who nurture and challenge them, and who do so in a positive moral context. With this moral safety net, students feel intellectually safe to challenge the views of the instructor and instructors are challenged to do their job of developing reflective judgements and critical thinking.

Schrader and Call (2002) designed a survey to examine the intellectual safety in college classrooms. The survey aimed to obtain a sense of students' emotional reactions to classroom environments, and to determine whether students could define intellectual safety and whether or not the concept held any meaning for them. The survey results revealed that students most often discussed the beliefs, attitudes, and behaviours of the instructor when speaking of making a climate feel safe. They also referred to the instructor in the context of the class structure, subject matter, and peers, who also contributed to a perception of safety, but not nearly as often as personal connections with the instructor. Based on the survey results, the researchers defined intellectual safety as (pp. 95-96):

> …a caring environment in which the professor is open and caring, demonstrates respect, embraces the uniqueness of students and their perspectives and does so in a classroom format where all are invited to participate actively, engage in personal self-disclosure while trusting the confidentiality of such openness, and where the professor maintains a sense of control and direction to facilitate learning.

Schrader (2004) states that students want to feel that they are cared for, respected, known, acknowledged, treated with equal value, and challenged, but not intimidated and comfortable. He states that Palmer's idea of hospitality is central to safety. Palmer (1983/1993 as cited in Schrader, 2004, p. 97) stated that:

> A learning space needs to be hospitable not to make learning painless but to make the painful things possible, things without which no learning can occur – things like exposing ignorance, testing tentative hypotheses, challenging false or partial information, and mutual criticism of thought. But none of them can happen in an atmosphere where people feel threatened and judged.

It appears that in order for students to perceive a learning environment as warm, challenging, supportive and safe (as opposed to threatening), instructors should create a classroom climate characterised by respect, caring, fairness, support, communication, mutual respect, and flexibility (Schrader, 2004). Good instructors are able maintain a balance between care and control, respect and fairness, and affirm students in their way of knowing, their sense of being and their contributions to the learning process.

Some researchers have included behaviour related to fairness and the promotion of mutual respect in their evaluation of instructor effectiveness. Feldman (1988) considered *Impartiality of Evaluation of Students; Quality of Examinations* as an important characteristics of good teaching. He defined this as the instructor's ability to evaluate student performance fairly and constructively and the extent to which grades are based on a fair balance of course requirements and content. Similarly, Boex (2000) included *Grading and assignments* in his evaluation of instructor effectiveness. This dimension referred to aspects such as reasonable exams and assignments and assigning grades fairly and impartially.

Cantano and Harvey (2011) considered *professionalism* to be a critical determinant of teacher effectiveness. They defined professionalism as the demonstration of honesty and integrity by being congruent in words and actions, displaying a sense of fairness and justice and maintaining confidentiality of information received. Keeley and colleagues (2006) included *Respectful* as a dimension in their behavioural checklist of teacher effectiveness. *Respectful* involved not humiliating or embarrassing students in class, being polite to students, not interrupting them while they are talking, and not talking down to students.

Dixon, Meier, Brown, and Custer (2005) conducted a study to identify the desired behaviour of training instructors who participated in institution-based enterprise activities. They first identified the entrepreneurial competencies that training academy managers considered either very important or critically important in order for trainer instructors to operate successfully in institution-based commercial enterprises. This was followed by an examination of training academy managers' perceptions of the training instructors' level of performance in these competencies. They considered the *Perception of Trustworthiness* as a desired behaviour of teachers. This dimension involved having integrity and being dependable, responsible, honest, and trustworthy.

The Checklist for Ethical Educators was created by the Minnesota Community Voices and Character Education Project from 1998 to 2002 (Narvaez, 2007). This instrument is based on findings about the importance of caring classrooms and communities for ethical development and achievement. This instrument contains various behavioural dimensions relating to the establishment of a safe and fair learning climate. *Promoting ethical behaviour* contains elements such as emphasising respectful, supportive relationships among students and instructors. *Providing safety and security* involves elements such as promoting mutual respect and proving the opportunity to express feelings. *Providing psychological support* involves providing opportunities for psychological development and the respectful discussion of different viewpoints. *Trust building* involves providing opportunities for the building of trust among students and making justice and fairness an explicit concern.

As such, *promoting safety and fairness* is constitutively defined as *behaviours promoting mutual respect, fostering feelings of safety and security, and demonstrating a sense of fairness and justice*.

Instructors as thought leaders in the classroom, aim to instil the right psychological orientation to learning in students. That is, students should interpret learning as problem-solving for the purpose of future problem-solving. This orientation cannot be instilled if students feel threatened, intimidated, and uncomfortable. An environment characterised by these elements will inhibit learning behaviours such as asking questions, making comments, and initiating discussions regarding the learning content. The trainer-instructor should, consequently, engage in behaviour that promotes mutual respect, creates opportunities for the safe expression of thought and opinions, and demonstrates a concern for justice and fairness in order to create a psychologically safe and fair climate. Without the fear of being ridiculed, rejected or discriminated against students will be more likely to present and discuss their views, grapple with concepts, and challenge opinions to construct new conceptualisations.

Hypothesis 11: Fostering psychological safety and fairness is hypothesised to positively affect learning climate.

2.6.4 Providing autonomy support

Deci and Ryan (1987, p. 1025) define autonomy as "action that is chosen; action for which one is responsible. Autonomy support was defined by Black and Deci (2000) as referring to a person in a position of authority that takes the other's perspective, acknowledges their feelings, and provides them with pertinent information and opportunities for choice, while minimising the use of pressures and demands. Autonomy support is an interpersonal behaviour that, through effective classroom environment and motivating styles, nurtures students' inner motivational resources (Kaur & Hashim, 2009). According to Stefanou, Perencevich, DiCintio, and Turner (2004) many researchers characterise autonomy support as (1) providing latititude and decision-making (Skinner & Belmont, 1993), (2) providing rationales for the value of learning in a non-coercive environment (Reeve, Bolt, & Cai, 1999), (3) clarifying the relevance of learning (Skinner & Belmont, 1993), and (4) providing positive feedback about competence (Deci, Vallerand, Pelleiter & Ryan, 1991).

Autonomy supportive instructors allow their students to act upon their personal interests and values which then engenders a sense of volition and psychological freedom (Reeve, 2009). Soenens et al. (2007) coined the term volitional functioning to differentiate self-determination theory's view on autonomy support from the promotion of independence. According to them, instructors can promote students' volitional functioning by proving them with the desired amount of choice by giving a meaningful rationale when choice is constrained, by accepting rather than countering irritation and anger that arises during the learning process, and by using inviting rather than controlling language.

According to self-determination theory, in order for students to be self-determined, they must have their psychological needs of autonomy, competence, and relatedness fulfilled in social contexts. Autonomy involves the need students have for latitude over decisions in school with regard to the "initiation, inhibition, maintenance, and redirection of activities" (Connell, 1990, p. 65). The learning environment can either facilitate or frustrate these psychological needs (Guay & Vallerland, 1997). Different classroom structures facilitate each of the three needs, however, the provision of choice and the removal of external controls best support autonomy. The amount of choice students have, and positive feedback they receive regarding competence, have been shown to increase student perceptions of control and direct the regulation of academic activities in support of responsibility and persistence (Deci et al., 1991). In contrast, the use of threats, deadlines, some forms of evaluation and surveillance, and other forms of control have negative effects on student self-determination (Deci & Ryan, 1987). It also decreases students' active involvement in their own learning (Ryan

& Stiller, 1991). It is apparent that instructors need to create a learning climate that facilitates autonomous students.

Various instructional behaviours have been found to foster student autonomy. Inviting students' opinions, for example, on what they would like to do or how they would like to do it; offering alternative choices on tasks according to their goals and interests (Assor, Kaplan & Roth, 2002); valuing their desire for the freedom to choose (Reeve & Jang, 2006); and creating opportunities for students to work in their own way and encouraging them to think for themselves before arriving at an answer (Reeve, 2006) foster student autonomy. Assor et al. (2002) found that fostering relevance by articulating the role of the learning activity in relation to the student's personal goals; allowing the expression of student dissatisfaction with learning tasks that cause the instructor to re-evaluate the learning task; and providing students with opportunities to choose tasks consistent with personal goals and interest support student autonomy. The fostering of relevance and the suppression of criticism, and not the provision of choice about learning tasks, were found to be the most important predictors of student autonomy.

Similarly, allowing students to share their thoughts and opinions during class activities and discussions; being responsive to suggestions and acknowledging their views (Reeve & Jang, 2006); and listening to and acknowledging negative feelings from students (Reeve, 2006) facilitates self-determination. Assor, Kaplan, Kanat-Maymon and Roth (2005) state that using controlling language such as "you must", "you should" and setting limits have been found to be perceived by students as controlling and to undermine intrinsic motivation. Furthermore, providing a rationale for doing an activity in a non-controlling language rather than imposing the task on students without any rationale fosters student autonomy (Reeve et al., 2002; Assor et al., 2002).

Reeve et al. (1999) found that teachers high in autonomy support listened to students more often and allowed students to handle and manipulate the instructional materials and ideas more often than low autonomy support teachers. Autonomy supportive instructors were also more likely to enquire about the wants and needs of students, respond to student questions, and assure students of their understanding of their students' emotional state. They were less likely to use directives and provide solutions. The researchers also found that autonomy-supportive instructors used motivational strategies that addressed intrinsic motivation.

In very controlling environments, learning activities might be so constrained that students attempt to reproduce information they passively receive from instructors and attempt to complete work even when they lack the understanding to do so (Stefanou et al., 2004). In learning environments where instructors support student autonomy, instructors show more enthusiasm for, and put greater effort into, seeking students' initiative and allowing students to become co-owners of decisions in the learning process (Reeve et al., 1999).

Stefanou and colleagues (2004) offer an alternative conceptualisation of autonomy support. Their conceptualisation of autonomy support includes three dimensions: organisational, procedural and cognitive autonomy support. Organisational autonomy support refers to the encouragement of student ownership of their environment and includes instructional behaviours that provide students with opportunities for choice over environmental procedures, for example: collaboratively developing rules and deciding on due dates for assignment. Procedural autonomy support involves the encouragement of student ownership of form and includes instructional behaviours such as offering students choice of media to present ideas. Cognitive autonomy support encourages student ownership of learning and involves instructional behaviours such as asking students to argue their point, generate their own solution paths, and evaluating their own and others' solutions.

According to Stefanou et al. (2004) autonomy supportive behaviours that indicate the relevance of learning tasks to students' personal goals are secondary to autonomy supportive practices that allow students to explore ideas and utilise their own unique way of solving problems in order to obtain solutions. They argue that autonomy support exists through: providing students with choices and opportunities for decision-making in regard to procedures and organisation; the encouragement of student independence in thinking, and allowing students to choose how they think. Furthermore, the researchers suggest that organisational and procedural autonomy support leads to superficial engagement and that cognitive autonomy support has more long-lasting effects of engagement and motivation.

Feldman (1988) included *Teacher's Encouragement of Self-Initiated Learning* as a dimension in his research on teacher effectiveness. This dimension comprises behaviours such as encouraging students to work independently, and to assume personal responsibility for their learning. Similarly, Pinder and Das (1979) included the item "*The instructor encouraged students to think for themselves*" in their input-output model of teaching effectiveness.

In line with the work of Stefanou and colleagues (2004), *autonomy support* is defined as *instructional behaviour that nurtures students' inner motivational resources by providing students with organisational, procedural and cognitive latitude.*

Numerous significant relationships have been found between autonomy support and positive outcomes. Autonomy support benefits achievement and motivation (Deci, Nezdik & Sheinman, 1981; Miserandino, 1996). Autonomy support in the classroom was significantly related to positive attitudes in the classroom and on-task behaviour (Weinert & Helmke, 1995). Deci et al. (1991) found that instructor orientation to autonomy support increased perceived competence and mastery motivation among students. Students who perceived themselves as competent and autonomous were more curious, more persistent, more involved and reported enjoying schoolwork more than students who reported low competence beliefs and low autonomy (Miserandino, 1996).

Autonomy support has been associated with increased effort as classroom autonomy support helps students to maintain effort beliefs regarding their abilities and provide them with the motivation to maintain the effort that is required to complete academic tasks (Reeve, Jang, Harde, & Omuru, 2002; Patrick, Skinner, & Connell, 1993). Deci and Ryan (1987) found that whenever students perform in autonomy supportive conditions, they tend to perceive themselves as more competent in cognition based activities and report higher self-esteem. Reeve et al. (2002) found that *autonomy support* is capable of creating opportunities and situations for students where they find content relevant to their interest and report more interest and enjoyment in the activity. Autonomy support has been found as a predictor of better engagement in learning situations (Reeve, Deci, & Ryan, 2004; Assor et al., 2005).

Controlling instructors interfere with and bypass students' inner motives and pressure students to act, feel, and think in instructor-preferred ways (Assor et al., 2005; Reeve, 2009).

They give directives, restrain criticism and independent opinions and use controlling language. A controlling instructor creates a learning environment characterised by control, duty and coercion. Several studies have also confirmed the detrimental effects of controlling environment over student's intrinsic motivation (Deci, Koestner & Ryan, 2001; Flink, Boggiano, & Barrett, 1990). It has also been found that when a cognitive activity is controlled, it is likely to become rigid and less conceptual. Controlling instructional behaviours can diminish conceptual learning (Deci & Ryan, 1987; Benware & Deci, 1984). Furthermore, controlling teaching is negatively related to intensive academic engagement, optimal motivation, and performance (Assor et al., 2005, Deci, 1971).

As a thought-leader in the classroom, the trainer-instructor aims to enhance student autonomy in order to instil the correct psychological orientation towards learning and enhance students' motivation to learn. The trainer-instructor aims to develop independent thinkers who take responsibility for their learning. Student autonomy will be fostered by providing students with organisational and procedural autonomy support. Cognitive autonomy support, focusing on the empowerment of students to develop self-reliance in thinking, will further facilitate student autonomy. Supporting cognitive autonomy will, however, be the salient feature of autonomy support as a motivator that leads to deeper involvement in learning and self-motivated scholarship. This will create a climate of autonomy which encourages students to develop self-reliance and independent thinking. Students will be able to choose alternative ways to approach tasks; they will experience more ownership for learning, and have a more direct impact on their own learning outcomes, stimulating their willingness to take responsibility. Autonomy supportive environments foster a sense of personal autonomy in students and foster perceptions that they are in control of their behaviour (Adie, Duda, & Ntoumanis, 2008). Students satisfy their need for autonomy which promotes their self-determined forms of motivation (Koka & Hagger, 2010).

Hypothesis 12: Providing autonomy support is hypothesised to positively influence learning climate.

2.6.5 Stimulating involvement and interest

Involvement refers to the extent to which students have attentive interest, participate in discussions, do additional work, and enjoy the class (Pickett & Fraser, 2010). Involvement often includes or leads to interest. Interest is generally defined as a positive psychological state that is based on or emerges from person-activity interaction. Student interaction refers to students suggesting ideas and approaches during the instruction session, explaining their thoughts or reasoning and discussing alternatives with others during small group activities, and sharing ideas or informally giving help during individual seatwork. Task related interaction refers to learners' perceptions of the extent to which instructors encourage learners to interact and exchange ideas with each other during a session. Interaction presents learners with the opportunity to explain, assess, and refine their ideas; to evaluate other possibilities; and to provide and receive help (Webb & Palincsar, 1996). Involvement and interaction often cultivate a feeling of interest and curiosity within students. Students can become interested in the learning material when interacting with it in a meaningful manner.

Various teaching behaviours can facilitate interest and involvement. Marsh and Bailey (2003) included *Group interaction* as a dimension in their SEEQ instrument. *Group interaction* refers to encouraging students to participate in class discussions. Similarly, Pinder and Das (1979) included the item "*The instructor raised challenging questions or problems for discussion*" in their input-output model of teaching effectiveness.

Feldman (1988) included three relevant competencies in his conceptualisation of teacher effectiveness. They included *Teacher's Encouragement of Questions and Discussion,* and *Openness to Opinions of Others* and *Intellectual Challenge and Encouragement of Independent Thought (by the Teacher and the Course).* The former refers to whether or not the instructor is open-minded, discusses points of view other than their own, encourages class discussion and student participation, and invites criticism of his/her ideas. The latter involves the instructor encouraging intelligent and independent thought by students and posing thought-provoking presentations and questions. *Teacher's stimulation of interest in the course and its subject matter* refers to the instructor's presentation of the course material in an interesting and informative manner.

Phipps, Kidd, and Latif (2006) conducted a study to evaluate the relationships among students' grade expectations, students' actual grades, and students' evaluations of instructors. They defined instructor effectiveness as consisting of four sub-dimensions of which *learning* was one. *Learning* involved motivating students to do their best, encouraging them to contribute to class learning, and stimulating interest in the material.

Erickson and Erickson (1979) evaluated teaching improvement programs by focusing on qualitative changes in teaching performance and faculty satisfaction into quasi-experimental studies. More specifically, their study focused on evaluating the effectiveness of a consultation procedure. In order to assess the effectiveness of the consultation procedure, they developed The Teaching Analysis by Students: Short Form A (TABS-A) to help identify teaching strenghts and problems and to measure perceptions of qualitative changes in teaching performance over the study. TABS-A items were selected and grouped into three teaching skill components, namely *stimulation*, *organisation* and *evaluation*. *Stimulation* included behaviours such as inspiring excitement or interest in the content of the course, maintaining an atmosphere which actively encourages learning, arousing interest when introducing an instructional activity, selecting materials and activities which are thought-provoking, getting students to participate in class discussions, and getting students to challenge points of view raised in the course.

Keeley et al. (2006) included *Creative and interesting* and *Promotes class discussion* in the Teacher Behaviour Checklist. *Creative and interesting* refers to behaviours such as experimenting with teaching methods; using technological devices to support and enhance lectures; using interesting, relevant, and personal examples; and not being monotone. *Promotes class discussion* involves asking controversial or challenging questions during class, giving points for class participation, and involving students in group activities during class.

Barbazette (2008) presented 25 competencies developed from knowledge and skills that are required by master trainers and instructors. His competencies present a list of behaviours exhibited by master trainers. Beginner and intermediate trainers generally exhibit two or three of the behaviours listed whereas master tariners utilise almost all of the behaviours listed. He included *encouraging particpation* as a competency. *Encouraging participation* involves the trainers supporting and encouraging trainees to participate in activities. Behaviours such as asking appropriate questions, encouraging diverse opinions and facts from reluctant participants, and drawing out quiet participants in a nondefensive manner can be utilsed to achieve this.

Transformational leadership includes the behaviour *intellectual stimulation.* It involves stimulating additional effort among subordinates by compelling them to reconsider ideas they have not questioned before and to reassess their old values and beliefs (Bolkan & Goodboy, 2009; Pounder, 2006). This dimension measures the extent to which followers are provided with interesting and challenging tasks and encouraged to solve problems in their own manner.

Fassinger (1996) investigated why students participate in classroom activities both from a student and professor standpoint. He proposed several behaviours instructors can engage in to promote class participation. He suggested instructors place greater emphasis on activities that boost students' confidence. This related closely to the fear of being viewed as unintelligent by one's peers or instructor. He stated that instructors could attempt to decrease anxiety by emphasising that all questions are welcome, by reminding students that the learning process involves making mistakes, and by inviting students to explicitly design their own norms for classroom interaction. Furthermore, a positive emotional climate can enhance students' tendencies to offer comments or raise questions.

All the behaviours discussed can foster student and task related interaction and generate a sense of involvement and interest. Instructors have to stimulate the interest of students in order to make them curious about the learning content. Instructors have to "hook" students in order to gain their attention and then "hold" their attention to facilitate learning. When considering the behaviours discussed, it appears that Erickson and Erickson's (1979) conceptualisation of s*timulation* is most likely to promote catch and hold factors. For the purpose of this study, stimulation is renamed to *promoting interest and involvement* which is constitutively defined as *instructional behaviour inspiring excitement or interest in the learning material* and *getting students involved in class and learning activities.*

An instructor that exhibits enthusiasm and tries to engage students in the learning material is likely to be perceived as positive. Students will be more likely to believe that the instructor is excited about the learning material and want students to engage in the learning process. Students who participate in class tend to perform better on exams (Reinsch & Wambsganns, 1994), are more motivated (Junn, 1994), and possess more confidence in the classroom (Fassinger, 1995).

The trainer-instructor should attempt to increase student motivation by cultivating a feeling of interest and curiosity within students. If an atmosphere of interest and curiosity characterises the classroom, students are likely to increase their interaction with, and partipation in, learning activities. According to social systems theory, a group leader controls the interaction among group members or between group members and the surrounding environment (Morrison, 1979). In the classroom, students interact by talking to other students, to the class as a whole, and to the trainer-instructor. The trainer instructor can control these activities by instructing students to do them, promoting and supporting specific types of interactions, or implicitly allowing students to do these activities with no specific intervention. Furthermore, if the trainer-instructor encourages interaction with, and participation in, learning material and activities, students are likely to become interested in it. The trainer-instructor can thus assist student learning, creating experiences that allow student to build knowledge and understanding. The goal as a though leader is thus to increase student interest and involvement towards learning and to create a climate of intellectual curiosity that is conducive to learning.

Hypothesis 13: Stimulating involvement and interest is hypothesised to positively influence learning climate.

2.6.6 Facilitating clarity and understanding

In order to facilitate student learning, the instructor has to create a meaningful structure within which the learning material can be understood by the student. The ability to teach clearly, so that students can understand course material, is fundamental to teaching (Chesebro, 2003). Instructional clarity has been repeatedly found to be an important variable in increasing student achievement and satisfaction (Brophy & Good, 1986; Cruickshank & Kennedy, 1986; Brown & Armstrong, 1984; Smith, 1982; Rosenshine & Furst, 1971). According to Rosenshine and Furst (1971) instructional clarity is the most effective variable for increasing student achievement.

Chesebro and McCroskey (1998) defined teacher clarity 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 non-verbal messages. Chesebro (1999, as cited in Chesebro, 2003) developed a

Profile of the Clear Teacher based on the literature on teacher clarity. This profile indicates that clear teachers structure their lessons and messages clearly and are verbally clear. Verbal clarity research usually examines aspects such as vagueness, fluency, mazes, explaining effectiveness, the pace of instruction, and the use of effective examples to enhance clarity (Chesebro, 2003). Research on structuring instructional presentations have focused on aspects such as advance organisers, organisations, transitions, internal summaries, reviews, previews, explicit teaching, and skeletal outlines provided to students. The non-verbal element of clarity refers to the use of time spent by instructors covering a topic as well as their speaking pace.

Research on clarity has expanded the construct to include clear communication processes in addition to course content (Civikly, 1992; Simonds, 1997; Kendrick & Darling, 1990). Simonds (1997) developed the Teacher Clarity Report which consists of ten items relating to clear communication of the course content, and ten items relating to the extent to which instructors are clear in communicating classroom processes. The scale developed by Sidelinger and McCroskey (1997) also measures teacher clarity. The scale consists of 22 items and relates to the communication of classroom processes, and the clarity of written communication. Similarly, Chesebro & McCroskey (1998) develop the Teacher Clarity Short Inventory which is a measure of clarity of content and process and is proportionate to other instructional measures in terms of length.

Marsh and Bailey (2003) included *organisation* in their evaluation of teaching effectiveness. According to them*, organisation* refers to the clarity of instructors' explanations. Boex (2000) included *organisation and clarity* as an aspect of teaching effectiveness. This dimension includes aspects such as lectures being easy to outline or cases being well organised and explained clearly. They also included a related dimension, *intellectual and scholarly ability*, which refers to the instructor's capacity to contrast the implications of various theories and to discuss recent developments in the field. Similarly, Pinder and Das (1979) included the items "*The instructor was well-prepared for each class"* and "The instructor summarised or emphasised major points in lectures and discussions" in their input-output model of teaching effectiveness. Both these item are associated with organisation and clarity.

In his examination of effective instructional characteristics, Feldman (1988) included several dimensions relating to the organisation and clarity of lectures. Firstly, *Teacher's Knowledge of Subject* refers to the instructor demonstrating comprehensive knowledge of their subject. *Teacher's Intellectual Expansiveness* involves the instructor relating course material to that of related fields and presenting other points of view, as well as their own. *Teacher's Preparation; Organisation of the Course* refers to the instructor giving a well-organised presentation. *Clarity and Understandableness* relates to the clarity with which the instructor explains new or difficult concepts and/or responds to the questions of students. Lastly, *Teacher's Elocutionary Skills* involves the extent to which the instructor speaks clearly and can be easily understood. It may also include how they vary the speed and tone of their voice.

Phipps et al. (2006) included p*resentation/style* as a dimension in their framework of instructor effectiveness. *Presentation/style* refers to the extent to which the instructor has an organised style of presentation, the methods used by the instructor are appropriate for the material presented, the instructor explain difficult material clearly, and the instructor speaks audibly and clearly.

According to Erickson and Erickson (1979) *organisation* involves behaviours such as making effective use of class time, clarifying material which needs explanation, and clarifying the purpose of each class session and learning activity. Barbazette (2005) included *using lectures effectively* in 25 competencies required to be a master trainer-instructor. This competency is similar to Erickson and Erickson's *organisation* competency and involves demonstrating behaviours such as sharing the objectives and giving an overview of lesson content, providing clear and accurate examples, and varying speech, pitch and volume.

One could argue that in order to create a meaningful structure within which the learning material can be understood by the student, the instructor needs to be an effective communicator. Ideas, concepts, and theories need to be communicated in a clear, organised and well-defined manner if students are to make sense of the learning material being presented. As such, many researchers have focused on the communication aspect of instruction. Cantano and Harvey (2011) defined *communication* as the display of verbal and written eloquence and flexibility based on the type of audience, communicating with clarity, precision and purpose, and taking the time to listen to others and decipher relevant points.

According to Dixon et al. (2005) *communication skills* involves a willingness to listen to others, being persuasive, possessing good verbal communication skills, and making good presentations.

Similarly, Keeley et al. (2006) included *effective communicator* in their teacher behaviours checklist. *Effective communicator* involves speaking clearly/loudly; using precise English; and giving clear, compelling examples. *Knowledgeable about subject matter* was also included as instrumental and was described as the instructors ability to easily answers students' questions, not reading straight from the book or notes, and using clear and understandable examples. *Being* p*repared* and p*resenting current information* was also included in the checklist. The former involves behaviours such as bringing necessary materials to class, never being late for class, and providing outlines of class discussion. The latter refers to behaviours such as relating topics to current, real life situations; using recent videos, magazines, and newspapers to demonstrate points; talking about current topics; and using new or recent texts.

The International Board of Standards for Training, Performance and Instruction (IBSTPI) published a set of instructor competencies in 1993 after extensively reviewing and testing the competencies by a group of practitioners and academics in the training and instructional design field (Foxon M. , Richey, Roberts, & Spannous, 2003). This particular model identified the core competencies that instructors require to complete an instructional assignment successfully. The model defines the generic instructor role, independent of settings and organisations - that is, competent trainers will perform effectively against these standards regardless the size of the audience. *Demonstrating effective communication skills* and *Demonstrating effective presentation skills* were included in the training manager competencies.

The American Society for Training and Development (ASTD) has conducted numerous studies in order to identify the competencies required by successful trainers. The McLagan Study of 1989 utilised a committee of 24 training experts to identify 35 HRD competencies in four basic areas: technical, business, interpersonal, and intellectual (Strategic Process Group, 2004). The 35 competencies classified by the ASTD as essential competencies that successful trainers need are described below (McLagan, 1989, as cited in Schneier, Russell, Beatty, & Baird, 1994). *Presentation skill* was grouped under interpersonal skills and referred to p*resenting information orally so that an intended purpose is achieved.*

It is clear from the above that how the instructor presents the learning material is an important aspect of instructor effectiveness and students learning. For the purpose of this study, the instructional behaviour facilitating the creation of a learning structure will be named *facilitating clarity and understanding*. Boex's (2000) definition of *organisation and clarity* will be adopted for this study. *Facilitating clarity and understanding* will be defined as *instructional behaviour that makes lectures easy to outline, cases being well organised, and learning material being explained clearly.*

Instructional communication research has demonstrated the benefits of clear teaching. Clear teaching behaviours have been linked to a decrease in state receiver apprehension (Chesebro & McCroskey, 2001); increased positive affect for course material and instructors, increased state motivation to learn, and increased perceptions of cognitive learning (Chesebro & McCroskey, 1998; 2001; Sidelinger & McCroskey, 1997; Titsworth, 2001a; 2001b). According to social systems theory, members of groups appear to appreciate leader-provided structure in that it reduces the uncertainty and confusion, and consequently the anxiety, inherent in any group setting (Morrison, 1979). As a thought leader in the classroom, the trainer-instructor can facilitate learning by reducing student uncertainty, confusion and anxiety through the facilitation of clarity and understanding of the learning material.

Hypothesis 14: Facilitating clarity and understanding is hypothesised to positively influence structure in the learning material.

2.6.7 Promoting a mastery climate

An instructor can encourage a particular goal orientation by emphasising certain cues, rewards, and expectations (Ames, 1992a). When an instructor structures an entire instructional process to communicate certain goals based on the context of the learning environment a motivational climate is created. Classroom climate plays an important role in eliciting the orientation of an individual toward mastery performance goals (Ames, 1992a; 1992b).

Several studies have investigated how a specific motivational climate can be created by trainer-instructors. Papaioannou (1995) found that instructors' attention toward high ability students induced a performance climate. In contrast, when students recognised their teachers' positive behaviour toward low achievers they perceived a mastery climate and demonstrated self-motivation practice, they recognised the implementation of effective instructional strategies, and they incorporated teachers' feedback into their practice (Gano-Overway & Ewing, 2004). Several studies that have attempted to implement a mastery orientation in the classroom have utilised the TARGET strategies and principles proposed by Ames (1992b) and Epstein (1988; 1989). According to these reseachers, instructors could implement mastery practices related to tasks, authority, recognition, grouping, evaluation, and time, into daily classroom routines to influence students' mastery motivation over the long term.

The task dimension relates to the content and sequence of the curriculum, the design of the classroom work and homework, difficulty of tasks, and the material required to finish assignments (Epstein, 1988, 1989). A mastery orientation usually occurs when the tasks involve variety, novelty, diversity, discovery, problem solving, challenges that fit individual needs, and short-term and realistic goals (Ames, 1992b). Furthermore, students are also more likely to consistently engage in learning when the learning tasks is perceived as meaningful. When a valuable learning activity is presented, students focus on the activity in order to develop and understand its contents, which leads to the improvement of existing skills and the development of new skills. These task features should facilitate the adoption of a desirable mastery goal orientation, which enhances motivation.

The authority dimension refers to the authority structure that influences the nature of decision making between instructors and students (Epstein, 1988). Classrooms that are characterised by the sharing of the resposibility of making choices, giving directions, monitoring work, setting and reinforcing rules, providing rewards, and evaluating success foster mastery motivational climates. Involving students in decision making and supporting autonomy results in adaptive motivational patterns, intrinsic motivation toward learning, and the use of effective learning strategies (Ames, 1992b; Lepper & Hodell, 1989). When students are allowed to pace their learning process, establish priorities, and develop self-management and self-regulatroy strategies, their sense of responsibility is nurtured (Valentini & Rudisil, 2006). Furthermore, encouraging students to initiate activities and make task choices, is an important strategy that can foster commitment, positive attitudes, intellectual and moral growth, and a mastery orientation.

Recognition refers to the informal and formal use of rewards, incentives, and praise in the classroom that recognises students' efforts and accomplishments (Ames, 1992a; Epstein, 1988, 1989). Instructors should avoid social comparison and rather provide students with private recognition. The student will be likely to derive their sense of pride and satisfaction from doing their best rather than by outperforming their peers (Ames, 1992a). Instructors can maintain or boost students' motivation to learn by recognising and rewarding their individual progress and improvement; creating 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 students.

Grouping involves whether or not, or how and why, students who are similar, or different in particular characteristics, are brought together, or kept apart, for instruction and other learning activites. Instructors can enhance students' mastery motivation by using flexible and heterogenous grouping arrangements and opportunites (Ames, 1992a; Epstein, 1988). Students working together create a climate that encourages them to share effective practice strategies, or to develop new strategies as they help one another solve problems. Valentini and Rudisil (2006) state that students should also experience a sense of belonging and acceptance. This sense of belonging is fostered by cooperative work, peer interaction, encouragement of individual initiative, and peer and teacher support. These aspects have, however, been dealt with in the variable *learning climate*.

Evaluation is concerned with utilising an effective evaluation system that leads the student to acknowledge their efforts, abilities, and improvement. Central to such an evaluation system is the empowering effect of private evaluations and the avoidance of social comparison. Public evaluation incites concerns about the adequacy of an individual's ability, consequently increasing the tendency to consider ability as capacity (Nicholls, 1989). However, when an instructor emphasises learning, understanding, solving problems, and performing a specific action, the conception of ability as a capacity becomes irrelevant. When individuals accomplish, understand or learn, this very act becomes intrinsically satisfying and a sense of competence is derived from it. In constrast, social comparison can hinder motivation as it decreases intrinsic involvement in the task.

Evaluation in a mastery climate is focused on past and present levels, which supports the interest of learning. Jagacinski and Nicholls (1987) found that the absense of social comparison is associated with greater feelings of competence and high effort. When students perceive that effort is valued, mistakes are part of learning, the focus is on self-improvement, and effective learning and problem solving strategies are employed, they demostrate better recall, and exhibit a focus on mastery rather than performance goals.

Epstein (1988) notes that evaluation should be geared toward individual progress and mastery. Instructors can achieve this by utilising individual progress criteria, improvement, and mastery; feedback; student self-evaluation, making the evaluation private and meaningful; and presenting reasonable opportunities for students to experience success from their efforts.

According to Ames (1992b) the time dimension refers to the workload, adequacy, pace of instruction, and learning task time. Instructors should provide flexible schedules for students providing them with sufficient instructional- and assignment time. This respects the students' learning pace (Ames, 1992a; Epstein, 1989). Providing opportunities and time for improvement, and helping students to establish work and practice schedules, will promote the adoption of a mastery goal orientation.

The *Checklist for an Ethical and Achieving Classroom* has eight categories of which a mastery atmosphere is considered to be one (Narvaez, 2008). Mastery atmosphere is defined as "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 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 student skills, etc.

For the purpose of this study, *promoting a mastery climate* is defined as *instructional behaviours that emphasise learning, understanding, and personal improvement rather than focussing only on normative comparison.*

Numerous studies suport 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 students (Biddle, 2001, as cited in Solmon, 2006). Koskey, Karabenic, Wooley, Bonney, and Dever (2010) state that classrooms with a combination of the TARGET characteristics are consistently found to relate to adaptive academic behaviours and outcomes that include persistence at tasks, effort attributions for success and failure, task interest, deep processing, self-regulated studying, and adaptive help-seeking behaviours. Several studies have demonstrated how these structures can be implemented in a physical education setting (Valentini & Rudisill, 2004a, 2004b; Valentini, Rudisill, & Goodway, 1999a, 1999b). Such a mastery orientation intervention has been found to enhance students' cognitive and affective responses (Morgan & Carpenter, 2002; Solmon, 1996).

Smith, Smoll, and Cumming (2007) examined the effect of a cognitive-behavioural intervention designed to promote a mastery climate on changes on male and female athletes' cognitive and somotic performance anxiety over the course of a baseball season. Hierachical linear modelling analysis revealed that athletes in the intervention condition perceived their coaches as being more mastery-involving when compared to athletes in the untreated control condition. The intervention, named the mastery approach to coaching (MAC), involved coaches attending a workshop in which a mastery climate was explicitly described, its creation was strongly recommended, its benefits were discussed, desirable and undesirable methods of responding to specific situations were demonstrated, and role play was utilised.

Morgan, Sproule, and Kingston (2005) suggest that in order to foster a mastery motivational climate and reduce behaviours that lead to a performance focused climate, instructors should use a more student-centred teaching style rather than a traditional teacher-centred practice style. The TARGET struture represents such student-focused rather than instructor- focused teaching strategies. However, Morgan, Sproule, Weigand, and Carpenter (2005) caution that instructors implementing strategies that contribute to a mastery climate do not necessarily translate into students perceiving a mastery climate. Teachers should thus consider their students' perceptions and how they perceive the instructional environment. Moreover, Morgan et al. (2005) state that different students may perceive the same instructor behaviours differently.

Uncertainty also remains as to whether the TARGET structures interact in an additive or multiplicative way. If the structures are additive, a low mastery focus in one structure can be compensated for by the strenghts in another structure. If the structures are multiplicative, they cannot compensate for each other. Morgan et al. (2005) have suggested that an additive relationship exists between the TARGET structures and that the recognition and evaluation structures have the greatest impact upon perceptions of climate.

Hypothesis 15: Promoting a mastery climate is hypothesised to positively influence mastery classroom goal structure.

2.6.8 Clarifying learning conceptions and requirements

Students' conceptions of learning affect their approaches to learning (Biggs, 1999) which, in turn, affect their learning outcomes (Trigwell & Prosser, 1996). Devlin (2002) states that the challenge to instructors is to change the way some student currently and usually learn, and not to regard it as an impediment to teaching them. Targetting student conceptions of learning presents a valuable means to assist such change.

Devlin (2002) conducted a study to investigate students' conceptions of learning. The results indicated that many of the participants in the study view learning as a quantitive exercise accumulating facts and knowledge to be remembered and used in practice. Furthemore, participants indicated both directly and indirectly that they perceive a substantial amount of personal responsibility for their own learning. Devlin (2002) argued, however, that students in the study were taking personal responsibility for a quite particular, limited, sort of learning. She found that personal responsibility for contributing to the accumulation and memorisation of quantitive knowledge, facts, and procedures was perceived to be related primarily to practice within a particular industry or vocational area.

The results of Devlin's study indicate that students may, even when they accept personal responsibility for learning, expect to be spoon fed facts and procedures. Students' conceptions of learning indicate they believe that learning is the accumulation and memorisation of facts and procedures and they expect to receive at least some of this knowledge from their teachers. Once they have it, it will be added and stored in memory, but only after they have been provided with it. According to Devlin (2002), despite evidence of perceived personal responsibility for learning, without the ability to conceive of learning as a qualitative process it would be very difficult for students to adopt study and learning practices that lead to high quality learning.

Evidence does exist that conceptions of learning can change. For example, car mechanics' conceptions of learning developed and became more complex over a period of time (Eklund-Myrskog, 1997). Eklund-Myrskog (1997) explained that students realise the importance of understanding at some point in time and that a "cognitive jump" (p. 313) then takes place. No evidence or explanation for this cognitive jump is provided nor does she elaborate on how it can be encouraged in other students. Devlin (2002) states that such change must be encouraged. Learning should be viewed as an active process in which instructors encourage students to discover principles and ideas for themselves through active dialogue, negotiation, and other methods, and in which the student constructs new concepts or ideas for themselves. In order to change personal conceptions of learning, instructors should engage students in constructing and adapting new conceptions that are relevant to their context (Angelo, 2000).

It is apparent that students should possess an accurate qualitative definition of learning, one which requires them to actively engage with the learning material in such a manner that their knowledge and skills can be applied to novel learning problems. Not only is an accurate perception of learning important, of equal importance is an accurate perception of their role as students in the learning process. Students' interpretation/understanding of learning will, consequently, affect the manner in which they approach their learning material.

The instructor can endorse an accurate conception of learning by communicating to students that learning is a process of actively constructing cognitive or intellectual meaning; a process of constructing mental models/images. Students should understand that learning involves creating meaningful structure in learning material and writing the obtained insights into knowledge stations. Learning should be understood as active problem solving (transfer) and information processing.

Instructors should further communicate to students that this understanding of learning implies that a specific type of interaction with the learning material is required (which involves asking questions about, spending time on, reflecting on, and reading more about the learning content). Students should accept the responsibility to create and/or find meaningful structure.

This interpretation of learning and the role of the student in learning is preferred over learning as pure memorisation with the objective of regurgitation. As discussed earlier, learning and the application of learning is essentially the same process. There exists a upward spiraling cyclical relationship between learning and application. Learning is problem solving (transfer) for problem solving (transfer). In order to be successful students and successful employees, there can be no division between classroom learning and action learning. If students fail to understand this, they will not be able to apply what has been learnt in the classroom in practice. Unless students have an appropriate understanding of the concept of learning and unless they become competent at learning in the true sense of the term, they will fail as students in the classroom and as job incumbents in the practical world of work.

An individual would have role clarity if they have a clear responsibility of their job, the actions needed to accomplish their responsibilities, and the consequences or evaluation of their performance to self and others (Kahn, Wolfe, Quin, Snoek, & Rosenthal, 1964). Students would be clear about this role if they know (1) what the expectations of the role set are; (2) what activities will fulfil the role responsibilities; and (3) what the consequences of role performance are to self and others. Zirbel (2006) states that one manner in which the instructor can deal directly with student misconceptions is to tell the students directly what the role of each party is in the learning process. However, merely telling students is not enough; students have to experience this for themselves. The instructor should thus model the appropriate behaviour and uphold the learning responsibilities of each party. Students need to experience the "confusion" that ultimately results in deep understanding.

There are four widely accepted dimensions of role ambiguity in the organisational literature which may be experienced by role incumbents and are based on the perspective of the role incumbent (Singh, Verbeke, & Rhoads, 1996; Sawyer, 1992; Bedeian & Armenakis, 1981). Responsibility ambiguity refers to what is expected and what should be done. Process ambiguity refers to the manner in which things are done, that is, the way to achieve organisational objectives. Priority ambiguity refers to the timing (when and in what order) of how things should be done. Behaviour ambiguity refers to how the role incumbent should act in various situations or what behaviours will lead to the desired outcomes.

Several researchers have included behaviour relating to the clarification of course objectives and requirements into their conceptualisation of teacher effectiveness. No competencies could be found regarding how to ensure that students' hold an accurate perception of learning and/or their role and responsibilities in the learning process. Feldman (1988) defined *Clarity of Course Objectives and Requirements* as how well the instructor organises the course, with clearly specified objectives, assignments, requirements and related aids, so that students know what is expected of them. Pinder and Das (1979) included the item "*the instructor's objectives for the course have been made clear*" in their input-output model of teaching effectiveness. The International Board of Standards for Training, Performance, and Instruction (IBSTPI) (Foxon, Richey, & Roberts, 2003) included the competency *establishes daily and academic term goals* in their model of trainer effectiveness. They defined the competency as the instructor preparing/following the syllabus and having goals for each class. Finally, Keeley et al. (2006) included the behaviour *respond appropriately to learners' needs for clarification or feedback* in their framework. It appears these behaviours are related more to how students should complete learning tasks, when certain tasks should be performed, and the criteria by which their performance will be judged, rather than addressing their learning-related conceptions.

The instructor should not only communicate an accurate conception of learning and students' role in learning; instructors should model behaviours and attitudes that promote learning. Instructors can achieve this by talking about their own learning; demonstrating an inquisitive nature; making their thinking process explicit; and modelling and encouraging enthusiasm, open-mindedness, curiosity and reflection.

For the purpose of this study, *clarifying learning conceptions and requirements* refers to *behaviours promoting accurate conceptions of learning, accurate role perceptions, and clarity with regard to objectives, assignments, and requirements.*

Limited research exists on the effect of instructional behaviour on student role clarity. One study found a positive relationship (.614) between initiating leadership teaching-style and student role clarity (Scribd, 2008). The organisational literature appears to have more studies involving leader behaviours and subordinate role clarity. Churchill et al. (1985) found role perceptions to be better predictors of performance than any other predictor. Teas (1983) found sales supervisory behaviour to be related to sales force perception of role clarity. Similarly, Kohli (1985) and Shoemaker (1999) found several leadership practices related to the role clarity, self-efficacy, job satisfaction, and motivation of salespeople. Role ambiguity (the opposite of role clarity) has been found to have a significant negative effect on work satisfaction (Johnston, Parasuramn, & Futrell, 1989; Fry, Futrell, Parasuraman, & Chmielewski, 1986; Behrman & Perreault, 1984; Teas, 1980).

Hypothesis 16: Clarifying learning conceptions and requirements is hypothesised to positively influence accurate role perceptions.

2.6.9 Enhancing student self-efficacy

According to Bandura (1995) individuals differ in the areas of life in which they cultivate their sense of efficacy. Instructors should have some knowledge of their students' perceived strengths and weaknesses in learning in general, as well as specific learning tasks. Academic self-efficacy refers to students' belief that they can successfully execute the actions needed to produce a desired academic outcome. It involves an individual's beliefs about their capability to effectively learn or perform academic tasks.

Self-efficacy beliefs are developed by four sources, namely mastery experience, vicarious experience, verbal persuasion and physiological state (Alderman, 1999; Bandura, 1986; Dweck & Leggett, 1988; Maehr & Pintrich, 1997).

Mastery experience is considered to be the most influential source affecting self-efficacy beliefs. It refers to the subjective evaluation by a student of their past experience concerning a particular task or skill. Mastery experience results in two possible outcomes that influence self-efficacy: the perception of success or the perception of failure. An individual's sense of self-efficacy increases when the outcome achieved is considered to be a success. In contrast, when an outcome is considered a failure it lowers an individual's sense of self-efficacy. This plays a significant role in future successes - especially if failure occurs early in the learning experience and is attributed to an internal-unstable factor. If students have been successful at a particular skill in the past, they will probably believe that they will be successful at the skill in the future (Alderman, 1999). The proverb "nothing breeds success like success" is particularly true when it comes to developing self-efficacy (Siegle & McCoach, 2007).

The second type of experience affecting self-efficacy beliefs is vicarious experience, or observing others performing a task. When an individual is "observing others that are perceived to be similarly competent fail despite high effort it lowers observers' judgments of their own capabilities and undermines their efforts (Bandura, 1986, p. 399)". Self-efficacy gained through observation is less stable than that gained through mastery experience. Schunk (1989b) found that once strong self-efficacy is developed from one's own personal successes, an occasional failure may not have negative effects; however, self-efficacy based on observing others succeed will diminish rapidly if observers subsequently have unsuccessful experiences of their own.

The effect of this experience is not as strong as the mastery experience, nevertheless, it can still be utilised as a useful instructional tool. Schulze and Schulze (2003) state that some factors may make students more sensitive to the influence of vicarious experience, such as uncertainty about one's capabilities, lack of prior experience with a subject, and the criteria by which the ability is evaluated. In classrooms, performance is often evaluated in terms of social criteria, making social comparative information salient in self-efficacy appraisals. This is evidenced by the fact that students often express relief when they know they are not the only ones who are having difficulty with a specific skill or concept.

Verbal persuasion, or verbal judgments, is defined as comments by significant others that develop beliefs in self-efficacy (Bandura, 1986; Alderman, 1999). According to Bandura, verbal persuasion "can contribute to successful performance if the heightened appraisal is within realistic bounds" (p.400). Positive comments are less effective in increasing self-efficacy than negative comments are in decreasing self-efficacy (Alderman, 1999). Instructors often emphasise students' weaknesses in order to justify the marks deducted from their grade when they provide students with feedback. This can often result in students feeling negatively about their ability to perform a given task. Instructors should rather point out possible developmental areas and give students clear, concise feedback about what they need to do to continue this improvement and ultimately master the skill they are attempting to learn.

The physiological state of students can also affect their self-efficacy. For example, feelings of anxiety, fear, fatigue, or pain can negatively affect student self-efficacy beliefs (Bandura, 1997). Anxiety can interfere with students' self-efficacy, ultimately interfering with student performance. As such, a student that is attentive and engaged in class and studies diligently can perform poorly in evaluations if they experience severe test anxiety. Instructors can decrease test anxiety and help increase student self-efficacy and thus improve their concentration and performance (Schulze & Schulze, 2003).

Students use the four sources of information mentioned above to judge their capability to complete future tasks (Siegle & McCoach, 2007). Instructors can design instructional presentations and interactions that capitalise on the influence of these sources (Margolis & McCabe, 2006; Schunk, 1989a). Alderman (1999) has proposed several strategies that can increase students' academic self-efficacy including modelling, sharing of self-efficacy stories, constructive feedback, goal-setting, rewards, and estimating student self-efficacy by using a scale. A brief description of the various strategies will follow.

Modelling, or vicarious experience, is exhibited in the classroom as a process involving the demonstration and description of the process of mastering a new skill to a novice. Schunk (1989b, 1991) notes it is an effective method to increase self-efficacy as it provides explicit information about how to acquire a skill and can raise the students' expectation that they can master the skill. In the context of the classroom, the model can either be a mastery model or a coping model (Schulze & Schulze, 2003). The former refers to a person that is an expert at the task, while the latter refers to a person who may still experience some difficulty with the task but is able to teach and demonstrate the task successfully to someone who is just acquiring the skill. Both types of models are good to observe, and both should be used in the classroom at opportune times.

Fellow students and instructors can serve as both mastery and coping models. According to Alderman (1999), doing a task with a more capable peer can lead to task accomplishment. This might be due to the fact that peers are often more able to assess what sort of explanation another student would understand best (Schunk, 1989b). Instructors who are experts in their field are frequently unable to relate to a novice's point of view and therefore find it more difficult to explain concepts in simple terms that students can understand.

A cooperative and respectful classroom atmosphere is imperative if fellow students are to serve as effective coping models (Schulze & Schulze, 2003). Instructors often encourage competition through rewards, grading practices, or other means of normative comparison. Although the purpose of such practices is to incentivise students to achieve, they often have counterproductive effects. In a competitive classroom environment, there exists little incentive for competent students to provide assistance to fellow students that are struggling with a concept or assignment. Students may wish for the poor performance of their peers as this will enable them to appear superior in contrast. However, when a cooperative atmosphere is encouraged, peers can act as mentors and effective coping models. This cooperative atmosphere should be supported by a mastery classroom goal structure in which activities and teaching practices stress individual accomplishment and improvement rather than normative comparison.

The instructor can also play the role of coping model (Schulze & Schulze, 2003). This is achieved by commencing with the demonstration of a task or skill and intentionally displaying some difficulty at first. The instructor can then correct themselves and relate the process to the students who may encounter the same difficulties. More capable students who have mastered the task or skill can employ the same strategy. Alternatively, the skill or task can be displayed by the instructor or a more competent peer by correctly performing the task or skill as an expert or mastery model.

Instructor feedback can be utilised as a strategy to increase academic self-efficacy. Certain types of feedback can have a significant effect on students' perceptions of their own effort and ability. Attribution theory states that effort and ability are both internally perceived causes (Weiner, 1979). Instructors can help students to understand the relationship between effort and ability (Good & Brophy, 1994). Schunk (1984) found that successful students, who received positive feedback on their ability rather than their effort, developed higher self-efficacy and learning. Studies suggest instructors encourage students to use effort as an explanation for failure and ability as an explanation for success (Schunk 1989a, 1984). Such feedback is more effective when it is provided early in the student's performance.

It appears that the nature of the feedback and the manner in which it is delivered is also important. Students perceive unsolicited advice or assistance from instructors as a signal of low ability (Zimmerman & Martinez-Pons, 1990). Students receiving help consider themselves to be less capable and students observing them make the same inference (Graham & Barker, 1990). Similarly, expressions of sympathy after a substandard performance, or praise after an easy task, function in a similar manner. Siegle and McCoach (2007) suggest that for optimum effects, instructors should: 1) help students to practice lack-of-effort explanations when they perform poorly; 2) call attention to student ability when students succeed at meaningful and reasonably difficult tasks; and 3) be careful about offering unsolicited help and targeting only low achievers for help. Instructors should make an effort to give students clearly defined assignments and clearly articulated constructive feedback (Schraw, Dunkle, & Bendixen, 1995). Schraw and Brooks (2001) state that giving students clear and constructive feedback may be the most overlooked instructional strategy.

Goal setting can enhance academic self-efficacy (Bandura, 1986; Schunk, 1989b). Students can sometimes be unaware of the progress they are making or of their abilities. Goals function as a standard against which they can estimate their progress. When individuals can easily determine their progress against a goal, their perception of improvement increases their self-efficacy. However, in order to ensure student goal achievement, instructors should see to it that students' goals are proximal and not distal (Schulze & Schulze, 2003). Proximal goals can easily be reached but are still challenging. Furthermore, goals that include specific performance standards are more likely to increase self-efficacy than more general goals (Siegle & McCoach, 2007). Progress towards explicit goals is easier to evaluate. Specific goals lead to higher levels of performance than non-specific goals across a variety of incentive conditions, and students who are given specific goals maintain those higher levels even when incentives are withdrawn (Rosswork, 1977).

Research on goal-setting and self-efficacy suggest that teachers can improve student self-efficacy by assisting students in establishing and measuring goals (Siegle & McCoach, 2007). Instructors can: (1) let students decide how to break up larger goals into smaller, attainable ones; (2) state goals, and have students state goals, in terms that are sufficiently clear to avoid any ambiguity when assessing progress at a later stage; and (3) ensure that instructor-set goals are challenging and adapting these goals when students appear to be under- or over challenged.

Rewarding students is another method that has been utilised to increase student self-efficacy. Alderman (1999) states using rewards is considered to be the least effective method for enhancing student self-efficacy. Rewards include the use of praise or assigning enjoyable in-class assignments (Schulze & Schulze, 2003). Rewarding students as a group, rather than on an individual basis is considered to be more effective. Group rewards will assist in creating a more cooperative atmosphere which is imperative if peers are to serve as effective models.

Siegle and McCoach (2007) also discuss a number of strategies instructors can use to enhance student self-efficacy. They propose the following strategies: (1) reviewing lesson accomplishments from the previous day, posting the current lesson's objectives prior to instruction, and reviewing lesson objectives at the end of the lesson; (2) asking students to record something new they learned or something at which they excelled in their dairy on a daily basis; 3) encouraging students who perform poorly to attribute their failures to lack of effort and encouraging them to try harder; 4) drawing students' attention to their growth and complementing them on their specific skills; and 5) employing fellow students as peer or mastery models.

For the purpose of this study, *increasing 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*.

The above discussion clearly indicates that various instructional behaviours and strategies have a significant effect on students' academic self-efficacy. A multitude of studies have found that modifying instructional techniques increases self-efficacy (Meece et al., 1988; Wood & Locke, 1987; Schunk & Hanson, 1985; Bandura & Schunk, 1981; Dweck, 1975). Siegle and McCoach (2007) found that teachers can modify their instructional strategies with minimal training and effort, and this can result in the increased self-efficacy of their students.

Trainer-instructors have a major influence on the learning experience of students. Trainer-instructors can control information, provide or withdraw their support, provide extra resources and provide learning opportunities. Trainer instructors, as thought-leaders in the classroom, role model appropriate behaviour to their students. If the students identify with the trainer instructor as a role model, the trainer-instructor is perceived in a positive light (Bandura, 1986). Through the development of self-efficacy, they are empowered to achieve the thought-leader's vision (Kirkpatrick & Locke, 1996; Yukl, 1998). According to Eden (1992) leadership is the mechanism through which leaders raise follower self-efficacy which, in turn, increases performance.

Hypothesis 17: Enhancing student self-efficacy is hypothesised to positively influence academic self-efficacy.

The foregoing theoretical argument logically culminates in the learning potential structural model depicted below in Figure 2.6.

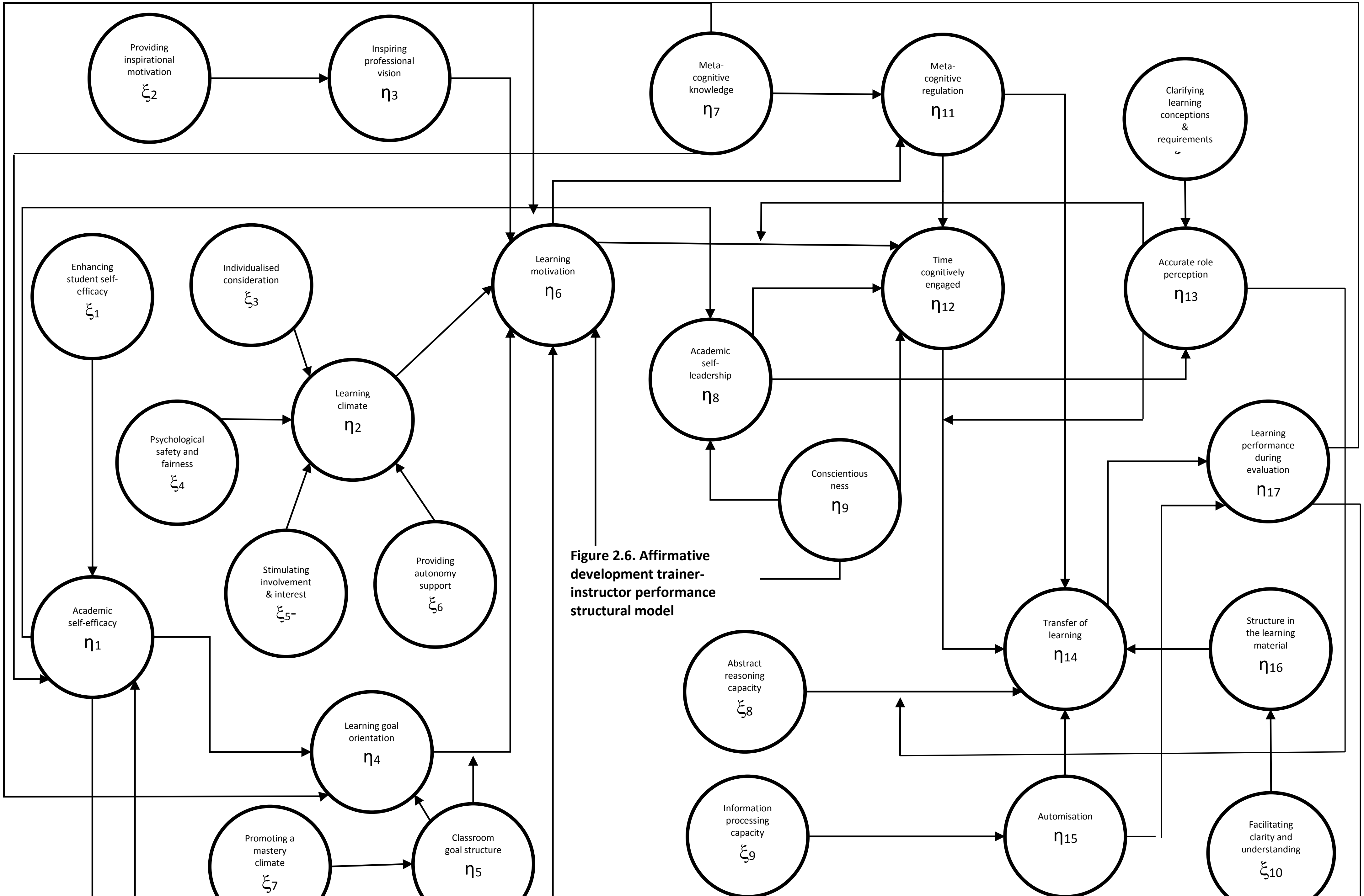

Figure 2.6. Affirmative development trainer-instructor performance structural model

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this study was to investigate the research question "*Why is there variance in the performance of affirmative development trainer-instructors? What constitutes trainer-instructors' competencies, what are the training outcome latent variables these competencies are meant to achieve, and how are these competencies and outcomes related?*"

In order to answer the research initiating question, theorising was utilised to develop a structural model. The model identified and depicts the hypothesised critical trainer-instructor competencies that influence the trainer outcome latent variables and the manner in which these competencies and trainer outcome latent variables combine to *trainer-instructor performance*.

The affirmative development trainer-instructor performance structural model complements the existing De Goede (2007), Burger (2012) and Van Heerden (2013) learning potential structural model. If empirical support for the hypothesised structural linkages can be obtained, the model will prove valuable in assisting the human resource function in improving the success of affirmative development interventions to the extent that it provides a valid account of how trainer-instructors can influence and optimise the psychological process underlying student learning performance.

Babbie and Mouton (2001) state a structural model can be considered valid (or permissible) to the extent that the model closely fits the available empirical data. Research methodology serves the epistemic ideal through two characteristics, namely objectivity and rationality (Babbie & Mouton, 2001). Objectivity refers to the scientific method's deliberate, explicit focus on the reduction of error. A number of critical points exist in the process of testing the validity of the explanatory structural model where the epistemic ideal runs the risk of derailing. Appropriate steps needed to be taken at these points to maximise the likelihood of valid findings. Scientific rationality refers to the scientific method's insistence that the validity of research findings should be critically evaluated by knowledgeable peers. This is done by evaluating the methodological rigour of the process that was used to arrive at the conclusions.

To allow this process to operate, however, requires a detailed description and a thorough motivation of the methodological choices that were made at the various critical choice points in the method. In this chapter the substantive research hypotheses, the research design, statistical hypotheses, statistical analysis techniques, sampling design and measuring instruments are discussed.

3.2 Substantive research hypotheses

The objective of the research was to identify the competencies and training outcomes that constitute affirmative development trainer-instructor performance and to identify how these competencies and outcome latent variables are causally related. Furthermore, the trainer-instructor performance model was causally linked to the learning performance structural model of De Goede (2007), Burger (2012) and Van Heerden (2013). The literature study culminated in an affirmative development trainer performance structural model depicted in Figure 2.6.

The structural model depicted in Figure 2.6 includes the latent variables encompassed in the De Goede (2007), Burger (2012), and Van Heerden (2013) model. Transfer and automisation are also included in this model, however, it was argued earlier that operationalising these latent variables will present several logistical problems (Van Heerden, 2013). The same problem in measuring these variables, as described by Van Heerden (2013), applied to this particular study.

In the classroom, students transfer specific crystallised abilities (developed through prior learning) onto novel learning problems comprising the curriculum. The meaningful structure that the learner finds in the learning material needs to be automated. The actual *transfer* that takes place in the classroom and the subsequent *automisation* of the derived insight determines *learning performance during evaluation*. Operational measures of *transfer* and *automisation* comprising *learning performance in the classroom* thus needs to be specific to the learning material relevant to the specific training procedure utilized in the empirical testing of the structural model, and as dynamic measures they will have to be integrated into the training programme (Van Heerden, 2013). *Transfer* and *automisation* as learning competencies, have to be measured by observing these processes in action over time. As such, students will have to be evaluated in terms of the extent to which they solve/make sense of/find structure in novel learning problems/material that they are confronted with in class and how they utilise the solution to make sense of subsequent problems in the classroom. Furthermore, students also need to be evaluated in terms of how these insights are automated to knowledge stations.

The above problem appears to be particularly logistically/practically challenging. This suggests the need to delete *transfer* and *automisation* from the revised model that is empirically tested as separate latent variables. The suggested deletion of the variables can be ascribed to the questionable utility of investing significant resources in overcoming the logistical challenges associated with the development and implementation of suitable measures of classroom *transfer* and *automisation* but with virtually no subsequent practical value. The suggested deletion of the variables should not be ascribed to the questionable theoretical relevance of these learning competencies. The deletion of *transfer* and a*utomisation* automatically implies the deletion of *information processing capacity* and *abstract reasoning capacity* as the latter two variables only influence the former two variables.

When conducting research, one also needs to consider the burden the study poses to participants in terms of questionnaire length and cognitive load. When the completion of a questionnaire becomes too taxing - in terms of time and the cognitive energy exerted - participants are likely to become fatigued, which could result in errors or response bias. For this reason, the hypothesised trainer-instructor performance model needed to be reduced. It was, subsequently, decided that the first-generation affirmative development trainer performance structural model included competency potential latent variables that could be directly influenced by the competencies of the trainer and the trainer outcome latent variables related to those student competency potential and trainer competency latent variables. The influence of trainer competencies flows through the trainer outcomes and the student competency potential latent variables, to the student learning competencies, and finally to learning performance. The effect of trainers' behaviour should, consequently, be more direct on student competency potential latent variables than student learning competencies. Since it is not practically possible to test the fully-fledged structural model, it seemed logical to test the section of the model that focuses on the proximal influence of trainer behaviour on the student, rather than focussing on the distal influence[12].

The following latent variables were, subsequently, excluded from the first-generation testing of the model: *learning performance during evaluation; facilitating clarity and understanding; structure in the learning material; clarifying learning conceptions and requirements; accurate role perception; time cognitively engaged; conscientiousness; academic self-leadership; meta-cognitive regulation; meta-cognitive knowledge.*

The reduced affirmative development trainer-instructor performance model is shown in Figure 2.7.

The overarching substantive hypothesis of this study was that the affirmative development trainer performance structural model depicted in Figure 2.7 provides a valid description of the manner in which the trainer-instructor competencies would affect the outcomes that influence the level of classroom learning performance of the learner. The overarching substantive research hypothesis (*Hypothesis 1*) can be dissected into the following 14, more detailed, specific direct effect substantive research hypotheses[13]:

Hypothesis 3: In the proposed trainer-instructor performance structural model it was hypothesised that *enhancing student self-efficacy* positively influences *academic self-efficacy.*

[12] This decision should, however, not lead to the criticism that the research study should have been more carefully and more clearly delineated at the outset of the study. The level of the learning performance achieved by learners on an affirmative development programme is determined by a complex nomological network of latent variables. A valid stance of the manner in which latent variables structurally combine to affect learning performance is a prerequisite for the purposeful and rational derivation of interventions that can be expected to improve learning performance. Explanatory research is not conducted to test hypotheses on relations between latent variables. There is no particular value in establishing whether two (or more) latent variables that have not been studied before (or have not been studied before in a particular context) are related. Explanatory research (in this specific context) is conducted to obtain a valid insight in the psychological mechanism that determines the level of learning performance a learner achieves. Starting the research process with a research problem in the sense of a question about the nature of the relationship between two or more latent variables, or starting the research process with a pre-selected set of latent variables, will unlikely bring a penetrating insight in the complex nomological net underpinning employee performance.

[13] Due to the reduction of the structural model the numbering of the hypotheses as set out in Chapter 2 does not correspond to the numbering of the substantive (and statistical) hypotheses as set out in Chapter 3. Furthermore, the numbering of the substantive hypotheses reflect the fact that the exact and close fit null hypotheses will also be tested with regards to the measurement and structural model.

Hypothesis 4: In the proposed trainer-instructor performance structural model it was hypothesised that *academic self-efficacy* positively influences *learning motivation*

Hypothesis 5: In the proposed trainer-instructor performance structural model it was hypothesised that *learning climate* positively influences *learning motivation.*

Hypothesis 6: In the proposed trainer-instructor performance structural model it was hypothesised that *individualised consideration* positively influences *learning climate.*

Hypothesis 7: In the proposed trainer-instructor performance structural model it was hypothesised that *fostering psychological safety and fairness* positively influences *learning climate.*

Hypothesis 8: In the proposed trainer-instructor performance structural model it was hypothesised that *stimulating involvement and interest* positively influences *learning climate.*

Hypothesis 9: In the proposed trainer-instructor performance structural model it was hypothesised that *providing autonomy support* positively influences *learning climate*

Hypothesis 10: In the proposed trainer-instructor performance structural model it was hypothesised that *providing inspirational motivation* positively influences *inspiring professional vision.*

Hypothesis 11: In the proposed trainer-instructor performance structural model it was hypothesised that *inspiring professional vision* positively influences *learning motivation.*

Hypothesis 12: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery goal orientation* positively influences *learning motivation.*

Hypothesis 13: In the proposed trainer-instructor performance structural model it was hypothesised that *academic self-efficacy* positively influences *mastery goal orientation*

Hypothesis 14: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery goal structure* positively influences *mastery goal orientation*

Hypothesis 15: In the proposed trainer-instructor performance structural model it was hypothesised that *promoting mastery classroom goal structure* positively influences *mastery goal structure.*

Hypothesis 16: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery classroom goal structure* moderates the effect of *mastery goal orientation* on *learning motivation.*

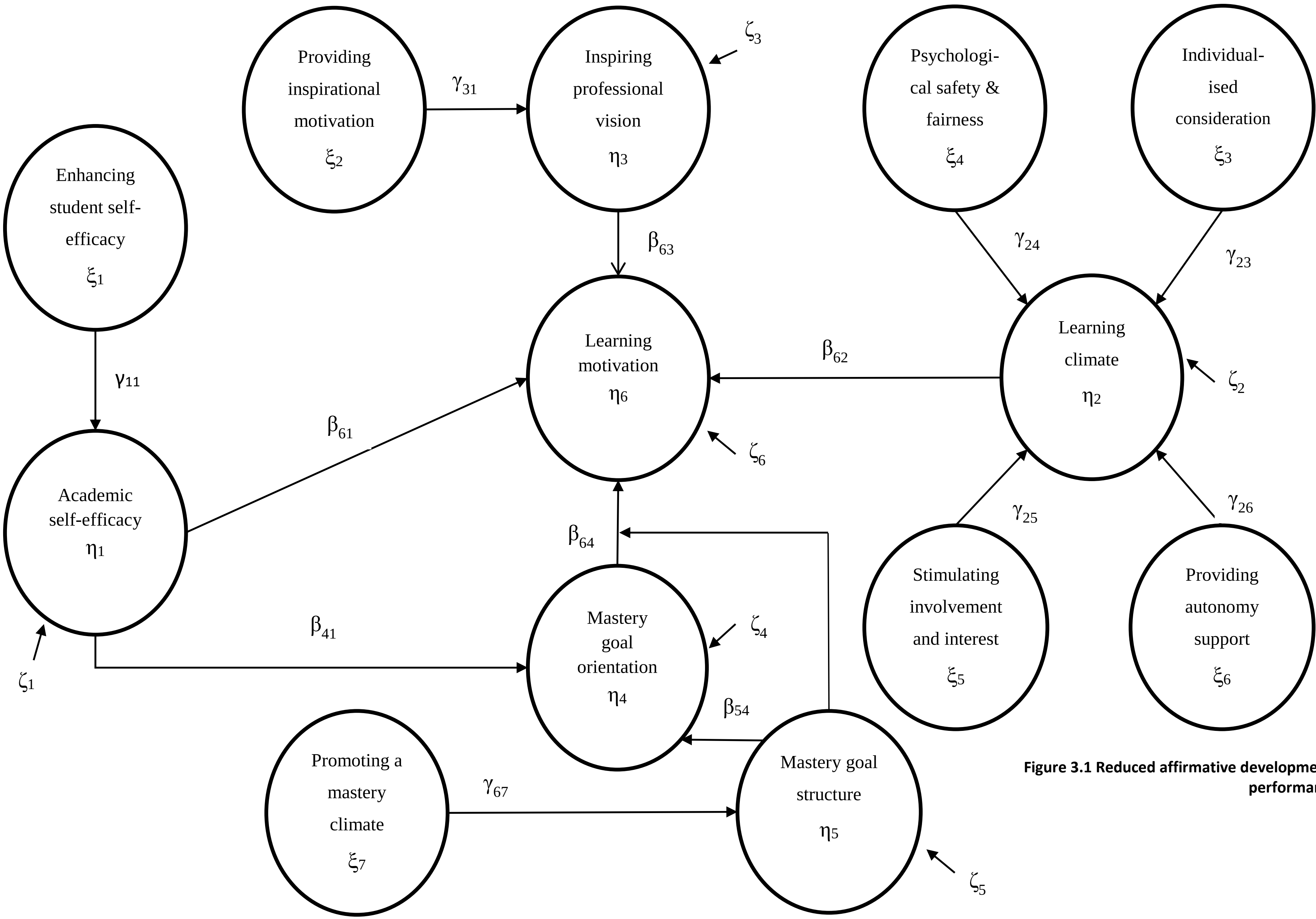

Figure 3.1 Reduced affirmative development trainer-instructor performance structural model

3.3 Research design

The overarching substantive research hypothesis makes a specific claim with regard to the affirmative development trainer-instructor performance structural model. The affirmative development trainer-instructor performance structural model, as depicted in Figure 2.7, hypothesises specific structural relations between the various trainer competencies and trainer outcomes latent variables. A plan or strategy was needed to empirically test the validity of the overarching substantive hypothesis and the validity of the various path-specific substantive research hypotheses. The research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance (Kerlinger, 1973). Likewise, Babbie and Mouton (2001) define the research design as the plan or structured framework of how the researcher intends to conduct the research process in order to solve the research problem – it can therefore be considered as a blueprint of how the research will be conducted. The extent to which the research design can maximise systematic variance, minimise error variance, and control extraneous variance (Kerlinger, 1973; Kerlinger & Lee, 2000), will ultimately determine the unambiguousness of the empirical evidence collected.

Two broad types of research designs can be distinguished: experimental and *ex post facto* research designs (Kerlinger, 1973). An *ex post facto* research design is a systematic empirical inquiry in which the researcher does not have direct control of independent variables as their manifestations have already occurred or because they inherently cannot be manipulated (Kerlinger & Lee, 2000). In contrast, an experimental research design is characterised by the researcher manipulating and controlling one or more independent variables and observing the dependent variable or variables for variation concomitant to the manipulation of the independent variable. An e*x post facto* research design does not allow for experimental manipulation and random assignment. In the experimental case the researcher has manipulative control over at least one of the active variables (Kerlinger, 1973). In the former case the design endeavours to discover what happens to one variable when the other variables change. Inferences about the hypothesised relation existing between the latent variables are made from concomitant variation in independent and dependent variables (Kerlinger & Lee, 2000).

It is imperative that researchers have a balanced understanding of the strengths and weaknesses of *ex post facto* and experimental designs. Kerlinger (1973) states that in addition to the limitation of *ex post facto* designs not being able to manipulate independent variables, they are also characterised by a lack of power to randomise, and by the risk of improper interpretation.

With regard to the second limitation: both experimental and *ex post facto research* allow for the possibility to draw subjects at random. In *ex post facto* research, however, the researcher cannot employ the assignment of subjects to groups at random or the assignment of treatments to groups at random. As such, the researcher employing an *ex post facto* research should be aware of the possible influence of self-selection bias, whereby subjects "select" themselves into groups on the basis of characteristics other than those the researcher are interested. Experimental research, on the other hand, allows the researcher to exercise control by randomisation. Subjects can be assigned to groups at random or treatments can be assigned to groups at random.

The third limitation, risk of improper interpretation, 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 do not imply causation.

Despite the various limitations associated with *ex post facto* research, it remains a valuable research design. This is due to the fact that the nature of research problems, especially in psychology and education, do not lend themselves to experimental inquiry, as the variables considered in these studies cannot always be manipulated. As such, this study employed an *ex post facto* approach, due to the fact that the nature of the variables considered in this study do not lend themselves to manipulation. More specifically, an *ex post facto* correlational research design in which each latent variable in the reduced structural model (shown in Figure 2.) is operationalised in terms of at least two or more indicator variables (assuming in total p exogenous indicator variables and q endogenous indicator variables) was utilised to test the overarching and specific substantive research hypotheses.

The *ex post facto* correlational design requires measures on the p exogenous indicator variables and the q endogenous indictor variables across n observations. Diamantopoulos and

Siguaw (2000) state that at least two indicator variables per latent variable are required to ensure the comprehensive LISREL model is identified. Measures are obtained on the observed variables and the observed ([(p+g) x (p+q)]/2) covariance matrix is subsequently calculated, reflecting the variance in and covariance between the indicator variables. Estimates for the freed parameters in the comprehensive LISREL model are obtained in an iterative fashion with the objective of reproducing the observed covariance matrix as closely as possible (Diamantopoulos & Siguaw, 2000). The comprehensive LISREL model essentially represents a hypothesis on the nature of the process that produced the variances in and covariances between the indicator variables. If the fitted model fails to closely reproduce the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Kelloway, 1998), it follows that the affirmative development trainer performance structural model does not provide an acceptable explanation for the observed covariance matrix. As such, the structural relationships hypothesized by the model do not provide an accurate account of the process determining the level of the trainer-instructor’s job performance. The opposite, however, is not true. If the fitted covariance matrix derived from the parameter estimates obtained for the comprehensive LISREL model closely agrees with the observed covariance matrix it does not mean that the process portrayed in the structural model necessarily produced the observed covariance matrix. The latter outcome would therefore not warrant the conclusion that the process depicted in the structural model must necessarily be the one that operates to determine the level of job performance that trainers achieve. A close fitting model (that is, a high degree of fit between the observed and estimated covariance matrices) only implies that it is permissible to interpret the statistical significance and magnitude of the estimated path coefficients. This also means that the part of the structural model that receives support can be regarded as one plausible account of the process that determines the level of performance that trainers achieve.

A close fitting model therefore implies that the statistically significant paths in the model provide a valid account of the process determining trainer performance (Babbie & Mouton, 2001). This conclusion can only really be justified if prior evidence exists that the measurement model fits closely.

3.4 Statistical hypotheses

The appropriate format of the statistical hypotheses is determined by the manner in which the proposed research design intends to evaluate the validity of the proposed structural model, as well as the nature of the envisaged statistical analyses. Structural equation modelling was utilised to evaluate the validity of the proposed structural model via the *ex post facto* correlational design. The affirmative development trainer performance structural model comprises of numerous exogenous and endogenous latent variables and the model proposes causal paths between these latent variables. Structural equation modelling is the only analysis method that enables the testing of the proposed structural model as an integrated, complex hypothesis. A significant amount of meaning would be lost if a series of multiple regression analyses were used to test the proposed paths, as it would require the model to be dissected into as many sub-models. The explanation as to why trainer-instructors vary in the level of job performance achieved is not located in any specific point in the structural model; rather it is contained in the whole network of relationships between the latent variables. The subsequent hypotheses were formulated using the conventional LISREL notational system (Du Toit & Du Toit, 2001; (Jöreskog & Sörbom, 1999; 1996a; 1996b).

To estimate the hypothesised model's fit, the extent to which the model is consistent with the obtained empirical data was tested. An exact fit null hypothesis and a close fit null hypothesis was tested in order to determine model fit (Diamantopoulos & Siguaw, 2000).

The overarching substantive research hypothesis claims that the affirmative development trainer-instructor performance structural model provides a valid portrayal of the process that determines the level of affirmative development trainer job performance. Alternatively stated, the overarching substantive research hypothesis states that the structural model depicted in Figure 2.7 provides a valid account of the process that determines affirmative development trainer-instructor job performance. If the overarching substantive research hypothesis is interpreted to indicate that the structural model provides a perfect account of the manner in which trainer competency latent variables affect trainer outcomes and learning potential latent variables, the substantive research hypothesis translates into the following exact fit null hypothesis:

H_{02a}: RMSEA = 0[14]
H_{a2a}: RMSEA > 0

If the overarching substantive research hypothesis is taken to mean that the structural model provides an approximate account of the manner in which trainer-instructor competencies affect trainer outcome latent variables the substantive research hypothesis translates into the following close fit null hypothesis:

H_{02b}: RMSEA ≤ .05
H_{a2b}: RMSEA > .05

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

Hypothesis 3: In the proposed trainer-instructor performance structural model it was hypothesised that *enhancing student self-efficacy* positively influences *academic self-efficacy.*

H_{03}: $\gamma_{11} = 0$
H_{a3}: $\gamma_{11} > 0$

Hypothesis 4: In the proposed trainer-instructor performance structural model it was hypothesised that *academic self-efficacy* positively influences *learning motivation*

H_{04}: $\beta_{61} = 0$
H_{a4}: $\beta_{61} > 0$

Hypothesis 5: In the proposed trainer-instructor performance structural model it was hypothesised that *learning climate* positively influences *learning motivation.*

H_{05}: $\beta_{62} = 0$
H_{a5}: $\beta_{62} > 0$

[14] The numbering of the statistical hypotheses reflect the fact that exact and close fit null hypotheses will also be tested with regards to the measurement model to evaluate the success with which the latent variables in the affirmative development trainer-instructor performance structural model has been operationalised.

Hypothesis 6: In the proposed trainer-instructor performance structural model it was hypothesised that *individualised consideration* positively influences *learning climate.*

H_{06}: $\gamma_{23} = 0$
H_{a6}: $\gamma_{23} > 0$

Hypothesis 7: In the proposed trainer-instructor performance structural model it was hypothesised that *fostering psychological safety and fairness* positively influences *learning climate.*

H_{07}: $\gamma_{24} = 0$
H_{a7}: $\gamma_{24} > 0$

Hypothesis 8: In the proposed trainer-instructor performance structural model it was hypothesised that *stimulating involvement and interest* positively influences *learning climate.*

H_{08} $\gamma_{25} = 0$
H_{a8}: $\gamma_{25} > 0$

Hypothesis 9: In the proposed trainer-instructor performance structural model it was hypothesised that *providing autonomy support* positively influences *learning climate*

H_{09}: $\gamma_{26} = 0$
H_{a9}: $\gamma_{26} > 0$

Hypothesis 10: In the proposed trainer-instructor performance structural model it was hypothesised that *providing inspirational motivation* positively influences *inspiring professional vision.*

H_{010}: $\gamma_{32} = 0$
H_{a10}: $\gamma_{32} > 0$

Hypothesis 11: In the proposed trainer-instructor performance structural model it was hypothesised that *inspiring professional vision* positively influences *learning motivation.*

H_{011}: $\beta_{63} = 0$
H_{a11}: $\beta_{63} > 0$

Hypothesis 12: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery goal orientation* positively influences *learning motivation.*

H_{012}: $\beta_{64} = 0$
H_{a12}: $\beta_{64} > 0$

Hypothesis 13: In the proposed trainer-instructor performance structural model it was hypothesised that *academic self-efficacy* positively influences *mastery goal orientation*

H_{013}: $\beta_{61} = 0$
H_{a13}: $\beta_{61} > 0$

Hypothesis 14: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery goal structure* positively influences *mastery goal orientation.*

H_{014}: $\beta_{45} = 0$
H_{a15}: $\beta_{45} > 0$

Hypothesis 15: In the proposed trainer-instructor performance structural model it was hypothesised that *promoting mastery classroom goal structure* positively influences *mastery goal structure.*

H_{015}: $\gamma_{57} = 0$
H_{a15}: $\gamma_{57} > 0$

Hypothesis 16: In the proposed trainer-instructor performance structural model it was hypothesised that *mastery classroom goal structure* moderates the effect of *mastery goal orientation* on *learning motivation.*

H_{016}: $\gamma_{68} = 0$[15]
H_{a16}: $\gamma_{68} > 0$

[15] The effect of *mastery goal orientation* interaction effect is calculated as $\eta_4 * \eta_5$ and depicted as ξ_8.

3.5 Sampling

3.5.1 Sampling Considerations

This research study aims to enhance the effectiveness of HR interventions aimed at selecting and developing affirmative development trainer-instructors in order to ultimately facilitate the successful learning of relatively cognitively demanding learning material in affirmative development training in South Africa. The research is focused specifically on, and related to, successful learning amongst previously disadvantaged South Africans with learning potential. The target population of the study was therefore South African affirmative development training-instructors who present affirmative development programmes.

Burger (2012) and Van Heerden (2013) argued that the psychological dynamics underlying the learning performance of affirmative development learners do not differ from the dynamic underlying the learning performance of non-affirmative development learners. They also argued that that the psychological dynamics governing learning performance in affirmative development programmes do not differ substantially from those that govern learning performance in other teaching and training contexts. Similarly, given the fact that the affirmative development trainer performance model links to the learning potential model, it was also assumed that the psychological dynamics underpinning the job performance of affirmative development trainer-instructors do not differ from the psychological dynamics underpinning the job performance of non-affirmative development trainer-instructors. In other words, the same complex nomological network of latent variables that determine trainer job performance and student learning performance in affirmative development programmes is also at work determining trainer job performance and student learning performance of students in tertiary educational institutions. It is, however, probable that the level of latent variables may differ across different teaching and training contexts. Although Burger (2012) and Van Heerden (2013) evaluated their structural models on a sample of previously non-disadvantaged school learners, the current study empirically evaluate the structural model on a sample of previously disadvantaged learners who were enrolled for a (technical) training programme that would not necessarily qualify as an affirmative development programme. The sampling population was the population of South African trainer-instructors teaching at South African technical training colleges. Testing the validity of the affirmative development trainer performance model on the sampling population was, however, not practically feasible.

The rationale underlying sampling is to select a subset of individuals from the sampling population that are representative of the target population in the research study. This requires the operationalisation of the target population as a sampling population. According to Babbie and Mouton (2001) the sampling population consists of those final sampling units in the target population that have a positive, non-zero probability of being selected in the sample. A sample is regarded as representative to the extent to which it provides an accurate portrayal of the characteristics of the sampling population. Ideally, the sampling and target populations should coincide. This is, however, seldom the case in practice. The researcher should consequently aim to minimise the discrepancy between the target and sampling population (i.e. the sampling gap). In the case of this study, a sizable gab exists between the target and sampling population that necessitate caution when generalising the findings of the study to the target population.

De Goede and Theron (2010) state 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 was addressed from the perspective of structural equation modelling. SEM is a large sample technique (Kelloway, 1998). Three factors are usually considered in deciding on an appropriate sample size for a study utilising SEM: the ratio of sample size to the number of parameters to be estimated; statistical power; and practical and logistical considerations.

Kelloway (1998) suggests that sample sizes of 200 observations or more appears to be satisfactory for most SEM applications. Kline (2010), however, warns that model complexity and statistical power are factors that influence sample size requirements. Complex models require larger samples due to the fact that more parameters need to be estimated in order to ensure that the conclusions derived are reasonably stable. It would be unacceptable if the number of freed model parameters exceed the number of observations in the sample. Bentler and Chou (as cited in Kelloway, 1998, p. 20) recommend that the ratio of sample size to number of parameter estimated should range between 5:1 and 10:1. Jackson (cited in Kline, 2010, p. 12), on the other hand, proposes a rule-of-thumb of the N:q in determining the relation between sample size and model complexity when using maximum likelihood (ML) estimation. According to Jackson, researchers think about minimum sample size in terms of the ratio of cases (*N*) to the number of model parameters that require statistical estimates (*q*). When citing Jackson, Kline (2010) states that an ideal sample size-to-parameters ratio would be 20:1. Given the proposed structural model, the Bentler and Chou (as cited in Kelloway's, 1998) guideline warrants a sample of 445-890 research participants to provide a convincing test of the proposed affirmative development trainer performance structural model (89 freed parameters[16]). Based on the recommendation of Kline (2010) using Jackson's N:q rule, the appropriate sample sizes to investigate the proposed model, 1780 respondents would be appropriate to investigate the proposed structural model.

Statistical power refers to the conditional probability of rejecting the null hypothesis given it is false (P[reject H_0: S=S(Q)|H_0 false]) (Theron, 2011). From the perspective of SEM, statistical power is associated with the probability of rejecting the null hypothesis of close fit (H_0: RMSEA ≤ .05) when in fact it should be rejected.

If statistical power is excessively high, even a small deviation from close fit would result in a rejection of the close fit null hypothesis. Any attempt to empirically corroborate the validity of the model would then be futile. On the other hand, if statistical power is excessively low, the close fit null hypothesis would still not be rejected even if the model fails to fit closely. Failure to reject the close fit hypothesis under conditions of low power will then not deliver very convincing evidence on the validity of the model.

Item response theory was used as part of the item analysis performed on each subscale to screen items for inclusion in the item parcels that were used to operationalise the latent variables in the structural model. More specifically, the graded response model was applied to the data. De Ayala (2009) states that due to the interaction of the distribution of respondents across response categories as well as across items it is difficult to provide a guideline on required sample size that would be applicable to all situations. Reise and Yu (2006, as cited in Ayala, 2009) found that at least 500 respondents are required to achieve

[16] This calculation assumes that all latent variables will be operationalised by two indicator variables but for the interaction term that will be operationalised by four indicator variables.

adequate calibration with the graded response model. They utilised a 25-item instrument. According to Ayala, it may be anticipated that there is a sample size at which one reaches a point of diminishing returns in terms of improvement of estimation accuracy, for example a sample size of 1200. In this case, if a sample size ratio method is used to determine sample size (e.g. 5 persons per parameter), it is probably more useful to use a sample size closer to the lower bound than 1200. The sample suggestions are, however, tempered by the purpose of administration, the number of missing values, the estimation approach, the instrument's characteristics, and the use of a prior distribution to estimate alpha.

Practical and logistical considerations (e.g. cost, the availability of suitable respondents, buy-in and willingness from the employer to allocate the required number of employees to the research) can have a significant impact on decisions relating to sample size. Taking all three the above considerations into account it, a sample of minimum 500 research participants was selected for the purpose of testing the proposed learning potential structural model.

3.5.2 Choice of sampling method

Kerlinger (1973) categorises methods of sampling as either probability sampling procedures or non-probability sampling procedures. A detailed discussion of the two categories of sampling and each of their sub-categories with all the advantages and disadvantages is beyond the scope of this thesis. A brief discussion follows below, aiding the choice and critical evaluation of sampling methods used in this study.

Sampling aims to select a set of final sampling units (FSU) from a population in such a way that descriptions of the statistical characteristics of specific attributes of those sampling units accurately portray the parameters of the sampling population from which the FSU's are drawn (Babbie & Mouton, 2001).

Probability sampling enhances the likelihood of accomplishing this aim and also provides methods for establishing the degree of probable success. The total (sampling) population is known in probability sampling and each individual in the population has a specific non-zero probability of selection (Groves, et al., 2009). Furthermore, sampling is done by a random process based on probabilities. Simple random sampling, stratified sampling, cluster sampling and systematic sampling are all considered as probability sampling techniques.

Simple random sampling is a method of sampling in which one selects a sample from a population so that each member of the population has an equal and independent chance of being selected (Babbie & Mouton, 2001). Kerlinger (1973), however, states that a more correct definition would be that random sampling is the method of drawing a sample from a population so that all possible samples of fixed size *n* have the same probability of being selected.

Stratified sampling involves dividing the population into strata, such as: men and women, black and white, and the like, from which random samples are drawn (Babbie & Mouton, 2001). One does, however, need information on every element of the population frame in order for the elements to be divided into separate groups, or strata (Groves et al., 2009). Strata are mutually exclusive groups of elements on a sampling frame. Independent selections are then made from each stratum one by one. Separate samples are drawn from each such group, using either the same selection procedure or different selection procedures.

Cluster sampling is a sampling technique used when the statistical population consists of natural but relatively homogeneous groupings, for example: households (Groves et al., 2009). The total population is divided into the cluster and a random sample of the clusters (consisting of elements) is selected. The required information is collected only for the list of elements of selected clusters. This may be done for every element in these groups or a subsample of elements may be selected within each of these groups. Kerlinger (1973) states multi-stage cluster sampling is commonly used in surveys. Multi-stage sampling involves successive random sampling of units, or sets and subsets, for example: school districts can be randomly sampled, then schools, then classes, and finally pupils (Babbie & Mouton, 2001).

Systematic sampling is considered a simpler way to implement stratified sampling (Groves, 2009). In this method, a sample is selected by taking every k^{th} element in the population. It is executed by determining the population and sample sizes, and computing the sampling interval k as the ratio of population to sample size. The first sample element is randomly chosen in the first interval of length k and following on that every k^{th} FSU is selected from every interval. For example, if the element randomly selected from the elements through 10 is 6, then the subsequent elements are 16, 26, 36, etc. (Babbie& Mouton, 2001).

A non-probability sampling technique is used when the population is not completely known, the individual probabilities are not known, and the sampling method is based on factors such as common sense or ease, with an effort to maintain representativeness and avoid bias. Q*uota sampling* involves selecting sample elements that are considered to be representative, 'typical' and suitable for certain research purposes based on knowledge of strata of the population (e.g. sex, race, religion) (Babbie & Mouton, 2001). *Purposive sampling* is characterised by the use of judgment and a deliberate effort to obtain representative samples by including presumably typical areas or groups in the sample (Babbie & Mouton, 2001). *Accidental sampling (*also known as *convenience sampling)* involves the researcher taking available samples at hand (e.g. classes of seniors in high school, members of a specific department in an organisation, etc.) (Kerlinger, 1973). This is considered to be the weakest form of sampling, but is probably the most frequently used.

3.5.3 Sampling procedure

Although it was argued above that the value of the structural model does extend to all forms of formal training and teaching and is not restricted only to affirmative development candidates, it would, however, be deemed most appropriate to select a sample that only includes participants that qualify as affirmative development candidates. Furthermore, the ideal would be to select affirmative action candidates participating in an affirmative development programme. These programmes are, in reality, not easy to locate. Logistical and practical problems thus prevented finding a large enough sample of willing participants for this that qualified as affirmative development candidates, enrolled in an affirmative development training programme.

The logic of the preceding argument allowed the selection of a sample of affirmative development candidates not involved in affirmative development programmes. Consequently, the focus shifted to affirmative action candidates participating in tertiary (technical) education programmes that aim to train them for a specific vocation. Accidental sampling was used to select college students from a tertiary education college to participate in the study. The college is based in the Western Cape and consists of a socio-economically and racially diverse group of students. Institutional permission was obtained from the Department of Higher Education and Training. Informed consent was obtained from the students who participated in the study. Due to the non-probability sampling procedure that was used to select the sample, it cannot be claimed that the sample is representative of the sampling population. The substantial sampling gap between the target and sampling populations compounds the problem. It therefore also cannot be claimed that the sample is representative of the target population.

3.6 Data collection procedure

Data was collected over the course of two weeks by means of a paper-and-pencil format questionnaire. Research participants completed the questionnaires during college hours in their specific class. The questionnaires were handed out to the students at the beginning of the class. The purpose of the research were explain to student, they were provided with instructions on completing the questionnaires and were assured of the confidentiality of their responses (see Appendix A). The students subsequently had the opportunity to complete the questionnaires and handed the questionnaires back to the researcher upon completion.

3.7 Measurement instruments

In order to empirically test whether the affirmative development trainer-instructor performance model provides a valid account of the variance observed in affirmative development trainer performance, measures of the various exogenous and endogenous latent variables included in the model are require. Furthermore, the extent to which valid and credible conclusions can be made on the ability of the proposed affirmative development trainer-instructor performance structural model to explain variance in trainer-instructor job performance depends on the extent to which the manifest indicators are indeed valid and reliable measures of the latent variables they are tasked to represent. According to Diamantopoulos and Siguaw (2000), unless the quality of the measurements used to fit the structural model can be trusted, any assessment of the substantive relations of interest will be problematic. Given the fact that the indicator variables are composite measures formed from multi-indicator measures (see paragraph 3.8.3.1), it should then also be determined whether the various multi-indicator measurement instruments used to operationalise the exogenous and endogenous latent variables are in fact, reliable and unbiased measures of the latent variables they are representing.

Evidence was needed to establish the psychometric integrity of the selected measurement instruments used to operationalise the latent variables comprising the proposed affirmative development trainer-instructor performance structural model. Part of the evidence was presented by the research evidence available on the reliability and validity of the selected measuring instruments in literature to justify the choice of existing measuring instruments. The psychometric integrity of the selected measuring instruments was also empirically evaluated as part of this study via item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Item analysis was performed to identify problematic items and to determine the reliability coefficient for the subscales. Both classical measurement theory item analysis as well as item response theory item analysis was performed. EFA was used to examine the unidimensionality assumption of the subscales that claim to measure a single underling factor. CFA was used to evaluate the degree to which the design intention underlying the operationalisation of the latent variables contained in the reduced structural model via composite indicator variables succeeded.

Hair, Black, Babin, Anderson, and Tatham (2006) state that measures can be operationalised by either using scales from prior research or developing new scales. The former involves defining and operationalising constructs as they were in previous research. This is achieved by searching the literature on the individual constructs and identifying scales that may have performed well in previous studies. In the current study, several of the measurement instruments selected to operationalise the latent variables are existing measures that have been employed in previous research studies.

Construct measures can also be developed when the constructs that are being studied do not have a rich history of previous research (Hair et al., 2006). In the current study, there were some latent variables that could not be operationalised by existing measures found in the literature (due to constitutive definitions not matching operationalised definitions). These latent variables were consequently operationalised by developing new items to comprise the scales. In some cases, if possible, items from existing instruments that were related/similar to the latent variable in question were modified to operationalise and reflect the construct more aptly.

Admittedly, the most appropriate course of action would have been to assess the quality of the newly developed measures prior to testing the measurement and structural model in order to obtain evidence that the manifest indicators were indeed valid and reliable measures of the latent variables they are linked to as this would maximise the probability of obtaining valid and credible conclusions on the ability of the proposed affirmative development trainer-instructor performance structural model to explain variance in trainer-instructor job performance. This phase is generally called pre-testing and involves the administration of the newly developed measures on respondents similar to those from the population in order to screen the items (Hair et al., 2006). Empirical testing of the pre-test results are done in an identical manner to the final model analysis. Items are refined and deleted in order to avoid these issues when the final model is analysed. Due to several resource constraints, no pre-testing was performed on the items. The psychometric integrity of the selected measurement instruments was empirically evaluated for the first time as part of the final model analysis.

3.7.1 Enhancing student academic self-efficacy

No existing instrument could be found to measure the trainer-instructor competency "enhancing student self-efficacy". As such, the existing literature was searched for examples of efficacy enhancing instructor behaviours and techniques. According to Alderman (1999) modelling, sharing self-efficacy stories, constructive feedback, goal-setting, rewards, and estimating student self- efficacy by using a scale, could all be used as strategies to enhance student academic self-efficacy. Schulze and Schulze (2003) provide a detailed discussion of Alderman's strategies. Furthermore, Siegle and McCoach (2007) listed specific self-efficacy enhancing instructional strategies in their research on teacher training. Training specifically focused on teacher feedback, goal setting, and modelling. The behaviours and strategies discussed by these authors were adapted and used as examples to write items for the scale. The enhancing self-efficacy scale includes items related to feedback, modelling, goal-setting, and rewards. The scale consists of 20 items.

3.7.2 Academic self-efficacy

Van Heerden (2013) utilised the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) in the validation of her learning performance structural model. In line with Van Heerden (2013), this study utilised and administered the self-efficacy for learning performance subscale of the MSLQ to measure the construct of *academic self-efficacy*.

The MSLQ is an 81-item, self-report instrument, comprising of two main sections; namely learning strategies and motivation (Pintrich, Smith, García, & McKeachie, 1992). The MSLQ consists of 15 sub-scales, six within the motivation section (a total of 31 items) and nine (a total of 50 items) subscales within the learning strategies section. The self-efficacy sub-section is one of the sub-sections contained in the motivation section. The self-efficacy scale, *Self-efficacy for learning and performance*, consists of nine items concerning perceived competence and confidence in performance of class work.

The instrument originally obtained reasonable factor validity (Pintrich et al., 1993) using confirmatory factor analysis on a dataset consisting of 380 students. Pintrich and colleagues (1993) obtained a coefficient alpha of .93 for the *Self-efficacy for learning and performance* subscale. Zero-order correlations between the different scales were fairly robust and suggested that the scales were valid measures of the motivational and cognitive constructs. Furthermore, the predictive validity of the subscale, as determined by the correlation between the subscale and students' final course grades, was significant, albeit moderate (.41) and demonstrated predictive validity.

Sedaghata, Abedinb, Hejazic, and Hassanabadi (2001) reported a Cronbach alpha reliability coefficient of .87 for the self-efficacy subsection while Pintrich and De Groot (1990) reported a Cronbach reliability coefficient of .89 for the subsection. Furthermore, in their meta-analysis of the MSLQ Credé and Phillips (2011) found a mean reliability of .91 for the self-efficacy for learning and performance subscale with a standard deviation of the reliability distribution of .02. These results were based on 21 independent reliability coefficients.

3.7.3 Learning Motivation

Nunes (2003) developed a combined questionnaire to measure trainee motivation to learn and intention to learn. The motivation to learn questionnaire (MLQ) was divided into three sections. Section B (*Motivation to Learn*) provides an assessment of *learning motivation* defined as the specific desire to learn the content of the training programme. This motivation to learn section of the questionnaire was used in the present study.

Burger (2012) administered the 6-item instrument 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 therefore the absence of poor items. The results of the dimensionality analysis indicated that only factor could be extracted and all the items loaded onto one factor satisfactorily. The unidimensionality assumption for this scale was corroborated.

3.7.4 Mastery goal orientation

The *personal achievement goal orientation* subsection of The Patterns of Adaptive Learning Scales (PALS) developed by Midgley, et al. (1997) was selected to measure learning goal orientation. All the PAL Scales, including the *personal achievement goal orientation scales*, have since been developed and refined over time by a group of researchers using goal orientation theory to examine the relation between the learning environment and students' motivation, affect, and behaviour (Midgley, et al., 2000).

The original personal achievement goal orientation scales mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal obtained Cronbach alpha values of .86, .86, and .75 respectively. Confirmatory factor analyses using LISREL and maximum likelihood estimation was performed on a measurement model in which the three goal orientation measures were hypothesized to be distinct albeit correlated (Anderman, Urdan, & Roeser, 2003). The model displayed reasonably good fit [χ^2 (132, N = 647) = 389.77, *p<.001*; GFI = .94; TLI = .93; CFI = .94; RMSEA = .055 with P (.05) = .94]. One item that cross-loaded on both the performance-approach and performance-avoidance scales was deleted and the model fit was improved [χ^2 (116, N = 647) = 298.55*, p<.001*; GFI = .95; TLI = .95; CFI = .96; RMSEA = .049 with P (.05) = .55].

Using the original subscales, Urdan and Midgley (2003) assessed the personal achievement goals of 5th, 6th, and 7th graders to predict their mathematic achievement. They found a Cronbach alpha value for personal mastery goal orientation of .84, .86, .80 for 5th, 6th, and 7th grade respectively; a Cronbach alpha value for the personal performance-approach goal orientation scale of .86, .85, .84 (for 5th, 6th, and 7th grade), and a Cronbach alpha value of personal performance-avoidance goal orientation of .82 and .78 for 6th and 7th grade. Similarly, Lau and Nie (2008) adapted the original PALS personal goal subsection in their study predicting math achievement of grade 5 students. Confirmatory factor analysis indicated that a three-factor structure provided an adequate fit for the data, χ^2(62, *N* = 1926), = 707.91, TLI = .91, CFI = .94, RMSEA = .07. Each scale showed adequate to high internal consistency with a Cronbach alpha of .85 for personal mastery goal, .87 for personal performance-approach goal, and .72 for the personal performance-avoidance goal scale.

Midgley and colleagues (1998) state that although they believe the original scales are useful and valid measures of goals, they believe that the revised scales are more appropriate for current conceptualisations of goals as organising schema. The revised scales (in the same order) obtained Cronbach alpha values of .85, .89, and .74 (Midgley et al., 2000). Confirmatory factor analysis was performed on the 14 personal goal orientation items to examine the factor structure of the three sets of items (Midgley et al., 2000). The expected model was confirmed by LISREL and goodness of fit indices suggested that the model fits the data well (GFI = .97, AGFI = .95). More specifically, personal mastery, performance-approach, and performance-avoid goals all loaded on different latent factors.

The revised scales were utilised to measure student goal orientation. The 13 items were slightly adapted to suit the context of the respondents.

3.7.5 Classroom goal structure

The *classroom goal structure* subsection of *The Patterns of Adaptive Learning Scales* (PALS) developed by Midgley and colleagues (1998) was selected to measure classroom goal structure. Midgley and colleagues (2000) added this subsection in the revised edition of the PALS questionnaire. Previously, the instrument assessed student perceptions of their teachers' goals. The scales obtained internal consistency coefficient of .76, .70 and .83 for classroom mastery goal structure, classroom performance-approach goal structure, and classroom performance-avoidance goal structure, respectively. Confirmatory factor analysis on the mastery goal structure, performance-approach goal structure, and performance-avoid goal structure using LISREL confirmed that the items loaded on different latent factors (GFI = .96, AGFI = .94). The scale consists of 14 items.

3.7.6 Promoting a mastery goal structure

Promoting a mastery climate was measured by adapting items from The *Mastery Atmosphere-I* and the *Mastery Atmosphere-II* scales of The *Checklist for an Ethical and Achieving Classroom (CEAC)* (Narvaez, 2008). The questionnaire is based on research findings regarding what helps students develop ethical character and achieve academically. The questionnaire is primarily used as a tool for educators to design their classroom practice to promote ethical character development and achievement.

The *Mastery Atmosphere* scales utilise instructional practices that motivate students to learn rather than focus only on comparing their performance to the performance of others. The items of the original scale were formulated in terms of a question, for example: "Do I answer student questions about the purposes of tasks and assignments?" Six of the seven items from the *Mastery Atmosphere-I* scale and three of the five items from *Mastery Atmosphere-II* scale were selected and adapted in the form of statements. One additional item (not included in the CEAC) was written and added to form the *Promoting a mastery climate* scale. The scale consists of 10 items.

3.7.7 Classroom learning climate

Classroom learning climate consists of five dimensions: *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *autonomy,* and *involvement and interest*.

The *teacher emotional support* and *teacher academic support* sub*scales* were adapted slightly from the Classroom Life Measure (Johnson, Johnson, & Anderson, 1983). Each subscale had four items. The measure of *teacher emotional support* assessed the belief that the teacher cared about and liked the student as a person, whereas 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. Patrick et al. (2007) obtained a Cronbach alpha of .84 for the *teacher emotional support* scale and a value of .64 for the *teacher academic support* scale. Patrick, Kaplan, and Ryan (2011) found a Cronbach alpha of .84 and .76 for the *teacher emotional support* scale and the *teacher academic support* scale, respectively.

Psychological safety and fairness was measured using four items from Ryan and Patrick's (2001), promoting mutual respect scale. The items were adapted for the purpose of the research. Patrick at al. (2007) obtained a Cronbach alpha of .65 for the promoting mutual respect scale. Five additional items were written for this scale. The subscale consists of 9 items.

The *teacher emotional support-, teacher academic support-, and promoting mutual respect scales* have been shown to be both reliable and valid across different samples of adolescents (Patrick & Ryan, 2005, as cited in Patrick et al., 2007; Patrick, Turner, Meyer, & Midgley, 2003).

Six of the eight items from the involvement subscale of the *What is happening in this class?* (WIHIC) survey was used to measure *interest and involvement*. The WIHIC *involvement* scale measures the extent to which students have attentive interest, participate in class, and are involved with other students in assessing the viability of new ideas. The subscale obtained a Cronbach alpha of .88 (MacLeod & Fraser, 2010). Den Brok, Fisher, Rickards, and Bull (2005) obtained a reliability coefficient of .86 for the scale. Four additional items were written for this subscale. The subscale consists of a total of 10 items.

The *autonomy* subscale was developed based on Stefanou and colleagues' (2004) *conceptualisation of autonomy*. In their research various autonomy support strategies are listed to illustrate the different dimensions of their conceptualisation of autonomy. Ten of the examples provided in their study were adapted into items to form the autonomy subscale.

3.7.8 Fostering psychological safety and fairness

The Fostering psychological safety and fairness subscale was developed based on items from The *Checklist for an Ethical and Achieving Classroom (CEAC) (Narvaez, 2008).* One item from the p*romoting ethical behaviour* subscale, five items from the p*roviding safety and security* subscale, and two items from the p*roviding psychological support* subscale were adapted to form the *fostering psychological safety and fairness scale.* The items of the original scale were formulated in terms of a question, for example: "Do I emphasise respectful, supportive relationships among students, teachers, and parents?" The items were rephrased in terms of statements. Two additional items were written and added to the scale. The scale consists of 10 items.

3.7.9 Demonstrating individualised consideration

Feldman (1988) provides an appendix to his study in which he lists 22 instructional dimensions. Under each dimension he provides a list of items used in various studies (including his own) to rank the importance of the behaviour as perceived by students and/or faculty. Items listed under the instructional dimensions, *Teacher's Concern and Respect for Students; Friendliness of the Teacher* and *Teacher's Availability and Helpfulness*, were selected and adapted to form the *demonstrating individualised consideration* scale. The scale is comprised of 13 items.

3.7.10 Stimulating involvement and interest

The Feldman (1988) appendix was also used in the development of the *stimulation involvement and interest* subscale. Eight items (items 1-8) listed under the instructional dimensions *Teacher's Encouragement of Questions and Discussion, and Openness to Opinions of Others* and *Intellectual Challenge and Encouragement of Independent Thought (by the Teacher and the Course)* were selected and adapted for the *stimulation involvement and interest* scale.

Webb and Palincsar (1996) defined task related interaction as learners' perceptions of the extent to which instructors encourage learners to interact and exchange ideas with each other during a session. Interaction present learners with the opportunity to explain, assess, and refine their ideas; to evaluate other possibilities; and to provide and receive help. The behaviour listed in this definition was used to develop additional items (items 9-11) to be included in the scale. Furthermore, Erickson and Erickson (1979) defined *stimulation*, *organisation* and *evaluation* as behaviours such as inspiring excitement or interest in the content of the course, maintaining an atmosphere which actively encourages learning, arousing interest when introducing an instructional activity, selecting materials and activities which are thought-provoking, getting students to participate in class discussions, and getting students to challenge points of view raised during the course. Three items (items 12-14) were created and included in the scale based on the behaviours Erickson and Erickson (1979) used to describe the competency. The subscale consists of 14 items.

3.7.11 Providing inspirational motivation

No existing scale could be found in the literature to measure *providing inspirational motivation.* Nine items were developed to measure the competency based on the constitutive definition of the construct.

3.7.12 Providing autonomy support

Four items (items 1-4) were selected from the items listed under *Teacher's Encouragement of Self-Initiated Learning* in the appendix of Feldman's (1988) study on teacher effectiveness. This dimension involves behaviours such as encouraging students to work independently and to assume personal responsibility for their learning.

Nine items (items 5-13) were developed based on Stefanou and colleagues' (2004) conceptualisation of autonomy. The various autonomy support strategies listed as examples of autonomy support behaviour were adapted for the purpose of this scale. The behaviours relate to cognitive, procedural and organisational autonomy.

One item (item 14 in the scale) was selected from the Learning Climate Questionnaire (Williams & Deci, 1996) and included in the *providing autonomy support* scale. The total scale consists of 14 items.

3.7.13 Inspiring professional vision

No existing scale could was found in the literature to measure *inspiring professional vision.* Seven items were developed specifically to measure the construct based on the constitutive definition as defined in the study.

3.8 Missing values

Missing data is a prevailing problem to researchers (Scheffer, 2003; Switzer & Roth, 2002). Before data can be analysed, the presence of missing values must be investigated and addressed. Both the number of missing values and the nature of the data determine which missing data technique (MDT) should be utilised (Switzer & Roth, 2002). According to Raghunathan (2004) the researcher's choice of which method to utilise should be based on the potential of the method to improve the inferential validity of the results. Similarly, Switzer and Roth (2002) state three judgement calls have to be made: (1) should a deletion or imputation techinque be used?; (2) what particaluar MDT?; and (3) what variation of MDT?

Several ‟missingness mechanisms” can exist in the data (Sheffer, 2002, p. 153; Switzer & Roth, 2002). Data can be Missing Completely at Random (MCAR). This refers to a situation where the missingness mechanism does not depend on the variable of interest, or any other variable, which is observed in the dataset. MCAR is both missing at random, and observed at random. If case deletion can be validly applied, the data is required to meet this very stringent condition and missing data is very rarely MCAR. Data that are missing at Random (MAR) is, contrary to its name, conditional on some X-variable observed in the data set, although not on the Y-variable of interest (i.e. the variable on which the missing value occurs). The term is actually more suitable to data that is MCAR. Data that is Not Missing at Random, (also known as informatively missing) occurs when the missingness mechanism depends on the actual value of the missing data (Scheffer, 2002). This situation is the most difficult condition to model.

Sheffer (2002) states data MCAR and MAR are ignorable for likelihood-based imputation methods but not for data NMAR. Multiple imputation: EM imputation and regression imputation, are all permissible if the missingness mechanism is not NMAR and the percentage of missing data is not too great.

Missing values were traditionally addressed through case deletion and mean imputation (Scheffer, 2002). Deletion techniques involve throwing out 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). In the 1990’s regression imputation and imputation of values using the expectation-maximisation (EM), both of which perform single imputation, became popular. More recently, multiple imputation has become available. Five popular methods for addressing missing values are discussed.

List-wise deletion of cases is typically used as the default option in the treatment of missing values in most statistical analyses (Sheffer, 2002; Switzer & Roth, 2002). This MDT essentially deletes an entire case whenever a data point within a specific case is missing. It is an *ad hoc* technique for addressing the issue of missing values in that it addresses the issue prior to any substantive analysis being done (Carter, 2006). The result is that only cases with complete data are left in the data set (Mels, 2003). A disadvantage of this method is that sample size available for data analysis could be dramatically reduced.

Pair-wise deletion is an attempt to maintain the conservative approach of deleting while minimising the amount of data lost (Switzer & Roth, 2002). This MDT only deletes a case when the missing data point is required for a particular analysis. Pairwise deletion involves the calculation of the covariance estimates for each pair of observed variables for only the cases where complete observations for both variables are available (Wothke, 1998, as cited in Carter, 2006). Cases may only be removed when they have any missing values on the variables involved in the calculation of covariance estimates (Kline, 1998, as cited in Carter, 2006). Pairwise deletion is often an improvement on listwise deletion as more of the original data is retained (Switzer & Roth, 2002). However, this method can also result in a sizable reduction in the size of the sample available for data analysis. Furthermore, this method could generate invalid estimates due to the varying sample sizes used to estimate parameters (Pigott, 2001). That is, using pairwise deletion can result in analyses in the same study that are based on very different (sub)samples (Switzer & Roth, 2002).

The most notable disadvantage of deletion techniques is their potential negative effect on power (Switzer & Roth, 2002). They invariably reduce the size of a sample, which can negatively effect the study power if the amount of loss is substantial. Substantial data loss can affect parameter estimates by introducing bias.

The multiple imputation method predicts missing values using existing values from the observed variables. Alternatively stated, estimates of missing values are derived for all cases in the initial sample (i.e. no cases with missing values are deleted). A new and complete data set is created for each set of imputed values. The researcher thus has a number of complete data sets rather than a single reconstituted data set (Pigott, 2001; Switzer & Roth, 2002). The parameter of interest is then calculated on each one of these data sets. Multiple imputation methods assume the data is missing at MAR and follow a multivariate normal distribution (Du Toit & Du Toit, 2001). This is, however, not always the case. Multiple imputation would be acceptable if the observed variables are measured on a scale comprising five or more scale values, provided that the observed variables are not excessively skewed (even if the null hypothesis of multivariate normality had been rejected) and provided that less than 30% of the data constitutes missing values (Mels, 2003).

The Full Information Maximum Likelihood (FIML) estimation procedure is probably more efficient than the available multiple imputation procedures. However, it has the disadvantage that no separate imputed data set is created, thereby preventing item and dimensionality analyses, and the calculation of item parcels, which is a requirement in this study. Similar to multiple imputation, this method assumes the data values are MAR and that the observed variables are continuous and follow a multivariate normal distribution.

Two of the difficulties associated with FIML can be overcome by employing MI of missing values (Pigott, 2001). Firstly, standard errors of estimates can easily be obtained with MI. Secondly, MI provides greater flexibility as it generates a completed dataset after imputation which can be used for further analysis.

Imputation by matching is a method involving the substitution of real values for missing values. The substitute values replaced for a case are derived from one or more cases that have a similar response pattern over a set of matching variables. Ideally, matching variables that will not be utilised in the confirmatory factor analysis should be used, which is frequently not possible. As such, the items least plagued by missing values are typically identified to serve as matching variables. The advantage of this method is that it makes less stringent assumptions than the multiple imputation procedures. The disadvantage of this method is that cases that are not successfully imputed are eliminated from the imputed data set.

Scheffer (2002) notes several advantages and disadvantages of imputation. Advantages include the minimisation of bias and the use of 'expensive to collect' data that would otherwise be discarded. Disadvantages include the possibility that it can allow data to influence the type of imputation and will increase the overheads of a survey. It is important to remember imputed data is *not* real data, and variance estimates need to reflect this uncertainty. Lastly, single imputation nearly always provides reduced variance estimates, therefore not reflecting the uncertainty due to imputation.

FIML and MI methods appear to hold clear advantages over the list-wise and pair-wise case deletion as well as over imputation by matching. The multiple imputation method was utilised provided the assumptions listed by Mels (2003) were met.

3.8 Data analysis

Item analysis, exploratory factor analysis and structural equation modelling (SEM) was used to analyse the questionnaire data and to test the proposed trainer-instructor performance structural model as depicted in Figure 2.7.

3.8.1 Item analysis

The scales used to operationalise the latent variables that constitute the structural model (as depicted in Figure 2.7) were developed to measure a specific construct, carrying a specific constitutive definition. Items were developed to function as stimulus sets to which respondents respond with behaviour that is a relatively uncontaminated expression of a specific underlying latent variable (De Goede, 2007). Item statistics indicate to what extent these design intentions were successful. Gulliksen (1950, as cited in Ellis & Mead, 2002) states the purpose of item analysis is to address the issue of selecting items for a test, so that the resulting test will have certain specific properties.

3.8.1.1 Classical test theory versus Item response theory

Classical test theory (CTT) is the most common approach to item analysis. The respondent's observed score on the whole instrument is the unit of focus and is typically calculated as the unweighted sum of the person's responses to the items of an instrument (Ayala, 2006).

CTT is based on the true score model (Ayala, 2006). According to this model, the observed score relates to the respondents location on the latent variable. A person's observed score (X) on an instrument is a function of their expected performance on the instrument plus error. Considering that the error scores are assumed to be random and that the mean of the infinite number of observed scores is the expectation of the observed scores ($\mu_i = \in (X_i)$), it follows that the mean error for the individual across the infinite number of independent administrations of the instrument is zero. μ_i is typically represented by T_i, representing a person's true score or trait score. A person's true score T_i (or μ_i) represents their location on the latent varible of interest and is fixed for an individual and instrument. It is commonly represented at $X_i = T_i + E_i$.

CTT has a major advantage as it holds relatively weak theoretical assumptions, making it easily applicable to many testing situations (Fan, 1998). Furthermore, although CTT is mostly focused on test-level information, item statistics are an important feature of CTT.

Item response theory is a system of models that defines an alternative way of establishing correspondence between latent variables and their manifestations (Ayala, 2006). Latent trait characterisations of individuals and items are used as predictors of observed responses.

In contrast to CTT, IRT primarily focuses on item-level information. Persons and items are located on the same (uni-dimensional) continuum. Furthermore, if an item is to be considered useful, the item must be able to differentiate between persons located at different points along the continuum. Uncertainty about respondent's locations are reduced by the item's capacity to differentiate between respondents. The item's capacity to differentiate between people with different locations can be allowed to vary across the instrument's items or can be held constant. As such, individuals are characterised in terms of their locations on the latent variable, and items are (at the least) characterised in terms of their location and capacity to discriminate between people. IRT is thus the regression of the observed item responses on the person's location on the latent variable and the item's latent characterisation.

IRT has experienced exponential growth in its use due to the shortcomings associated with classical test theory methods and measurement procedures (Hambleton, Swaminathan & Rogers, 1991; Fan, 1998). One of the most salient shortcomings of CTT is the fact that examinee characteristics and test characteristics cannot be seperated; they can only be interpreted in the context of the other. This feature of CTT is known as circular dependency: (a) the person statistic (i.e. observed score) is (item) sample dependent, and (b) the item statistics (i.e. item difficulty and item discrimination) are (respondent) sample dependent (Fan, 1998). Circular dependency poses some theoretical difficulties in CTT's application in some measurement situations, but despite this, practical solutions within the framework of CTT have been surmised for some of these problems (Fan, 1998).

According to CTT, reliability is defined as the correlation between test scores on parallel forms of a test (Hambleton et al., 1991). Satisfying the definition of parallel tests is, however, difficult, if not impossible, in practice. The problem with the standard error of measurement, which is a function of test score reliability and variance, is that it is assumed to be equal for all respondents. However, scores on any test are unequally precise measures for respondents of different abilities. The assumption of equal errors of measurement for all respondents is implausible.

Lastly, CTT is focused on the total test score rather than the individual items. CTT thus provides very little consideration to how examinees respond to a particular item. As such, no basis exists for determining how well a particular respondent will do when faced with a particular item. CTT does not allow for predictions of how individuals or groups of respondents will perform on a particular item.

Due to the above restrictions associated with CTT, IRT models have been endorsed by many researchers as these models are not group-dependent or test-dependent (i.e. free of circular dependency), are expressed at item level rather than at the test level, the model does not require strictly parallel test for assessing reliability, and the model provides a measure of precision for each ability score (Hambleton et al., 1991). Due to the shortcomings associated with CTT, both IRT and CTT was utilised to assess the quality of the measurement instruments[17].

3.8.1.2 Classical test theory item analysis

Item analysis attempts to identify and remove items that fail to contribute to the internally consistent description of the latent variable as measured by a specific scale. Alternatively stated, item analysis determines which of the items in a scale (if any) have a negative effect on the overall reliability of the scale due to their inclusion in the particular scale. Ideally, all the items of a particular scale should reflect a common underlying latent variable. Item analysis was, consequently, conducted to examine the reliability of the indicators of each

[17] The use and development of IRT theory in South African scientific research is fairly limited. There appears to be a need in South Africa to encourage the utilisation of IRT in scientific research. As such, this chapter discusses IRT theory, models, and methodology in a significant degree of detail with the intention of encouraging an understanding of IRT theory, its use in scientific research, and discourse around IRT methodology in the South African scientific community

latent variable, investigate the homogeneity of each sub-scale, and screen items prior to their inclusion in composite item parcels representing the latent variables. If a particular item was excluded, and a significant improvement in the overall scale reliability occurred as a result, the item was excluded from the subsequent factor analysis.

Various sources of evidence was considered to determine whether an item should be removed from a scale, including items means and standard deviations, item-total correlations, inter-item correlations, the squared multiple correlation, the change in subscale reliability when an item is deleted, and the change in subscale variance if an item is deleted. More specifically, the item characteristics was evaluated by means of examining the Cronbach requested Alpha of items and various item statistics of items. This study endorsed a cut-off point for the Cronbach Alpha of .8. This is slight more stringent than the cut-off value of .70 proposed by Nunnally (1978, p245). Nunnally (1978) stated that .70 should suffice for the early stages of research on predictor test or hypothesised measures of a construct, but also notes that in many applied settings a reliability of .80 is insufficient. In applied settings where important decisions are made with respect to specific test scores, a reliability of .90 should be the minimally accepted value and a reliability of .95 should be regarded as the desirable standard. It is apparent from the abovementioned discussion that a cut-off value of .80 is in fact lenient; however it would allude to the reliability and homogeneity of the sub-scale.

The screening of items was not based on any specific cut-off value for the corrected item total correlations and the squared multiple correlations. Rather, items were flagged if they differentiated themselves sufficiently from the general trend as it applied to the majority of items. Extreme means or small standard deviations, and noticeable increases in the alpha when compared to the scale's Cronbach's Alpha was, in addition, indicative that items should be considered for deletion. Items were not deleted based on any single item statistic. The decision to delete an item was based on a basket of evidence. The basket of evidence included CTT item statistics and IRT item statistics.

3.8.1.3 Item response theory item analysis

The mathematical models employed in IRT specify that a respondent's probability of answering a given item correctly (in the case of dichotomous items) or the probability of selecting a specific response option (in the case of polytomous items) depends on the respondent's ability and the characteristics of the item. The models include a set of assumption about the data to which the model applies. The viability of some of these assumptions cannot be assessed directly, however, indirect evidence can be collected and assessed and the overall fit of the model can be assessed.

Three assumptions are made: monotonicity; unidimensionality; and local independence (Hambleton et al., 1991). Monotonicity refers to the fact that the relationship between the respondents' item performance and the trait underlying item performance can be described by a strictly monotonically increasing function called the item characteristics curve. According to this curve, as the level of trait increases, the probability of endorsing an item increases. Unidimensionality refers to the assumption that only one underlying factor is measure by a set of items in a test. Although this assumption cannot be strictly met, the presence of a dominant factor that influences performance on the set of subscale items is required. Essential unidimensionality exists if each item is influenced by a number of factors but only a single common factor is measured by the subscale items. Local independence refers to the assumption that when the common underlying factor influencing test performance is held constant, respondent's responses to any pair of items are statistically independent. Local independence follows from essential unidimensionality. Essential unidimensionality exists if the partial inter-tem correlations approach zero when controlling for the common factor. That is, after taking respondents' standing on the latent trait into account, no relationship exists between examinees' responses to different items.

The item characteristics curve (ICC) is a mathematical expression that relates the probability of endorsing an item or providing a correct response on an item to the ability measured by the test and the characteristics of the item. A distinction is made between IRT models appropriate to dichotomous item data and IRT models appropriate to polytomous item data.

3.8.1.3.1 IRT models for dichotomous item data: A brief overview

A thorough understanding of dichotomous models is required to understand, apply and interpret polytomous models as the former forms the foundation of the latter. For example, the polytomous graded response model is considered to be the successive application of two parameter dichotomous models. Furthermore, a firm grasp of dichotomous model item parameters puts one in good stead to comprehend the more complex polytomous item parameters.

The three most popular models in IRT are the one-, two-, and three-parameter logistic models. The models are called such due to the number of item parameters incorporated in the model. Each model is a mathematical expression that relates the probability that a randomly chosen test-respondent answers item i correctly (or endorses the item) $P_i(\theta)$ to that respondent's standing on the latent trait. The one-parameter logistic model only allows the item characteristics curve (ICC) of items to vary in terms of the location parameter (β), the two-parameter logistic model allows the ICC of items to vary in terms of β and the discrimination parameter (α) and the three-parameter logistic model allows the ICC of items to vary in terms of β, α and the pseudo-guessing parameter (γ).

The location parameter (β), also known as the threshold or difficulty parameter, indicates where along the ability scale the item functions optimally (i.e., discriminates best). It is also the point on the latent trait scale where the probability of a correct response is .5 (for one- and two-parameter models) and it indicates the position of the ICC in relation to the latent trait scale. The greater the value of the β parameter the greater the ability is required for a test-taker to have a 50% chance of getting the item right (i.e. the more difficult the item). The values of β typically range from -3 to +3, where 3 indicates very difficult items and -3 indicates very easy items = -3[18].

The discrimination parameter (α) indicates the steepness of the item response function (IRF) at the items location. Alternatively stated, it is the slope of the IRF at point $\theta = \beta$. Here the slope is at its maximum. The discrimination parameter indicates how well the item differentiates between test-takers with a low standing on the latent trait from those with a high standing on the latent trait. Importantly, the discrimination parameter is not the general slope of the item characteristic curve (ICC); rather it is proportional to the slope of the ICC at $\theta = \beta$. The actual slope of the ICC at $\theta = \beta$ is α/4. Theoretically, the discrimination parameter can range from negative infinity to positive infinity, although it typically ranges between zero and two. Positive item discriminations imply that the probability of a correct response

[18] It is typically assumed that the latent trait scale is standardised with a mean of zero and a standard deviation of one.

increases as the ability level increases. Items with steeper slopes are more useful for separating examinees into different ability levels. [19]

The γ-parameter refers to the pseudo-guessing parameter. The inclusion of a γ-parameter suggests that respondents very low on the trait still have a non-zero probability of selecting the correct answer. It is thus the probability of getting the item correct by guessing alone. As such, γ does not vary as a function of the ability level. Although γ has a theoretical range of 0 to 1, it typically ranges from 0 to .35. The pseudo-guessing parameter assumes values that are smaller than the value that would result if test-takers guessed randomly on the item. Items with small γ –values are preferred. Large pseudo-guessing parameter values tend to put downward pressure on the discrimination parameter.

The one-parameter logistic model

The one-parameter logistic model (1PLM) is one of the most widely used IRT models. The item characteristic curves for the one parameter model are provided by the equation:

$$P_i(\theta) = \frac{e^{(\theta - bi)}}{1 + e^{(\theta - bi)}} \quad i = 1, 2, \ldots, n$$

where $P_i(\theta)$ is the probability that a randomly chosen test-taker with ability θ answers item i correctly (or endorses the item); b_i is the item difficulty parameter; *n* is the number of items in the test; *e* is a transcendental number whose value is 2.718; and $P_i(\theta)$ is a S-shaped curve with values between 0 and 1 over the ability scale.

In the 1PLM, the item difficulty parameter b_i is assumed to be the only item characteristic influencing test-taker performance. No item parameter corresponds to the CTT item discrimination index, in effect this is equivalent to the assumption that all items are equally discriminating with a fixed discrimination parameter. No allowance is made in this model for

[19] Negative item discrimination can occur. In such items, the probability of a correct response decreases as the ability level increases from low to high. Items with negative discriminations are occurs in two ways. First, if the correct response to a two-choice item has a positive value, the incorrect response will always have a negative value. Second, sometimes endorsing an item will result in a negative discrimination parameter value. This is indicative of a faulty item – either the item is poorly written or there is a misconception prevalent among high ability students.

the possibility that test-takers may guess. Alternatively stated, test-takers with a low standing on the latent trait have a zero probability of correctly answering the item.

The 1PLM is also often called the Rasch model. Although the 1PLM and Rasch model are mathematically identical, there are some differences (De Ayala, 2009). De Ayala (2009) states that in the Rasch model α is set equal to 1, whereas the α in the 1PLM is set equal to some constant other than 1. Furthermore, the models seem to adopt different philosophical perspectives. The Rasch model is used to construct the variable of interest and if model-data misfit is found, the data is discarded. In contrast, the 1PLM is focused on fitting the data as well as possible, given the model's constraints and when model-data misfit is found, the model is seen as suspect. Despite the difference between the two models, most IRT users (erroneously) consider the 1PLM and the Rasch model to both set α = 1.

The two-parameter logistic model

The item characteristic curves for the two parameter model (2PLM) are provided by the equation:

$$P_i(\theta) = \frac{e^{[\alpha j(\theta - bi)]}}{1 + e^{[\alpha j(\theta - bi)]}} \quad i = 1, 2, \dots, n$$

where the parameters $P_i(\theta)$ and b_i are defined the same as in the 1PLM and α_j refers to the discrimination parameter. The 2PLM is a generalisation of the one-parameter model that frees the assumption of equally discriminating items (that is, that items are allowed to have different item discrimination parameter values). The 2PLM, like the 1PLM, makes no allowance for the determination of the pseudo- guessing parameter.

The three-parameter logistic model

The three-parameter logistic model's (3PLM) item characteristic curves are provided by the equation:

$$P_i(\theta) = \gamma_j + (1 - \gamma_j)\frac{e^{[\alpha j(\theta - bi)]}}{1 + e^{[\alpha j(\theta - bi)]}} \quad i = 1, 2, \dots, n$$

where the parameters $P_i(\theta)$, b_i and α_j are defined the same as in the 2PLM and γ_j refers to the pseudo-guessing parameter. This parameter makes that allowance for guessing as a factor in test performance on selected response test-items.

3.8.1.3.2 IRT models for polytomous item data

The measuring instruments that were used to operationalise the latent variables in the structural model depicted in Figure 2.7 utilised Likert scales and would consequently result in ordered polytomous data. Ordered polytomous data, unlike dichotomous data, have more than two response categories and are inherently ordered (De Ayala, 2009). This implies that some responses indicate more (or less) of the latent trait being measured. For example, when respondents are confronted to an item from a competency scale such as “The instructor provides clear and constructive feedback”, they have to respond by selecting one of five response categories “never”, “almost never”, “rarely”, “sometimes”, or “often.” Similarly, when respondent are confronted with an item from a outcome scale such as “I intend to increase my knowledge during this course” they have to respond by selecting one of five response categories “strongly disagree”, “disagree”, “neither disagree not agree”, “agree”, or “strongly agree.” The response categories (and therefore also the respondent’s response) are rank ordered on an ordinal scale that represent an infrequent/unfavourable to a frequent/favourable occurrence/attitude. The ordered categories are separated by boundaries or thresholds.

When using data obtained from Likert scales, the response format typically consists of a series of ordinal categories. The Likert scale may contain a number of even or an odd number of response categories. Andrich’s (1978; 1878) Rasch rating scale model or the non-Rasch graded response model developed by Samejima (1969) (as cited in De Ayala, 2006) is suitable in such an instance.

Andrich’s (1978; 1878) Rasch rating scale model (RSM) uses responses obtained from a series of ordered categories and assumes that these ordered categories are separated by a series of ordered thresholds (also called item step location parameters or item boundary location parameters). Each threshold, b_i, is on the latent variable’s continuum and separates adjacent response categories (De Ayala, 2009). If a response scale makes provision for m+1 response categories there will always one fewer response thresholds than there are response categories (i.e., there will be m thresholds). For example, assume we are assessing individuals' standing on the latent trait learning motivation. One of the items in the learning motivation scale is "I intend to increase my knowledge during this course" and uses a five category Likert response scale. Five response categories imply four thresholds: one between category one (*strongly disagree*) and two (*disagree*), one between category two (*disagree*) and three (*neither disagree nor agree*), one between category three (*neither disagree nor agree*) and four (*agree*), and one between category four (*agree*) and five (*strongly agree*).

Assume the item has a location parameter (b_i) value of 0. When a person has a location θ, the probability of responding in a specific response category is dependent on whether the person is located below or above b_1. If θ < b_1, then the respondent is expected to respond to the *strongly disagree* category, otherwise they do not. If the respondent located above b_1 then the person's response of *disagree* would be determined by whether θ < b_2. Similarly, according to this response mechanism a person with θ > b_2 should respond with *strongly agree* if they are located above b_4, or respond with *agree* if they are located above b_3, otherwise their response would be *neither disagree nor agree*. The number of thresholds passed is represented by x_j and can hold the value from 0 thresholds to the mth threshold. When x_j =0, the person remains in the lowest category and when x_j = m, the person has moved through all the thresholds and has responded in the highest response category. For example, if a person has endorsed the *neither disagree nor agree* category, x_j = 2, as they have moved past two thresholds.

Items are always assumed to have the same number of thresholds. This does not, however, imply that thresholds are at the same locations on the continuum for all items. The item's location and the threshold value combined determine the threshold's location on the continuum. The RSM can be mathematically expressed as:

$$P_{xj}(\theta) = P\left(x_j \middle| \theta, b_{cj}, \kappa\right) = \frac{e^{[\kappa_{xj} + x_j(\theta - b_{cj})]}}{\sum_{k=0}^{m} e^{[\kappa_k + k(\theta - b_{cj})]}}$$

where the term, κ_{xj} is referred to as a category coefficient and is a function of the $b_j s$. By definition, $\kappa_{xj} = 0$ when x_j is zero, otherwise $\kappa_{xj} = \sum_{h=1}^{x_j} b_j$ with x_j assuming a value from 1 to the mth threshold. Each threshold has an item-step response function (ISRF). The ISRF is a graphical representation of the probability of obtaining a particular category score as a function of θ.

A respondent's location θ can be interpreted as their attitude and the item location b_{cj} can be interpreted as the difficulty of endorsing the item. The RSM is an extension of the Rasch/1PL model and therefore the following assumptions apply to the RSM: the items have similar capacity to discriminate among respondents and there is equal discrimination at the thresholds. Maximum likelihood estimation is used to estimate the model parameters. A person's observed score is a sufficient statistic for estimating their location on the continuum. For a Rasch model, test-respondents who obtain the same observed score have the same location on the continuum and the item score is a sufficient statistic for estimating the item's location. Thus, RSM items with the same item score have the same item location parameter.

Although the Rasch/1PL model produces attractive statistical features, it usually only applies to psychological instruments in which constructs are narrowly defined. As such, the assumption of equal discrimination was closely examined before the model was fitted. An alternative to the RSM is the graded response model (GRM) that relaxes the assumption of equal discrimination.

In contrast to the RSM, the GRM focuses on the probability of obtaining a score of 1 versus a score of 0, or the probability a score of 2 versus a score of 1 and 0, or the probability of obtaining a score of 3 versus a score of 0, 1 or 2, etc. The polytomous scores have in effect been turned into a series of cumulative comparisons, that is, below a particular category versus *at and above* this category. More generally stated, the GRM specifies the probability of a person responding in category *k* or higher versus responding in categories lower than *k*. The GRM specifies the probability of a person responding with category score x_j *or higher* versus responding in lower category scores.

The ISRFs of the parametric GRM are defined by logistic functions, in which the probability of obtaining a category score, $\boldsymbol{x_j}$, equal to the c^{th} threshold *or higher* is expressed as:

$$P_{xj}(\theta) = P\left(x_j \geq c \middle| \theta, \alpha_j, b_{cj}\right) = \frac{e^{[\alpha j(\theta - b_{cj})]}}{1 + e^{[\alpha j(\theta - b_{cj})]}}$$

where θ is the latent trait, α_j is the discrimination parameter for item j, and b_{cj} is the item-step location parameter for category score x_j and x_j = (0, 1,…,m). The location parameter b_{cj} indicates the point on the latent trait scale where the c^{th} step probability passes .5. The GRM always has m_j item step response function for item j and the δ_{xj}s are always in increasing order. The equation expresses the probability of an individual obtaining category score x_j *or higher* and not the probability of obtaining a particular category score x_j or responding in a particular category *k.*[20]

3.8.1.4 Selecting the appropriate model for the current data

Due to the fact that the measuring instruments that are used to operationalise the latent variables in the structural model depicted in Figure 7 utilise Likert scales, parametric graded response IRT models was used to describe the relationship between the probability of selecting a specific response option and the respondents standing on the latent trait θ.

3.8.1.5 Assessing model assumptions

The Statistical program, R (R Development Core Team, 2006), was employed to conduct the IRT item analysis. The statistical software packages utilised in the analysis were *ltm* (Rizopoulos, 2006), *mokken* (Van der Ark, 2007), *foreign* (R Core Team, 2013), *CTT* (Willse & Shu, 2008), *psychometric* (Flecther, 2010), and *psych* (Revelle, 2013).

Parametric GRMs also assume unidimensionality, local independence, and latent monotonicity (Van der Ark, 2007). As such, investigating the assumptions of nonparametric IRT models is also useful when parametric IRT models are used. Parametric IRT models, however, make the additional assumption that the ISRFs have a parametric functional form (normally a logistic function).

The first model assumption that was assessed was that of unidimensionality. Unidimensionality was assessed by investigating the scree plot of each scale and the

[20] The GRM is essentially a 2PLM. More specifically, it is the successive application of the 2PLM to an ordered series of bifurcated responses, for example, 0 versus 1,2 or 0,1 versus 2. The ORF for the GRM can be plotted to determine which categories are less likely to be chosen.

automated item selection procedure. The scree plot is based on the polychoric correlation matrix (Emons, 2012).[21]

The second assumption that was assessed was that of monotonicity. This was achieved by investigating the inter-item covariances and item-pair H-coefficients via Mokken scale analysis (Emons, 2012). Mokken scale analysis (MSA) is a scaling procedure for both dichotomous and polytomous items. It involves an item selection algorithm (AISP) to partition a set of items into Mokken scales and several methods to check the assumptions of (non)parametric GRMs and double monotonicity models.

It is usually assumed in practice, that manifest monotonicity is a valid test of latent monotonicity. Manifest monotonicity is an observable property of the test data, and defined as:

$$P\left(X_j \geq x \middle| R_{-j} = s\right) \geq P\left(X_j \geq x \middle| R_{-j} = r\right) \, for \; all \; j, x, s > r$$

When using manifest monotonicity to investigate latent monotonicity, it might be that the number of respondents having R_{-j} = r may be too small for an accurate estimation of $P\left(X_j \geq x \middle| R_{-j} = r\right)$. This issue is resolved by grouping respondents with adjacent rest scores until the size of the rest score group is greater than a preset criterion called *minsize*. A further consideration is that some violations of manifest monotonicity may be too small to be relevant. As such, only violations greater than *minvi* (default value is .03) are reported and for each reported violation a significance test at level α = .05 is computed.

3.8.1.6 Assessing item characteristics and parameters

Inspecting the H-coefficients

Mokken scale analysis was utilised to inspect the scalability coefficients. Three types of scalability coefficients exist: item-pair scalability coefficients, item scalability coefficients, and a test scalability coefficient (Van der Ark, 2007).

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[21] According to Joreskog and Sorbom (1996), polychoric correlations are suitable for ordinal data. Polychoric correlations deliver negligible or small bias compared to other correlations and it is also generally the best estimator.

An item-pair scalability coefficient exist for each pair of items, H_{ij}; *i, j = 1,…, J*. COV(X_i,X_j) is the covariance between X_i and X_j, and $COV(X_i,X_j)^{max}$ is the maximum covariance between X_i and X_j given the marginal distributions of X_i and X_j. If the variance of the scores on item *i* and item *j* are both positive, then H_{ij} is the normed covariance between the item scores:

$$\dot{H}_{ij} = \frac{COV(X_i, X_j)}{COV(X_i, X_j)^{max}}$$

If X_i or X_j have zero variance, H_{ij} can still be computed but the equation above is no longer true. In MSA, items belonging to the same Mokken scale should have positive item-pair scalability coefficients. Inspecting these coefficients form part of the assessment of the monotonicity assumption.

An item scalability coefficient exists for each item, H_j; *j = 1,…, J*. Let $R_{-j} = X_+ - X_j$; R_{-j} is called the rest score. COV(X_j,R_{-j}) is the covariance between X_j and R_{-j}, and $COV(X_j,R_{-j})^{max}$ is the maximum covariance between X_j and R_{-j} given the marginal distributions of X_j and R_{-j}. If X_j and R_{-j} both have positive variance, then H_j is the normed covariance between the item score and the rest score:

$$H_{ij} = \frac{COV(X_j, R_{-j})}{COV(X_j, R_{-j})^{max}}$$

Items belonging to the same Mokken scale should have an item scalability coefficient greater than a specific positive lower bound, *c*. Usually, c, the lower positive bound is greater than .3 H_j can be interpreted in a similar way as the discrimination parameters in parametric IRT.

A test scalability coefficient H, for the whole set of items can be expressed as

$$H = \frac{\sum COV(X_j, R_{-j})}{\sum COV(X_j, R_{-j})^{max}}$$

An item or a scale is considered weak if .3 < H < .4, considered moderately strong if .4 < H < .5, and considered strong if H > .5. The item and scale scalability coefficients were inspected.

Fitting the RSM and GRM

The rating scale model and graded response model was fitted to the data using the ltm package in R. Fitting the RSM and the GRM will provide the slope of the item step functions as well as the location parameter for each item step for each item in the scale. The ltm package uses a marginal maximum likelihood estimation process, using the Gauss-Hermite quadrature rule for the approximation of the required integrals. Parameter estimation under MMLE assumes that the respondents represent a random sample from a population and their ability is distributed according to a distribution function. For each item, m_i between category "threshold" parameters b_{ij} are estimated. The b*ij* parameters represent the trait level necessary to respond above threshold *j* with .50 probability. A single slope parameter, α, was estimated for each item, representing the capability of the item to distinguish between examinees with different ability levels.

According to Rizopoulos (2006) the fit the model(s) can be assessed by inspecting the two and three way margins rather than looking at the response patterns. The response pattern refers to the frequency of correct and incorrect responses on each item and on combinations of two or three items. For the two-way margins a 5 by 5 contingency table is constructed and obtained by taking the variables two at a time. The two or three largest chi-square residuals are listed and summed for each item pair. The rule of thumb for interpreting these margins are as follow: The values obtained in the two-way margins are compared to a critical chi-square value of $3.5*i_n*j_n$ (where n refers to the number of categories) which is equal to 87.5. The values obtained in the three-way margins are compared to a critical chi-square value of $3.5*i_n*j_n*k_n$, which is equal to 437.5. Residuals greater than the critical value are indicative of poor fit.

Rizopoulos (2006) further states that evaluating the fit of the model in the margins does not correspond to an overall goodness-of-fit test. As such, the unconstrained GRM was fitted as well to assess whether the unconstrained GRM provides a better fit than the constrained GRM (i.e. RSM). A likelihood ratio test (LRT) was used for this purpose. The LRT indicates whether going from the restrictive model to the less restrictive model significantly improves model fit (De Ayala, 2006). LRT is the difference between the two deviance statistics. A non-significant statistic indicates the additional complexity of the nesting model is unnecessary. The Akaike information criterion (AIC) and Bayesian information criterion (BIC) was inspected to assess model fit. These indices summarise the fit of the model. Both take number of parameters into account, however, the BIC also takes sample size into account, rewards goodness of fit, and includes a penalty that is an increasing function of the number of estimated parameters thereby reducing the tendency toward overparameterization. Lower AIC and BIC values indicate better model fit.

Assessing item parameters

According to Sijtsma, Emons, Bouwmeester, Nyklíček and Roorda (2008) a good instrument contains items of which the locations (b_j parameters) are widely spread along the scale. This allows for measurement at varying levels of the latent trait and can be used to determine mean differences between groups and individuals' levels of the latent trait. This line of reasoning was adopted for the purpose of this study as the instruments utilised in the study were used with the objective that the scales should be able differentiate sensitively between individuals that cover the whole of the θ scale. The instruments should be able to differentiate sensitively between students/instructors that cover the whole of the θ scale, and not only those that are very high or very low on the latent trait. Items with acceptable b_j-values are those that discriminate optimally across the whole/most of the θ scale. This is one the major advantages of IRT item analysis over CTT item analysis: it allows item selection for a specific test usage objective.

Sijtsma et al. (2008) state that the item's discrimination power is an important psychometric property as it is the degree to which the item distinguishes individuals with low level of the latent trait from individuals with relatively high levels of the latent trait. The higher the discrimination power the higher the item's contribution to reliable measurement. Items with high discrimination power will each contribute effectively to reliable measurement of individuals at different locations along the scale. According to Baker (2001) descriptive labels can be ascribed to discrimination parameters that fall within a specific range. These are: .01-.34 = very low; .35-.64 = low; .65-1.34 = moderate; 1.35-1.69 = high; and >1.7 = very high discrimination.

Item step response functions, option response functions, item information curves, and the test information function was inspected (Severo, Gaio, Lourenço, Alvelos, Bettencourt & Azevedo, 2011). ISRFs indicate the probability of obtaining a score of x_j or higher (versus lower scores) given a respondent's ability. Option response functions indicate the probability of obtaining a particular category score, x_j. The expected item score function plots the probability of a respondent's expected item score given their ability.

Item information curves (ICC) was examined to directly assess the amount of discrimination the items provide. ICCs are additive across items that are calibrated on a common latent scale. The ICC can be used to determine the contribution of each item to the precision of the total test. The summation of the ICCs results in the test information curve (TIC). The TIC can be utilised to ascertain how well a set of items is performing.

"Information" refers to the precision with which a parameter is estimated is measured by the variability of estimates around the values of the parameter (Baker, 2001). Thus, a measure of precision refers to the variance of the estimators which is denoted by σ^2. The amount of information, *I*, is given by the formula:

$$I = \frac{1}{\sigma 2}$$

Item response theory aims to determine the value of the ability parameter of the respondent. As such, the amount of information at a given ability level is the reciprocal of the variance of the ability parameter. If the amount of information is large, is suggests that the respondent's whose true ability is at that level can be estimated with precision. On the other hand, if the amount of information is small it suggests that the ability cannot be estimated with precision and the estimated will be widely spread around the true ability.

3.8.2 Dimensionality analysis

Each scale and subscale was designed with the intention to reflect an essentially unidimensional set of items. The purpose of these items is to operate as a stimulus set to which research participants respond with behaviour that is primarily an expression of the specific unidimensional latent variable in question. The intention was thus to obtain relative uncontaminated measures of the specific latent variable or dimensions of a latent variable via the items comprising the scale-subscale.

Dimensionality analysis was conducted to confirm the unidimensionality of the scales used to operationalise the latent variables that comprise the affirmative development trainer performance model, to remove items that have weak factor loadings, and, if necessary, to divide heterogeneous scales into two or more homogenous sets (De Goede, 2007; Theron, 2011). Support for unidimensionality would exist if the eigenvalue-greater-than-unity rule (supported by the scree plot) results in the extraction of a single factor; the magnitude of the factor loadings are reasonably high (>.50); and only a small percentage of the reproduced correlations are greater than .5. Dimensionality analysis thus complements item analysis as it aims to gather further evidence to justify the decision to remove any of the items from a specific scale that fails to reflect the variable of interest. Dimensionality via exploratory factor analysis complements the testing of the unidimensionality and local independence assumptions performed in the IRT item analysis via R.

Principal axis factoring (PAF) was used as the extraction technique. Principal axis factoring has several advantages over principal component analysis. Not only is it the most widely used and understood extraction technique, it also conforms to the factor analytic model where only common variance is analysed (random/error variance and unique variance is excluded) (Tabachnick & Fidell, 2007). PAF considers only common variance (i.e. common underlying dimensions within the data); it seeks the least number of factors that can account for common variance of a set of 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 event of factor fission, factor rotation was employed. Factor rotation is a technique used to discriminate between factors (Field, 2005). Oblique rotation allows factors to correlate whereas orthogonal rotation considers all factors to be independent (Field, 2005; Tabachnik & Fidell, 2007). Oblique rotation was employed in this study as it allowed for the possibility that the extracted factors may be correlated. Although this method is slightly more difficult to interpret, it generally produces more realistic results.

Latent variables, constitutively defined in terms of a two or more (p) dimensions (e.g. learning climate), was evaluated via structural equation modelling to determine the success with which the multi-dimensional latent variable was operationalised in terms of p homogenous subscales. Successful operationalisation is indicated if (a) the measurement model reflecting the design intention and the constitutive definition of the latent variable shows a close fit, (b) the freed factor loadings are all statistically significant ($p<.05$) and large ($\lambda_{ij} \geq .50$) in the completely standardised solution, (c) the measurement error variances are statistically significant ($p<.05$) and small (in the completely standardised solution) for all items, and (d) reasonably large R^2 values ($R^2 \geq .25$) for all items.

SPSS version 19 was employed to assess the unidimensionality of the scales used to operationalise the latent variables included in the proposed affirmative development trainer performance competency model.

3.8.3 Structural equation modelling

3.8.3.1 Variable type

Structural equation modelling (SEM) could be performed on the proposed affirmative development performance model by either utilising the individual scale items or by making use of item parcelling. Item parcelling involves summing or averaging item scores from two or more items and using these parcel scores as a substitute for item scores in SEM analysis (Bandalos, 2002).

Item parcelling presents several advantages. The use of item parcels can result in the estimation of fewer model parameters, therefore resulting in a more optimal variable to sample size ration and more stable parameter estimates, especially when sample sizes are relatively small (Bagozzi & Edwards, 1998; Little, Cunningham, Shahar, & Widaman, 2002). Various studies have, however, called the assumption that smaller parameter to sample size ratios would result in greater stability of parameter estimates into question (MacCallum, Widaman, Zhang, & Hong, 1999; Marsh, Hau, Balla, & Grayson, 1998).

Item parcelling is often used for situations in which the data to be analysed is non-normally distributed and coarsely categorised. Such conditions violate the assumptions on which normal theory maximum likelihood and generalised least squared estimation techniques are based. Item parcelling has been adopted as a means to mitigate these effects by making distributions more continuous and normally distributed (Bandalos, 2002). Researchers have also supported the use of parcelling based on findings that it achieves greater reliability, more definitive rotational results, and results in improved model fit compared to the results utilising individual items (Kishton & Widaman, 1994).

The use of parcelling is not without controversy or disadvantages. Parcels may actually increase the likelihood of misrepresenting a latent construct (Kim & Hagtvet, 2003). Its use depends on the unidimensionality of items being combined and when this assumption is not met, the use of parcels can obscure rather than clarify the factor structure of the data (Hall, Snell, & Singer Foust, 1999). Hall and colleagues (1999) have found that the use of parcelling can result in biased estimates of other model parameters. Caution was taken in using item parcels to establish scale norms as parcels may create arbitrary metrics that no longer carry important information regarding the threshold parameters that are contained in the scale (Little et al., 2002). Finally, Bandalos (2002) states that, due to the fact that item parcels have the effect of reducing the number of data points that must be fitted, solutions based on item parcelling would not yield as stringent a test of SEM models as would analyses based on the individual items.

Despite the disadvantages associated with item parcelling, the benefits of using this strategy seem to outweigh its possible handicaps. As such, item parcelling was employed in this study due to the statistical advantages associated with it.

Several strategies can be employed in the formation of item parcels including: random assignment, item-to-construct balance, a priori questionnaire construction, internal consistency, and the domain representative approach (Little et al., 2002). Theron (2011) suggests parcel formation based on either the factor loading information or based on the split-half method. The split-half method was employed in this study. Two item parcels were created per subscale: the first item parcel contained all even-numbered items and the second item parcel contained all odd-numbered items.

3.8.3.2 Multivariate normality and normalisation

The inappropriate analysis of continuous non-normal variables in structural equation models can result in incorrect standard errors and chi-square estimates. According to Theron (2010), failure to use the appropriate estimation technique can have significant negative effects on model fit. It is therefore essential that the univariate and multivariate normality of the indicator variables are assessed. This assessment was be performed via PRELIS in order to select the estimation technique best befitting the data.

Univariate tests of normality examine each individual variable for departures from normality (Van Heerden, 2013). This is accomplished by examining whether the standardised coefficients of skewness and kurtosis are significantly different from zero. Skewness and/or kurtosis values indicate significant departures from normality. Multivariate normality tests are performed to corroborate the univariate findings. The multivariate distribution cannot be normal if any of the observed variables deviate substantially from univariate normality. The converse is, however, not true. Univariate normality does not necessarily imply multivariate normality. Both the univariate and multivariate values of skewness and kurtosis should be assessed.

Normalisation would be attempted if the data does not follow a multivariate normal distribution (Jöreskog & Sörbom, 1996a). Robust likelihood estimation would be utilised if this attempt is unsuccessful.

3.8.3.3 Confirmatory factor analysis

Confirmatory factor analysis 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 relationship between the factors, and the nature of the loading patterns of the items on the factors. Williams, Ford, and Nguyen (2002, p. 367) state that "a measurement model represents an assumed process in which an underlying construct determines or causes behaviour that is reflected in the responses to… items on a questionnaire". Similarly, Hair and colleagues (2006) state that the measurement model is developed and specified by including the latent variables in the model and assigning indicator variables (items) to latent variables. The validation of the measurement model is accomplished by confirming that the various indicators hypothesised to measure the latent variables do, in fact, do so.

The comprehensive model comprises the structural model describing the structural relations that are hypothesised to exist between the latent variables and a measurement model describing the structural relations hypothesised to exist between the latent variables and the indicator variables that were earmarked to represent them. The fit of the comprehensive model can only be interpreted unambiguously for or against the fitted affirmative development trainer performance structural model if evidence exists that supports the claim that the indicator variables successfully reflect the latent variables (Diamantopoulos & Siguaw, 2000). As such, it is essential that the fit of the affirmative development trainer-instructor performance measurement model be evaluated prior to fitting the affirmative development trainer performance structural model. A poor fitting structural model can only be unambiguously interpreted as evidence against the structural relations hypothesised by the structural model if the measurement model fits closely.

Confirmatory factor analysis fits the hypothesised measurement model by finding model parameter estimates that allow the estimation of the reproduced covariance matrix that would subsequently be compared to the observed covariance matrix. Maximum likelihood estimation was to be used to derive the model parameters should the multivariate normality assumption be satisfied. Maximum likelihood estimation is the most common technique used to estimate the parameters, its yields, a set of parameter estimates, and their standard errors (Williams et al., 2002). These parameter estimates are used to obtain the estimated covariance matrix which provides an estimate of what the relationship among the observed variables are, given the specific model. If normalisation fails to achieve multivariate normality in the observed data, robust maximum likelihood estimation was to be employed. LISREL 8.8 (Du Toit & Du Toit, 2001) was used to perform the confirmatory factor analysis.

It would be ideal if the measurement model fits the population data exactly and perfectly explains the manner in which the indicator variables covary. The discrepancy between the estimated covariance matrix and the observed covariance matrix in the sample should therefore be explicable in terms of sampling error only, i.e. the hypothesis may be regarded as tenable; that the measurement model provides an exact description of the process that produced the observed covariance matrix in the population. Exact fit means that the stance is permissible; that the reproduced covariance matrix $\Sigma(\Theta)$ implied by the model and the observed population covariance matrix Σ are exactly the same in the population. This can be expressed as statistical **hypothesis 1a**, the null hypothesis of exact fit:

$$H_{01a}: RMSEA = 0$$

H_{a1a}: RMSEA > 0

The exact fit null hypothesis would be regarded as valid if the probability of observing the discrepancy between the observed and estimated covariance matrices in the sample given that H_{01a} is true in the population is sufficiently large (i.e., p>.05).

The exact fit null hypothesis is, however, an ambitious stance to hold. A more realistic stance is that the measurement model fits approximately in the population. The close fit null hypothesis can be expressed as statistical **hypothesis 1b**:

H_{01b}: RMSEA $\leq$ .050

H_{a1b}: RMSEA > .05

The close fit null hypothesis would be regarded as valid if the probability of observing the discrepancy between the observed and estimated covariance matrices in the sample given that H_{01b} is true in the population is sufficiently large (i.e., p > .05).

3.8.3.4 Interpretation of the measurement model fit and parameter estimates

The above hypothesis of exact and close model fit was investigated by means of conducting an overall fit assessment on the measurement model.

Measurement model fit was interpreted by inspecting the full array of fit indices provided by LISREL (Diamantopoulos & Siguaw, 2000). If the measurement model shows at least close fit the measurement model parameter estimates would be interpreted. More specifically, the statistical significance and magnitude of the freed factor loadings in Λ_X, the statistical significance and magnitude of the measurement error variances in the main diagonal in Θ_δ and the statistical significance and magnitude of the covariances between the latent variables. The magnitude and distribution of the standardised residuals and the magnitude of model modification indices calculated for Λ_X and Θ_δ would also be interpreted. Large modification index values indicate measurement model parameters that, if set free, would improve the fit of the model. If a large percentage of the currently fixed parameter in the model would result in a significant improvement in model fit when freed, this comments negatively on the fit of the measurement model in as far as it suggests that numerous possibilities exist to improve the fit of the current model proposed. Inspection of the model modification indices for the aforementioned matrices here primarily served the purpose of commenting on the model fit rather than suggesting ways of improving the measurement model.

The operationalisation of the latent variables comprising the structural model would be considered successful if (a) the measurement model reflecting the allocation of item parcels to the latent variable they were designed to reflect shows close fit, (b) the freed factor loadings are all statistically significant ($p < .05$) and large ($\lambda_{ij} \geq .71$) in the completely standardised solution, (c) the measurement error variances are statistically significant ($p < .05$) and small (in the completely standardised solution) for all items, and (d) reasonably large R^2 values ($R^2 \geq .50$) for all item parcels.

The latent variables in the measurement model are in terms of the theorising underlying the structural model assumed to be qualitatively distinct, separate constructs. When latent variables correlate strongly in Φ concern arises as to whether the latent variables are in fact qualitatively distinct, separate constructs. The discriminate validity of the measurement model would be examined by calculating confidence intervals for the ϕ_{ij} estimates using an Excel template developed by Scientific Software International (Mels, 2010). If the 95% confidence intervals for the variance phi-estimates ϕ_{ij} do not include unity, discriminant validity has been shown. If one or more confidence-intervals do contain unity it suggests that the correlation between those two latent variables could be unity in the parameter. Confidence in the claim/position that the two latent variables in question are qualitatively distinct constructs is then seriously compromised.

The above hypotheses of exact and close model fit were investigated by means of conducting an overall fit assessment on the measurement model. Measurement model fit was interpreted by inspecting the complete range of goodness of fit indices provided by LISREL (Diamantopoulos & Siguaw, 2000). Should the close fit null hypothesis (H_{01b}) failed to be rejected and the remaining conditions listed above be satisfied, H_{02a} and H_{02b} were be tested by fitting the comprehensive LISREL (comprising the measurement and structural model). The comprehensive affirmative development trainer performance LISREL model would be fitted by analysing the covariance matrix. For the sake of brevity, a detailed discussion of these indices is undertaken only in Chapter 4.

3.8.3.5 Comprehensive model fit

The structural model proposes specific structural hypothesis concerning the psychological process underlying the performance of trainers. The structural model thus provides a tentative explanation as to why the indicator variables covary in the manner that they do in the observed covariance matrix. The structural model fits the observed data to the extent that the covariance matrix reproduced from the parameter estimates obtained for the comprehensive model corresponds to the empirical covariance matrix. The inference is that the structural model with its parameter estimates fits the data if the comprehensive model can closely reproduce the observed covariance matrix when the measurement model also manages to do so. Conversely, the inference is that the structural model, with its parameter estimates, does not fit the data if the comprehensive model cannot closely reproduce the observed covariance matrix when the measurement model earlier managed to do so.

3.8.3.6 Interpretation of the structural model fit

A wide range of goodness of fit indices exist that can be utilised as summary measures of the fit of the overall model. Diamantopoulos and Siguaw (2000) caution, however, that none of these indices are unequivocally superior to the rest in all circumstances. In fact, particular indices have been shown to operate somewhat differently under various conditions. These researchers suggest that sample size, estimation procedure, model complexity, degree of multivariate normality, and variable independence, or any combination thereof, can influence the statistical power of the given indices.

It would be ideal if the measurement model fits the population data exactly and perfectly explains the manner in which the indicator variables covary. The discrepancy between the estimated covariance matrix and the observed covariance matrix in the sample should therefore be explicable in terms of sampling error only, i.e. the hypothesis may be regarded as tenable; that the measurement model provides an exact description of the process that produced the observed covariance matrix in the population. This can be expressed as statistical **hypothesis 2a**, the null hypothesis of exact fit of the structural model:

H_{02a}: RMSEA = 0

H_{a2a}: RMSEA > 0

Similar to the testing of the null hypothesis of exact fit of the measurement model, it is extremely unlikely that exact fit will be obtained in the comprehensive model as any model is only an approximation of reality. It is more likely that the reproduced covariance matrix implied by the model Σ(Θ) would closely approximate the observed population covariance matrix Σ. This can be expressed as the statistical **hypothesis 2b**, the null hypothesis of close fit of the structural model:

H_{02b}: RMSEA ≤ .05

H_{a2b}: RMSEA > .05

If support is obtained for the close fit null hypothesis (i.e. H02b is not rejected) the complete range of LISREL fit statistics and standardised residuals would be examined once again to arrive at a verdict on the fit of the comprehensive model. The fit indices were interpreted holistically and were carefully assessed before conclusions regarding model fit were made (Diamantopoulos & Siguaw, 2000). Once again, in the interest of succinctness, the indicators of fit are discussed in detail in Chapter 4. The unstandardised beta and gamma matrices were examined to assess the significance of the hypothesised causal relationships as well as the variance-covariance matrices. Squared multiple correlations and the completely standardised factor loadings were examined. The modification indices for the gamma (**Γ**), beta (**Β**), and psi (**Ψ**) matrices and the resultant change indexes presented by LISREL were also reviewed to identify possible model modifications. Finally, the standardised residuals, the stem-leaf residual plot, and Q-plot were also investigated and presented.

3.8.6.7 The inclusion of the moderating effect

The orthogonalised interaction approach developed by Little, Bovaird, and Widaman (2006) was utilised to assess the moderating effect of mastery classroom goal structure on the relationship between mastery goal orientation and learning motivation.

Little et al. (2006) used an all-possible-pairs strategy to construct interaction indicators (Marsh, Wen, Hau, Little, Bovaird, & Widaman, 2007). This method involves orthogonalised indicators created for a latent interaction construct by forming each possible product term from the set of indicators for the two latent variables, or constructs, involved in the interaction effect. The resultant uncentered product terms are then individually regressed onto the first-order effect indicators of the constructs. The residual obtained for the regression model is saved and used as an indicator of the interaction construct. The procedure is repeated for each of the uncentered product terms. The orthogonalised product terms (i.e., the residuals) are then included as indicators of a single latent interaction construct. The procedure suggested by Little and colleagues was applied to item parcels in this study.

An alternative item pairing strategy for the construction of interaction indicators was suggested by Marsh, Wen, and Hau (2004). Their decision was based on the logical rationale that all information should be used and information should not be reused (Marsh et al., 2007). The former referred to the guideline that all of the multiple indicators should be used in the formation of the indicators of the latent variable interaction factor. The latter refers to the guideline that multiple indicators should be used only once in the formation of the multiple indicators of the latent variable interaction factor to avoid creating artificially correlated uniquenesses when the same indicator is used to construct more than one product indicator. Marsh, Wen, and Hau (2004) expressed their criticism towards the all-possible-pairs strategy of constructing indicators of the interaction term.

Although Little et al. (2006) failed to present a rationale for their choice of approach and failed to consider any of the alternative strategies proposed by Marsh et al. (2006) in their simulation, they did compensate for the fact that each first order indicator was used in the construction of multiple product indicators by incorporating an elaborate network of correlated uniquenesses. Their approach did indirectly satisfy the criteria proposed by Marsh et al. (2006, as cited in Marsh et al., 2007) by controlling for artificial correlations among indicators with the use of correlated uniquenesses.

The Little et al. approach SEM parameterisation is characterised by the unique variance common to the created indicators, depending on which first-order effect indicators were used to create them. As such, the correlations between the residual variances of the interaction indicators should be specified and be allowed to have correlated residuals. Furthermore, the latent interaction term is not allowed to correlate with the main effect latent variables.

Little and colleagues compared the parameter estimates obtained from their approach to the unconstrained mean-centred approach of Marsh, Wen, and Hau, (2004) and the latent moderated structural (LMS) approach of Klein and Moosbrugger (2000). They found that their orthogonalised approach results in nearly identical parameter estimates compared to the other two approaches. The LMS approach did, however, result in lower AIC and BIC values, indicating a more parsimonious model. The deflated fit is achieved due to the interaction construct not being estimated directly as with the other two approaches and, consequently, fewer parameters are estimated. The orthogonalised approach did result in somewhat better fit than the two other approaches (even though both the mean-centred and orthogonalised approaches obtained excellent model fit) due to the complete orthogonality derived from residual centring that mean centring only approximates.

The Little et al. approach suffers from the limitation that the standard errors, and thus significance levels, of the parameters may be biased. However, the regression residuals that are used to estimate latent variable interactions from this orthogonalising procedure are generally fairly normally distributed and as a result, it is likely that the standard maximum likelihood estimator provides a reasonably robust estimate of standard errors and significance.

CHAPTER 4: RESEARCH RESULTS

4.1 Introduction

This chapter presents the statistical results of the various analyses performed. The results of the CTT item and IRT item analyses executed are presented to assess the psychometric integrity of the indicator variables meant to represent the various latent variables comprising the structural model derived in response to the research initiating question. This is followed by an evaluation of the extent to which the data satisfied the statistical assumptions relevant to the analysis techniques utilised. The fit of the measurement model is subsequently evaluated. If acceptable measurement model fit would be obtained, the structural model was to be considered.

4.2 Missing values

Missing values was addressed before analysing the data. Missing values did not seriously plague the majority of the items comprising the scales used to operationalise the latent variables in the model. However, there were a few respondents that failed to complete a whole scale (or more than one scale). The maximum number of items that was not completed by a single respondent was 77. The maximum number of respondents who failed to respond to any individual item was nine. Due to the fact that an adequate sample size was obtained, it was decided to delete all respondents that failed to complete more than 8% of the questionnaire. These respondents were eliminated from the dataset because they failed to respond to a whole scale (or more than one scale). It would thus become untenable to impute values for these respondents. Based on this criterion, 11 respondents were deleted from the dataset, resulting in a dataset containing 563 respondents.

Table 4.1 depicts the distribution of missing values across items.

Table 4.1.
Distribution of missing values across items

A1	A2	A3	A4	A5	A6	A7	A8	B1
0	3	2	3	0	2	1	0	0
B2	B3	B4	B5	B6	C1	C2	C3	C4
0	0	0	0	0	5	1	2	6
C5	D1	D2	D3	D4	D5	D6	E1	E2
3	1	2	1	2	1	0	1	2
E3	E4	E5	E6	E7	E8	E9	E10	E11
1	3	3	0	3	0	1	0	0
E12	E13	E14	E15	E16	E17	E18	E19	E20
0	2	2	7	3	2	1	4	2
E21	E22	E23	E24	E25	E26	E27	E28	E29
2	4	2	4	3	9	2	2	4
E30	E31	E32	E33	E34	E35	E36	E37	F1
1	2	1	0	0	3	3	3	1
F2	F3	F4	F5	F6	F7	F8	G1	G2
1	10	2	4	1	2	0	0	5
G3	G4	G5	G6	G7	G8	G9	G10	G11
2	0	0	1	0	2	2	5	4
G12	G13	G14	G15	G17	G18	G19	G20	G20
3	5	2	4	8	3	3	3	5
H1	H2	H3	H4	H5	H6	H7	H8	H9
6	7	6	2	3	3	0	1	2
H10	I1	I2	I3	I4	I5	I6	I7	I8
1	1	0	3	3	3	1	0	0
I9	I10	I11	I12	I13	J1	J2	J3	J4
5	1	1	1	2	0	0	3	2
J5	J6	J7	J8	J9	J10	J11	J12	K1
1	3	5	2	4	2	2	3	3
K2	K3	K4	K5	K6	K7	K8	K9	K10
3	3	1	0	5	2	2	2	2
L1	L2	L3	L4	L5	L6	L7	L8	L9
1	2	4	5	2	4	4	2	2
L10	L11	L12	L13	L14	M1	M2	M3	M4
3	1	2	4	3	2	2	4	4
M5	M7	M8	M9	M10	M11			
4	1	3	1	1	2			

where A=Academic self-efficacy, B=Learning Motivation, C=Mastery goal orientation, D=Mastery goal structure, E=Learning climate, F=Inspiring professional vision, G=Enhancing student academic self-efficacy, H=Fostering psychological safety and fairness, I=Demonstrating individual consideration, J=Stimulating involvement and interest, K=Providing inspirational motivation, L=Providing autonomy support, and M=Promoting a mastery goal structure

Imputation by matching was selected as the method for imputation. This method makes less stringent assumptions than multiple imputation procedures and normally appears to be the most conservative, safe procedure in the treatment of missing values (Theron, 2010). The items least plagued by missing values were identified to serve as matching variables in order to substitute real values for missing values. LISREL was, however, unable to run the analysis.

Multiple imputation (MI) was, consequently, used as the method to solve the problem of missing values. This method conducts several imputations for each missing value. Each imputation creates a completed data set, which could be analysed separately in order to obtain multiple estimates of the parameters of the model (Davey et al, Raghunatha and Schafer as cited in Dunbar-Isaacson, p.29, 2006). LISREL substitutes missing values for each case with the average of the values imputed in each of the data sets (Du Toit & Du Toit, 2001). Plausible values are therefore delivered whilst also reflecting the uncertainty in the estimates. This method is advantageous due to the fact that all cases are retained in the imputed data set (Du Toit & Du Toit, 2001).

The data in this study met the requirements according to Mels (2007) for the use of the multiple imputation methods: the observed variables were measured on a scale comprising five or more scale values, the observed variables were not excessively skewed and less than 30% of the data were missing.

4.3 Sample

Five-hundred-and-seventy-four questionnaires (N=574) were obtained over the course of two weeks. Twenty-eight classrooms and 21 lecturers were visited. Due to the large number of missing values for some respondents, their responses were deleted from the dataset (as explained above). A description of the effective sample after the listwise deletion of cases (that had missing values on more than 8% of the variables) and after the imputation of missing values in the remaining data set (N=563) is provided in Table 4.2.

Table 4.2
Sample characteristics

GENDER		
Variable	**Frequency**	**Percentage**
Male	365	64.8
Female	193	34.3
No Response	5	.9
RACE		
Variable	**Frequency**	**Percentage**
Black	250	44.4
Coloured	303	53.8
Indian	1	.18
White	7	1.24
Other	2	.36
AGE		
Variable	**Frequency**	**Percentage**
< 20	58	10.3
$\geq 20 \text{ x} < 25$	355	63.1
$\geq 25 \text{ x} < 30$	99	17.6
$\geq 30 \text{ x} < 35$	34	6.0
> 35	7	1.2
No response	10	1.8
Mean	23.05	-
Standard deviation	3.88	-
Minimum	16	-
Maximum	47	-
LANGUAGE		
Variable	**Frequency**	**Percentage**
Afrikaans	212	37.65
English	105	18.65
Setswana	1	.18
Sotho	10	1.78
Xhosa	233	41.38
Xisonga	1	.18
Zulu	1	.18
No response	0	-
EDUCATION		
National Qualifications Framework level	**Frequency**	**Percentage**
NQF 1: Grade 9	10	1.78
NQF 2: Grade 10 and National Certificates level 2	102	18.12
NQF 3: Grade 11 and National Certificates level 3	86	15.28
NQF 4: Grade 12 and National Certificates level 4	265	47.07
NQF 5: Higher Certificates & Advanced National Cert	64	11.37
NQF 6: Diploma and Advanced certificates	12	2.13
NQF 7 - NQF 10: Bachelor’s degree and higher	0	0
No response	24	4.26

4.4 Psychometric evaluation of the measurement instruments

A psychometric evaluation of the measurement instruments was conducted. The results of the analysis are presented on a scale-by-scale basis. All the scales were subjected to classical measurement theory item analysis, item response theory item analysis and exploratory factory analysis.

Item analysis was performed to identify and eliminate possible items that do not contribute to an internally consistent description of the various latent variables forming part of the proposed trainer-instructor performance competency model (Theron, 2010). Item analysis was conducted on all the scales after multiple imputation was completed. Decisions with regard to the deletion of an item were based on a basket of evidence obtained from the CTT. Items that were considered problematic were not used to represent latent variables in the model and were not included in the calculation of the composite indicator variables (i.e. item parcels). Item analysis was conducted by means of SPSS Reliability Procedure (SPSS 19.0).

The items in the various scales and subscales were designed to serve as stimulus sets to which respondents react with behaviour that is primarily an expression of a specific unidimensional underlying latent variable. Unrestricted principal axis factor analysis with oblique rotation was performed on the various scales and subscales. The purpose of the analysis was to evaluate whether the position that each scale or subscale measure a single indivisible factor was a tenable one, and if so, to evaluate the extent to which each item, along with the rest of the items in the particular scale, measure the underlying latent variable[22]. Items that were deleted during the item analysis phase were not included in the factor analysis.

The eigenvalue-greater-than-one rule and scree test were used to determine how many factors are required to adequately explain the observed correlation matrix (Tabachnick & Fidell, 2001). Factor loadings of items on the factor they were designated to reflect will be considered satisfactory if they are greater than .50. The adequacy of the extracted solution as an explanation of the observed inter-item correlation matrix was evaluated by calculating the percentage large (> .05) residual correlations.

[22] The extraction of a single factor on which all items of a subscale load with substantial (λij>.50) loadings would, however, not yet warrant the conclusion that the items all successfully measure the specific latent variable they were designed to reflect. The hypothesis that the items of a specific subscale successfully measure the specific latent variable they were designed to represent, nonetheless is survived an opportunity to be refuted.

Confirmatory factor analysis (CFA) was conducted on the scales that were conceptualised and operationalised as multi-dimensional. As such, CFA was conducted on the *learning climate* scale.

In the case were a single factor explained the variance obtained, item response theory item analysis was conducted to obtain further information on the item and scale parameters. Unidimensionality is a strict assumption that must be met in order to conduct IRT item analysis on a scale. IRT item analysis was thus not conducted on the scale where the forced extraction of a single factor was utilised. Mokken scale analysis was employed to assess the unidimensionality and monotonicity assumptions underlying IRT models. IRT item analysis was conducted by applying both the Rating Scale Model (RMS) and Graded Response Model (GRM) to the data using R (R 2.1.15). The fit of each model was evaluated as well as the relative fit. If the model fit significantly improved moving from the more constrained RSM to the less constrained GRM, the GRM was selected as the model most adequately describing the data. If the model fit did not significantly improve, the RSM was considered to describe the data best.

4.4.1 Psychometric evaluation of the academic self-efficacy scale

The *academic self-efficacy* scale comprised of eight items measured on a 5-point Likert scale with response categories ranging from *strongly disagree* to *strongly agree.*

4.4.1.1 CTT item analysis: Academic self-efficacy

The *self-efficacy* scale obtained a Cronbach's alpha of .866. This was considered satisfactory as it exceeded the critical cut off value set for this study of .80. Approximately 87% of the variance in the item responses can be explained in terms of a systematic source of variance (but not necessarily unidimensional and not necessarily the intended source). The item means ranged from 3.77 to 4.56 and the item standard deviations ranged from .677 to .897. Item A6 returned the highest mean and the second lowest standard deviation. The A6 mean is not sufficiently extreme to have significantly curtailed the variance of the distribution. The inter-item correlation matrix revealed correlations ranging between .364 and .572.

The results for the item analysis for the *self-efficacy* scale are depicted in Table 4. All corrected-item total correlations exceeded .3, but item A3 and A7 obtained lower values than the other items. The squared multiple correlations of items A3 and A7 are also slightly lower than the value of the other items. The inter-item correlation matrix indicated that item A1 and A5 showed the highest correlations with the other items in the scale and items A3 and A6 showed the lowest correlations with other the other items. The basket of evidence from the CTT results suggest that items A1 and A5 are the stronger items in the scale and items A3, A7 and A8 are the weaker items in the scale.

The item total correlations raised no concerns, indicating that the correlation between each item and the total score calculated from the remaining items were satisfactory and that the items were reflecting the same underlying factor. In addition, the squared multiple correlations were satisfactory and the results revealed that none of the items, if deleted, would increase the current Cronbach alpha. None of the items were flagged as problematic based on the CTT results and all the items of the *academic self-efficacy* scale were retained. This is in line with the results found by Burger (2012) and Van Heerden (2013).

Table 4.3

Self-efficacy scale: CTT Item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.866	.868	8

Item Statistics

	Mean	Std. Deviation	N
A1	4.13677	.852533	563
A2	3.76554	.855224	563
A3	4.40142	.684447	563
A4	3.93783	.897629	563
A5	4.30195	.764734	563
A6	4.56306	.678222	563
A7	4.40675	.677359	563
A8	4.24689	.783143	563

Inter-Item Correlation Matrix

	A1	A2	A3	A4	A5	A6	A7	A8
A1	1.000	.486	.394	.430	.567	.556	.403	.525
A2	.486	1.000	.456	.572	.470	.391	.423	.411
A3	.394	.456	1.000	.498	.370	.398	.453	.369
A4	.430	.572	.498	1.000	.476	.364	.419	.407
A5	.567	.470	.370	.476	1.000	.543	.377	.478
A6	.556	.391	.398	.364	.543	1.000	.477	.458
A7	.403	.423	.453	.419	.377	.477	1.000	.464
A8	.525	.411	.369	.407	.478	.458	.464	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	29.62345	14.950	.663	.484	.845
A2	29.99467	15.091	.636	.438	.848
A3	29.35879	16.405	.573	.360	.855
A4	29.82238	14.919	.624	.444	.850
A5	29.45826	15.544	.650	.462	.847
A6	29.19716	16.194	.622	.447	.850
A7	29.35346	16.386	.585	.377	.854
A8	29.51332	15.667	.608	.394	.851

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.220	3.766	4.563	.798	1.212	.069	8
Item Variances	.606	.459	.806	.347	1.756	.019	8
Inter-Item Covariances	.271	.185	.439	.255	2.379	.004	8
Inter-Item Correlations	.451	.364	.572	.208	1.569	.004	8

4.4.1.2 Dimensionality analysis: Academic self-efficacy

The full academic self-efficacy scale was factor analysed as none of the items were removed during the reliability analysis.

The correlation matrix showed that all correlations were larger than .30 and all were statistically significant ($p < .05$). The scale obtained a KMO of .895 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. The resultant factor structure is shown in Table 4.4.

Table 4.4
Factor matrix for the academic self-efficacy scale

	Factor
	1
A1	.725
A2	.683
A3	.615
A4	.671
A5	.706
A6	.680
A7	.633
A8	.661

46.0% of the non-redundant residuals obtained absolute values greater than .05. This erodes the credibility of the conclusion derived from the extracted factor solution above that all six the items provide relatively uncontaminated reflections of the single latent variable, learning motivation.

4.4.1.3 IRT item analysis: Academic self-efficacy scale

Assessment of the scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 4.81 and the first-to-second factor eigenvalue ratio equalled 5.94. The assumption of unidimensionality was thus met. The covariance matrix and item-pair H-coefficients contained no negative correlations. The monotonicity summary indicated that although there were some violations, none of the violations were significant and the fit index values were below the critical cut-off value of 40. The monotonicity assumption thus holds. The AISP procedure partitioned all the items into one scale, indicating that all the items are scalable.

All the residual values in the two-way margins for both the RSM and GRM models were smaller than the critical chi-square value of 87.5. Three triplets of items were flagged as exceeding the critical chi-square value for both the RSM and the GRM. Both the GRM and RSM margins flagged the item triplet 1, 2 and 8 and item triplet 3, 5 and 6 as indicating poor fit. In addition, the three-way margins for the RSM identified the item triplet 2, 3 and 4 was problematic and for the GRM the item triplet 1, 2, and 4 was identified as problematic, suggesting that both the RSM and GRM inadequately fit the data. Although the AIC and BIC indicated that the RSM fit the data better, the LRT revealed that moving from the more restrictive RSM to the less restrictive GRM did not significantly improve model fit ($p > .01$).

Although the model failed to adequately describe the relationship between item response and latent trait in the case of two items, the RSM best describes the data.[23] As such, the RSM item parameters were interpreted. The inability of the RSM model to adequately describe the relationship between item response and latent trait in the case of two items, however, cautions against an uncritical acceptance of the results.

Table 4.3 shows that the discrimination parameters of all items in the RSM are equal to 1.985. These item discrimination values are very high (Baker, 2001). The location parameters appear to function mostly at the lower end (below the mean) of the latent trait scale. In particular, for item A6 individuals who lie .45 standard deviations below the mean have a .50 probability of obtaining the highest category score 4, whereas for item A2 individuals that lie 1.3 standard deviations above the mean have a .50 probability of selecting the highest response option. This implies that respondents with average self-efficacy level would tend to endorse the *agree* or *strongly* agree category.

Table 4.5

Self-efficacy scale: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*a*	Item *H*	% of information contributed
A1	-3.121	-2.280	-1.289	.454	1.985	.551	12.29
A2	-3.108	-1.818	-.718	1.296	1.985	.558	13.54
A3	-3.646	-2.906	-2.072	.043	1.985	.486	12.04
A4	-3.022	-1.909	-.962	.826	1.985	.534	12.78
A5	-3.517	-2.705	-1.562	.178	1.985	.537	12.50
A6	-3.708	-2.965	-2.154	-.450	1.985	.550	11.68
A7	-4.910	-2.990	-2.199	.035	1.985	.495	12.69
A8	-3.425	-2.879	-1.562	.290	1.985	.507	12.46

With regard to the percentage of information contributed to the scale, Table 4.5 shows that item A2 contributes the most information to the scale whereas item A6 contributes the least information. The H coefficients indicate all the items except item A3 and A7 can be considered

[23] If an item is found to show poor fit for the RSM and/or the GRM, it implies that the item statistic is not plausible and should therefore not be interpreted. According to the underlying philosophy of the Rasch model, the model is fitted to the data and if the data shows misfit, the data (and not the model) is discarded. In this case, however, the model is fitted to the data, and where model misfit is found, the model is rejected as an explanation of the relationship between item responses and the latent trait. As such, the model parameters should not be interpreted as tenable.

items of strong scalability. Items A3 and A7 fall within the moderate scalability category yet lean slightly more towards strong scalability. The scale H is strong, with a coefficient of .528.

All the items, but in particular item(s) A6 (as well as A3 and A7), can be considered to discriminate poorly among individuals with above average self-efficacy. However, none of the items can indubitably be described as poor items. All the items discriminate satisfactory among individuals of average and below average self-efficacy. The test information function for the scale is displayed below in Figure 8. The test information function for the academic self-efficacy scale confirms the scale's difficulty in accurately discriminating between cases with above-average self-efficacy.

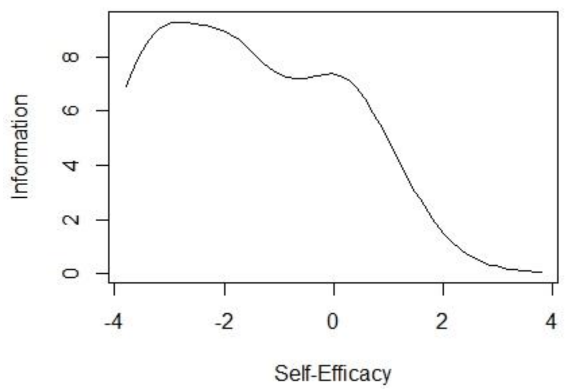

Figure 4.1. ***Self-efficacy scale information function***

4.4.2 Psychometric evaluation of the learning motivation scale

The *learning motivation* scale consists of 6 items measured on a 5-point Likert scale with response categories ranging from *strongly disagree* to *strongly agree*.

4.4.2.1 CCT item analysis: Learning motivation

The results for the item analysis for the *learning motivation* scale are depicted in Table 6. The *learning motivation* scale obtained a satisfactory Cronbach's alpha of .817. The item means ranged from 4.13 to 4.64 and the item standard deviations ranged from .61 to .86. This indicates that most individuals endorsed the agree category. None of the items means could be considered extreme means. The correlations in the inter-item correlation matrix ranged between .298 and .635. All the corrected item total correlations and squared multiple correlations were satisfactory. The squared multiple correlation indicates the multiple correlation when regressing each item on a weighted linear composite of the remaining variables. The squared multiple correlations were, however smaller for item B1 and, in particular, for item B2 in comparison with the other items. The results, however, revealed that none of the items would increase the current Cronbach alpha if deleted. The results of the item analysis of the *learning motivation* scale therefore did not raise any concerns. None of the items were deleted. This is in line with the results found by Burger (2012) and Van Heerden (2013).

Table 4.6

Learning motivation scale: CTT Item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.817	.825	6

Item Statistics

	Mean	Std. Deviation	N
B1	4.52575	.626202	563
B2	4.12789	.863239	563
B3	4.33393	.746548	563
B4	4.45293	.697610	563
B5	4.25044	.843319	563
B6	4.64121	.610589	563

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	21.80639	7.975	.530	.291	.800
B2	22.20426	7.248	.483	.253	.815
B3	21.99822	7.087	.653	.472	.772
B4	21.87922	7.185	.687	.511	.767
B5	22.08171	6.936	.584	.384	.790
B6	21.69094	7.794	.608	.397	.786

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.389	4.128	4.641	.513	1.124	.035	6
Item Variances	.544	.373	.745	.372	1.999	.025	6
Inter-Item Covariances	.232	.171	.331	.160	1.932	.003	6
Inter-Item Correlations	.440	.298	.635	.337	2.130	.007	6

4.4.2.2 Dimensionality analysis: Learning motivation

The correlation matrix showed that all correlations were larger than .30 and all were statistically significant ($p < .05$). The scale obtained a KMO of .849 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted since only one factor obtained an eigenvalue greater than 1. The scree plot also suggested that a single factor should be extracted. Although the loadings for item B1 and B2 in the factor matrix were lower, compared to the other items in the scale, all the factor loadings were nonetheless larger than .50 and thus satisfactory. The lower loadings of B1 and B2 echo the results obtained in the CTT item analysis. The resultant factor structure is shown in Table 4.7.

Table 4.7

Factor matrix for the learning motivation scale

	Factor
	1
B1	.585
B2	.537
B3	.735
B4	.783
B5	.668
B6	.678

40.0% of the non-redundant residuals obtained absolute values greater than .05. The credibility of the extracted factor solution was therefore somewhat tenuous, yet acceptable. The unidimensionality of the scale was confirmed.

4.4.2.3 IRT item analysis: Learning motivation

Examination of the scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 3.74 and the first-to-second factor eigenvalue ratio is equal to 5.34. The assumption of unidimensionality therefore held. The covariance matrix and item-pair H-coefficients showed only positive correlations. No significant violations were present in the monotonicity summary and the fit index values were below the critical cut-off value of

40. The monotonicity assumption held for the data. The AISP procedure partitioned all the items into one scale, indicating that all the items were scalable.

All the residual values in the two-way margins for both the RSM and GRM model were smaller than the critical chi-square value of 87.5. For both the RSM and the GRM one triplet of items was flagged as exceeding the critical chi-square value. The three-way margins for the RSM identified the item triplet 2, 5 and 6 as a misfit and for the GRM the item triplet 1, 3, and 6 was identified as a misfit. The AIC and BIC indicated that the GRM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit ($p < .01$). The GRM thus described the data best.

Table 4.8 shows that the discrimination parameters of the items in the GRM range from moderate discrimination (a_{B2}=1.197) to very high discrimination (a_{B4}=3.403). The location parameters appear to function mostly at the lower end (below the mean) of the latent trait scale. For item B1 and B2, respondents need extremely low learning motivation to have a .50 probability of obtaining a category score of 1 or higher. For item B2, respondents need to fall .587 standard deviation above the mean to have a probability of .5 to obtain the highest category score, 4. The option response functions (not included) show the general trend that respondents that have a standing on the latent trait ranging from the 0 to 1.5 standard deviations below the mean are most likely to select category 4 (*agree*). The scale therefore seems to somewhat problematic in terms of its ability to discriminate between cases that fall towards the upper end of the learning motivation latent trait continuum.

Table 4.8

Learning motivation scale: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*A*	Item *H*	% of information contributed
B1	-4.305	-3.760	-2.854	-.283	1.480	.486	9.72
B2	-4.263	-2.907	-1.573	.587	1.197	.433	8.43
B3	-3.288	-2.362	-1.563	.098	2.535	.543	14.98
B4	-3.238	-2.479	-1.560	-.150	3.403	.571	30.19
B5	-3.254	-2.361	-1.436	.172	1.920	.490	14.10
B6	-3.590	-2.862	-2.263	-.631	2.326	.553	16.94

In terms of the percentage of information contributed to the scale, item B4 contributed the most information to the scale whereas item B2 contributed the least. The more information an item contributed, the higher the measurement accuracy of that item. The H coefficients indicated that items B3, B4 and B6 can be considered items of strong scalability. Items B1, B2, B5 and B7 fell within the moderate scalability category. The scale can be considered as possessing strong scalability, with a scale H-coefficient of .507. The scale therefore is able to reasonably accurately identify the location of individuals on the latent trait continuum.

All the items, but in particular items B1, B3, B4, and B6 can be considered to discriminate poorly among individuals with above average self-efficacy. Items B2 and B5 discriminated satisfactory among individuals of average and below average self-efficacy. This is reflected in the test information function displayed below in Figure 4.2. The graph shows that the scale is most informative below the mean. More specifically, two peaks can be seen on the graph, indicating that the scale is most informative between approximately -3 and -1.5 standard deviations below the mean and between -.5 standard deviation below the mean and .5 standard deviations above the mean.

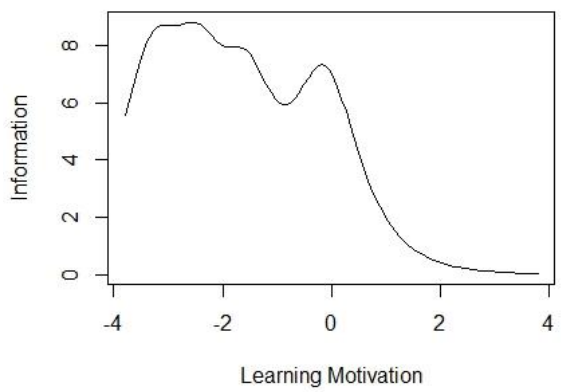

Figure 4.2. ***Learning motivation scale information function***

4.4.3 Psychometric evaluation of the mastery goal orientation scale

This study utilised a measure developed by Midgley et al. (2000) to measure the *goal-orientation* construct. The measure comprises of 14 items that are divided into three scales. These three scales represent the three components of *goal-orientation*: *performance-*

approach, performance-avoidance and *mastery goal-orientation*. The operationalisation *of goal-orientation* of this measure thus corresponds to the constitutive definition of the construct as used in this study. As this study is only formally pursuing the relationship between *mastery goal-orientation* and *learning performance*, item analysis was only performance on the five items comprising *mastery goal-orientation*. The items were measured on a 5-point Likert scale.

4.4.3.1 CTT item analysis: Mastery goal orientation

The results for the item analysis for the *mastery goal orientation* scale are depicted below in Table 4.8. The scale obtained a marginally satisfactory Cronbach's alpha of .799. The item means covered the upper part of the scale and ranged from 4.46 to 4.64 and the item standard deviations ranged from .58 to .66. The inter-item correlation matrix revealed correlations ranging between .362 and .547.

All the corrected item-total correlations and squared multiple correlations were satisfactory, with no seeming outliers. The results revealed that none of the items would increase the current Cronbach alpha if deleted. The results of the item analysis of the *mastery goal orientation* scale therefore did not raise any concerns. All the items in the scale were therefore retained.

Table 4.9

Mastery goal orientation scale: CTT Item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.799	.800	5

Item Statistics

	Mean	Std. Deviation	N
C1	4.45826	.650443	563
C2	4.57016	.614155	563
C3	4.47069	.659271	563
C4	4.47602	.651342	563
C5	4.63943	.584200	563

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
C1	18.15631	3.669	.582	.376	.760
C2	18.04440	3.772	.584	.377	.760
C3	18.14387	3.593	.606	.372	.752
C4	18.13854	3.749	.543	.329	.773
C5	17.97513	3.846	.592	.378	.758

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.523	4.458	4.639	.181	1.041	.006	5
Item Variances	.400	.341	.435	.093	1.274	.002	5
Inter-Item Covariances	.177	.137	.219	.082	1.601	.001	5
Inter-Item Correlations	.444	.362	.547	.185	1.512	.004	5

4.4.3.2 Dimensionality analysis: Mastery goal orientation

As none of the items included in the *mastery goal orientation* scale were deleted during item analysis, the full scale was subjected to factor analysis.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .807 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item C3 obtained the highest factor loading. The resultant factor structure is shown in Table 4.10.

40.0% of the non-redundant residuals obtained absolute values greater than .05. The credibility of the extracted factor solution was therefore somewhat tenuous, yet acceptable. The unidimensionality of the scale was confirmed.

Table 4.10

Factor matrix for the mastery goal orientation scale

	Factor
	1
C1	.670
C2	.668
C3	.700
C4	.622
C5	.674

4.4.3.3 IRT item analysis: Mastery goal orientation

The scree plot indicated the presence of one dominant factor. The assumption of unidimensionality was met. All the values in the covariance matrix and item-pair H-coefficient matrix were positive. No significant violations were present in the monotonicity summary and the fit index values were below the critical cut-off value of 40. The monotonicity assumption held for the data. The AISP procedure partitioned all the items into one scale, indicating all the items can be allocated into a scalable Mokken scale. The H coefficients indicated that items C2, C3 and C5 can be considered items of strong scalability. Items C1 and C4 fall within the range of moderately strong scalability. The scale can be considered as possessing moderately strong scalability, with a scale H-coefficient of .494. The H-coefficients are displayed in Table 4.11.

R was unable to fit the RSM or the GRM to the data. R displayed the following message: “algorithm did not converge” and “fitted probabilities numerically 0 or 1 occurred”. The reason for non-convergence is unknown. The inability of either model to converge into a solution erodes the confidence in the scale created by the favourable results obtained from the CTT item analysis and the dimensionality analysis.

Table 4.11

Mastery goal orientation scale: IRT Item statistics

	Item H
C1	.488
C2	.500
C3	.501
C4	.453
C5	.536

4.4.4 Psychometric evaluation of the mastery goal structure

This study utilised a measure developed by Midgley et al. (2000) to measure the *mastery goal structure* construct. The scale consists of 14 items that are divided into three subscales representing the three components of *goal orientation*: *performance-approach goal structure, performance-avoidance goal structure* and *mastery goal structure*. As this study is only formally pursuing the relationship between *mastery goal orientation* and *mastery goal structure*, item analysis was only performed on the six items comprising the *mastery goal orientation* scale. The items were measured on a 5-point Likert scale.

4.4.4.1 CTT item analysis: Mastery goal structure

The *mastery goal structure* scale obtained a marginally unsatisfactory Cronbach's alpha of .792, the lowest reliability obtained for a scale in the study. The item means covered the higher end of the scale and ranged from 4.27 to 4.48 but the item standard deviations nonetheless indicated sufficiently sensitive items in that they ranged from .77 to .92. This indicates that most individuals responded in the agree category. The inter-item correlation matrix revealed correlations ranging between .214 and .584, with item 6 showing the lowest pattern of correlations with the other items. The results are shown in Table 4.12.

Examination of the corrected item total correlations and squared multiple correlations indicate item D6 (*"In our class, it's OK to make mistakes as long as you are learning")* does not follow the general trend. The low inter-item correlations of D6 with the remainder of the items, the low item-total correlation (.350), the low squared multiple correlation (.137) and the increase in Cronbach's alpha (.792 to .810) raised the concern that D6 shares insufficient variance with the remainder of the items in the scale. This basket of evidence was considered sufficient to justify the removal of this item. D6 was consequently removed from the scale and the CTT analysis was rerun. The deletion of item D6 resulted in an increase of Cronbach's alpha to .81. No other problematic items surfaced after the deletion of D6.

Table 4.12

Mastery goal orientation scale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.792	.797	6

Item Statistics

	Mean	Std. Deviation	N
D1	4.36234	.870720	563
D2	4.36945	.772244	563
D3	4.28597	.808055	563
D4	4.48313	.794319	563
D5	4.36412	.782772	563
D6	4.27709	.919127	563

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	21.77975	8.318	.590	.429	.748
D2	21.77265	8.806	.576	.403	.753
D3	21.85613	8.671	.571	.349	.754
D4	21.65897	8.602	.602	.412	.747
D5	21.77798	8.618	.611	.415	.745
D6	21.86501	9.242	.350	.137	.810

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.357	4.277	4.483	.206	1.048	.006	6
Item Variances	.683	.596	.845	.248	1.417	.010	6
Inter-Item Covariances	.265	.164	.393	.228	2.389	.004	6
Inter-Item Correlations	.396	.214	.584	.369	2.722	.012	6

4.4.4.2 Dimensionality analysis: Mastery goal structure scale

Item D6 was deleted from the *mastery goal structure* scale during the CTT item analysis. The five remaining items in the scale were subjected to factor analysis.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .797 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item D1 obtained the highest factor loading. The resultant factor structure is shown in Table 4.13.

Table 4.13

Factor matrix for the mastery goal structure scale

	Factor
	1
D1	.711
D2	.671
D3	.660
D4	.672
D5	.681

50.0% of the non-redundant residuals obtained absolute values greater than .05, thereby casting some doubt on the conclusion derived from the extracted factor solution above that all the items provide relatively uncontaminated reflections of the single latent variable, mastery goal structure. The large percentage of large residual correlations suggests the need to assume the presence of a second factor. The merits of a two-factor factor structure as explanation for the observed correlation matrix was not examined.

4.4.4.3 IRT item analysis: Mastery goal structure

The scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 3.48. The first-to-second factor eigenvalue ratio indicate that the first factor is 4.12 the size of the second factor. The assumption of unidimensionality was thus met. Only positive correlations were present in the covariance matrix and item-pair H-coefficients matrix, indicating no violations in monotonicity. The monotonicity summary showed no significant violations. The assumption of unidimensionality was thus met. The AISP procedure partitioned all the items into one scale.

None of the residual values in the two-way margins for both the RSM and GRM model were smaller than the critical chi-square value. The three-way margins for the RSM and GRM indicated that the item triplet B2, B4, and B5 exceeded the critical chi-square value, thus showing misfit. The AIC and BIC indicated that the RSM has superior fit, however, the LRT revealed that moving from the more restrictive RSM to the less restrictive GRM did not significantly improve the model fit ($p > .01$). The RSM thus described the data best.

Table 4.14 shows the results for the scale. In terms of the percentage of information contributed to the scale, items D2 and D3 contributed the most information to the scale whereas item D1 and D4 contributed the least. The H coefficients indicate all the items, except item D2, D3, and D5 can be considered items of strong scalability. The scale marginally missed the requirement of .5 for strong scalability, with a H-coefficient of .496.

Table 4.14

Mastery goal structure scale: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*A*	Item *H*	% of information contributed
D1	-2.809	-2.266	-1.562	-.130	2.068	.507	18.14
D2	--3.804	-2.437	-1.621	-.049	2.068	.485	21.78
D3	-3.420	-2.438	-1.389	.109	2.068	.492	21.13
D4	-3.160	-2.482	-1.736	-.399	2.068	.507	18.65
D5	-3.389	-2.581	-1.556	-.053	2.068	.488	20.49

Table 4.14 shows the discrimination parameters of the RMS is equal to 2.068, showing very high discrimination. The location parameters appear to function mostly at the lower end (below the mean) of the mastery goal structure scale. Item D3 is the only item with positive cumulative probabilities for the final threshold. That is, for this item, respondents need to lie above the mean to have a .5 probability of obtaining the highest category score.

In general, the options response functions show that individuals that score above the mean on mastery goal structure are most likely to respond in the *strongly agree* category, whereas individuals that lie between 1.5 standard deviations below the mean and the mean are most likely to respond in the *agree* category. Respondents that lie further than 1.5 below the mean are like to respond in the first three categories. Furthermore, the test information curve reflects the fact that the *mastery goal structure* scale can discriminate best between respondents that fall below the mean. The scale discriminates best at approximately two standard deviations below the mean.

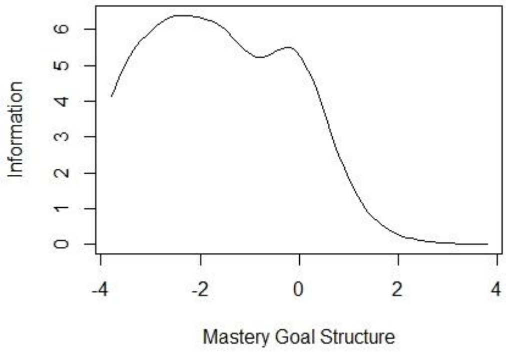

Figure 4.3. ***Mastery goal structure scale information function***

4.4.5 Psychometric evaluation of the classroom learning climate scale

The *classroom learning climate* scale consists of five subscales, namely *teacher emotional support*, *teacher academic support*, *psychological safety and fairness*, *autonomy,* and *involvement and interest*. The items are measured on a 5-point Likert scale, with response categories ranging from *strongly disagree* to *strongly agree.* The psychometric results are presented per subscale.

IRT item analysis was not conducted on the subscales of the *Learning climate* scale as the variable is represented by a single (multidimensional) latent variable in the structural model. The interest thus lies in the total *Learning climate* score and the not scores of the subscales. Future research could explore the possibility of including the five subdimensions of *Learning climate* as separate latent variables in the structural model.

4.4.5.1 Psychometric evaluation of the teacher emotional support subscale

4.4.5.1.1 CTT item analysis: Teacher emotional support subscale

The four itemed *teacher emotional support* subscale obtained an acceptable Cronbach's alpha of .866. The item means covered the centre of the scale and ranged from 3.73 to 4.21 and the item standard deviations ranged from .992 to 1.167. The inter-item correlation matrix revealed correlations ranging between .560 and .682, indicating the items measure the same underlying factor. Item E1 ("In our class, the instructor respects students' opinions") obtained the lowest correlations with the other items in the subscale. All the corrected item total correlations and squared multiple correlations were satisfactory, with no seeming outliers. The results revealed that none of the items would increase the current Cronbach alpha if deleted. The results thus flagged none of the items as problematic. The *teacher emotional support* retained all its original items. The results are shown in Table 15 below.

Table 4.15

Teacher emotional support subscale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.866	.867	4

Item Statistics

	Mean	Std. Deviation	N
E1	4.20959	.992201	563
E2	3.88277	1.114657	563
E3	3.73179	1.166328	563
E4	4.12256	1.052487	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.987	3.732	4.210	.478	1.128	.048	4
Item Variances	1.174	.984	1.360	.376	1.382	.027	4
Inter-Item Covariances	.725	.585	.869	.284	1.486	.009	4
Inter-Item Correlations	.619	.560	.682	.122	1.218	.002	4

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
E1	11.73712	8.436	.690	.503	.840
E2	12.06394	7.466	.770	.603	.806
E3	12.21492	7.457	.719	.529	.829
E4	11.82416	8.135	.692	.483	.839

4.4.5.1.2 Dimensionality analysis: Teacher emotional support

All the correlations in the correlation matrix for the *teacher emotional support* subscale were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .814 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable. One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item C3 obtained the highest factor loading (see Table 4.16). The results indicated that 0% of the non-redundant residuals obtained absolute values greater than .05, suggesting that the extracted factor solution provides a highly credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated.

Table 4.16
Factor matrix for the teacher emotional support subscale

	Factor
	1
E1	.755
E2	.857
E3	.786
E4	.751

4.4.5.2 Psychometric evaluation of the teacher academic support subscale

4.4.5.2.1 CTT item analysis: Teacher academic support subscale

The *teacher academic support* scale consisted of four items and obtained an acceptable Cronbach's alpha of .855. The lowest item mean was 4.337 and the highest was 4.687, with the item standard deviations ranging from .610 to .910. The inter-item correlation matrix revealed correlations ranging between .554 and .679, with item E8 ("*In our class, the instructor likes to help students learn*") showing the lowest pattern of correlations with the other items. All the corrected item total correlations and squared multiple correlations were satisfactory, albeit slightly lower for item E8. The results revealed that none of the items would increase the current Cronbach alpha if deleted. None of the items in the *teacher academic support* scale raised any concerns and are depicted in Table 4.17.

Table 4.17

Teacher academic support subscale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.855	.865	4

Item Statistics

	Mean	Std. Deviation	N
E5	4.57016	.710845	563
E6	4.44938	.792881	563
E7	4.68739	.609796	563
E8	4.33748	.910476	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.511	4.337	4.687	.350	1.081	.023	4
Item Variances	.584	.372	.829	.457	2.229	.038	4
Inter-Item Covariances	.348	.294	.469	.175	1.594	.004	4
Inter-Item Correlations	.615	.554	.679	.124	1.224	.002	4

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
E5	13.47425	4.015	.698	.527	.816
E6	13.59503	3.668	.728	.531	.802
E7	13.35702	4.301	.726	.549	.815
E8	13.70693	3.368	.692	.491	.829

4.4.5.2.2 Dimensionality analysis: Teacher academic support

All the correlations in the correlation matrix for the *teacher academic support* subscale were larger than .30 and significant ($p < .05$). The scale obtained a KMO of .811 and the Bartlett's

Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable. One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted.

The factor matrix indicated that all the items loaded satisfactory on one factor as all factor loadings were larger than .50. Item E49 *("In our class, the instructor wants students to do their best")* had the strongest loading on the factor (see Table 4.18). The results indicate that 16% of the non-redundant residuals obtained absolute values greater than .05, suggesting that the extracted factor solution provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated.

Table 4.18
Factor matrix for the teacher emotional academic subscale

	Factor
	1
E5	.782
E6	.796
E7	.807
E8	.753

4.4.5.3 Psychometric evaluation of the psychological safety and support subscale

4.4.5.3.1 CTT item analysis: Psychological safety and fairness subscale

The *psychological safety and fairness* subscale (consisting of nine items) obtained a satisfactory Cronbach's alpha of .864. The item means covered the centre of the scale and ranged from 3.256 to 3.936 and the item standard deviations ranged from 1.215 to 1.156. The inter-item correlation matrix revealed correlations ranging between .215 and .718. Items E10 (*"In our class, students are treated fairly and equally")*, E12 (*"In our class, students do not make fun of each other's ideas")*, E14 (*"In our class, students are not scared to answer questions, even if they might be wrong"*), and especially E17 (*"In our class, students feel free to disagree with the instructor and to ask questions")* had slightly lower inter-item correlations, corrected item-total correlations, and squared multiple correlations compared to the other items in the scale. This finding suggests the presence of more than one factor.

The deletion of any one of these item would result in only a small decrease in Cronbach's alpha. These items are can be considered the weaker items in the scale, sharing less variance with the other items. None of these results, however, warranted the deletion of these items. The results are depicted in Table 4.19.

Table 4.19

Psychological safety and fairness: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.864	.866	9

Item Statistics

	Mean	Std. Deviation	N
E9	3.93606	1.156521	563
E10	3.93250	1.233745	563
E11	3.65719	1.181740	563
E12	3.25577	1.214656	563
E13	3.75844	1.047916	563
E14	3.74245	1.115768	563
E15	3.65187	.978202	563
E16	3.44760	1.073130	563
E17	3.91297	1.089202	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.699	3.256	3.936	.680	1.209	.053	9
Item Variances	1.263	.957	1.522	.565	1.591	.034	9
Inter-Item Covariances	.522	.296	1.024	.728	3.463	.021	9
Inter-Item Correlations	.418	.215	.718	.503	3.341	.013	9

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
E9	29.35879	38.832	.609	.563	.848
E10	29.36234	38.854	.557	.568	.853
E11	29.63766	37.918	.662	.487	.842
E12	30.03908	38.977	.560	.369	.853
E13	29.53641	39.395	.642	.495	.845
E14	29.55240	40.262	.525	.399	.855
E15	29.64298	39.636	.678	.546	.843
E16	29.84725	39.062	.651	.529	.844
E17	29.38188	41.048	.481	.292	.859

4.4.5.3.2 Dimensionality analysis: Psychological safety and fairness subscale

All the correlations in the correlation matrix for the *psychological and safety* subscale were significant (p < .05), but all the correlations were not greater .30. The scale obtained a KMO of .855 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable.

The eigenvalue-greater-than-one rule suggested the extraction of two factors. The rotated factor matrix indicated that item E9 ("*In our, class students feel respected"*) and E10 (*"In our class, students are treated fairly and equally"*) loaded primarily onto the second factor. This factor is most likely representing the fairness component of the subscale. All the items except item E17 ("*In our, class students feel free to disagree with the instructor and ask questions)* loaded satisfactorily on one of the factors with a loading of greater than .50. Item E17 presented itself as a complex item with modest loadings on both factors. The pattern matrix is shown in Table 4.20.

Table 4.20
Rotated factor structure for the psychological safety and fairness subscale

	Factor	
	1	2
E9	.315	.711
E10	.162	.945
E11	.587	.403
E12	.596	.214
E13	.739	.170
E14	.607	.135
E15	.708	.281
E16	.699	.255
E17	.376	.336

The study conceptualised *psychological safety and fairness* as a single latent variable, but (as the name implies) consists of a safety component and a fairness component. The results of the factor analysis suggest that it could possibly be meaningful to elaborate on the fairness component and distinguish between *psychological safety* and *fairness* in future studies. Future research should elaborate on the fairness component and establish whether the two components are differentially influenced by and have a differential influence on other latent variables.

For the purpose of this study, however, it did not appear feasible to create a separate *fairness* subscale consisting of only two items. It would be highly questionable to represent the fairness construct with only two items. As such, it was decided to retain the fairness component in the subscale. The analysis was rerun by forcing the extraction of a single factor. The resultant single-factor factor structure is shown in Table 4.21

Table 4.21

Factor matrix when forcing the extraction of a single factor for the psychological safety and fairness subscale

	Factor
	1
E9	.638
E10	.591
E11	.724
E12	.616
E13	.697
E14	.575
E15	.747
E16	.724
E17	.506

Forced extraction delivered results that showed all the items loading satisfactory on one factor. The reproduced correlation matrix revealed, however, that the credibility of the solution was highly questionable as 63% of the non-redundant residuals obtained absolute values greater than .05. The fact that only 25% of the residual correlations were large for the two-factor solution, reiterates the fact that it would be useful to elaborate and distinguish between *psychological safety* and *fairness*.

4.4.5.4 Psychometric evaluation of the Interest and involvement subscale

4.4.5.4.1 CTT item analysis: Interest and involvement subscale

The ten itemed *involvement and interest* subscale obtained an acceptable Cronbach's alpha of .878. The item means ranged from 3.675 to 4.162 and the item standard deviations ranged from .864 to 1.045. The values for the correlations in the inter-item correlation matrix ranged from .285 and .729. All the corrected item-total correlations and squared multiple correlations were satisfactory. The results revealed that none of the items would increase the current Cronbach alpha if deleted. The results of the item analysis of the *involvement and interest* subscale therefore did not raise any concerns and are depicted in Table 4.22 below.

Table 4.22

Involvement and interest subscale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.878	.878	10

Item Statistics

	Mean	Std. Deviation	N
E18	3.96625	.967771	563
E19	4.11545	.892331	563
E20	4.08348	.887914	563
E21	4.16163	.872974	563
E22	4.00178	.903727	563
E23	4.13854	.863653	563
E24	3.67496	1.044829	563
E25	3.75311	.969905	563
E26	3.80462	.978877	563
E27	3.82416	1.025989	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.952	3.675	4.162	.487	1.132	.031	10
Item Variances	.889	.746	1.092	.346	1.464	.015	10
Inter-Item Covariances	.371	.241	.670	.429	2.782	.010	10
Inter-Item Correlations	.419	.285	.729	.444	2.559	.010	10

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
E18	35.55773	34.468	.606	.429	.865
E19	35.40853	35.271	.587	.430	.867
E20	35.44050	35.386	.579	.578	.867
E21	35.36234	35.602	.569	.564	.868
E22	35.52220	34.883	.617	.492	.865
E23	35.38544	35.437	.594	.441	.866
E24	35.84902	33.755	.613	.488	.865
E25	35.77087	33.978	.652	.574	.862
E26	35.71936	34.405	.594	.423	.866
E27	35.69982	33.919	.612	.453	.865

4.4.5.4.2 Dimensionality analysis: Interest and involvement subscale

All the correlations in the correlation matrix for the *interest and involvement* subscale were statistically significant ($p < .05$), although two of the correlations of item E25 were smaller than .3. The subscale obtained a KMO of .871 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable. Two factors were extracted, since two factors obtained eigenvalues greater than 1. The location of the elbow in the scree plot also suggested that two factors should be extracted. The rotated factor matrix indicated that all the items loaded on one of the two factors satisfactorily with factor loadings larger than .50 but for E22 and E23 that showed themselves as complex items loading on both factors. The pattern matrix is shown in Table 4.23.

Table 4.23

Rotated factor structure for the interest and involvement subscale

	Factor	
	1	2
E18	.511	.388
E19	.390	.505
E20	.168	.829
E21	.173	.796
E22	.443	.491
E23	.439	.455
E24	.706	.201
E25	.823	.147
E26	.577	.298
E27	.682	.220

The obtained rotated two-factor factor structure makes conceptual sense when examining the item content. Items E18 (*"In our class, students discuss ideas and work"*), E24 (*"In our class, students discuss possible solutions to problems with each other"*), E25 (*"In our class, students share ideas with one another")*, E26 (*"In our class, students put a lot of energy in class work and activities")*, and E27 (*"In our class, students try to explain to or to teach one another"*) all relate to the participation of students in class activities. Items E19 (*"In our class, students give their opinions during class discussions"*), E20 (*"In our class, students are encouraged to answer questions"*) and E21 (*"In our class, students are encouraged to ask questions"*) relate to whether students are encouraged to participate in class activities. The two factor solution can therefore be regarded as a meaningful fission of the original latent *Classroom learning climate* dimension *interest and involvement*. 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"*) are complex items as they display a double loading pattern and relate to students' attitude toward and interest in learning.

The results suggest that it could prove useful to distinguish between *active participation* and *encouragement to participate* as two facets of *interest and involvement*. For the purpose of this study, *interest and involvement* was conceptualised as a unidimensional construct and the design intention was not to distinguish between the two components. Furthermore, it would not be meaningful to create a three-item subscale reflecting *encouragement to participate*. As such, forced extraction of a single factor was performed on the scale. The results (see Table 4.24) show that all the items obtained factor loadings greater than .6. The obtained loadings are thus satisfactory. However, 62% of the non-redundant residuals obtained absolute values greater than .05, making the obtained single-factor factor solution tenuous. This stands in contrast to the 24% of the residual correlations that were large for the two-factor solution.

Table 4.24
Factor structure when forcing the extraction of a single factor for the interest and involvement subscale

	Factor
	1
E18	.650
E19	.631
E20	.628
E21	.616
E22	.666
E23	.640
E24	.656
E25	.691
E26	.639
E27	.654

4.4.5.5 Psychometric evaluation of the autonomy subscale

4.4.5.5.1 CTT item analysis: Autonomy subscale

The *autonomy* subscale consisted of 10 items. The scale obtained a satisfactory Cronbach's alpha of .842. The item means ranged from 3.325 to 4.231 and the item standard deviations ranged from .874 to 1.33, with E36 (*"In our class, students have opportunities to use mistakes as learning experiences"*) and E28 (*"In our class, students have opportunities to take responsibility for due dates for assignments"*) obtaining the highest means. The values for the correlations in the inter-item correlation matrix ranged from .132 and .682. The inter-item correlations, corrected item-total correlations and squared multiple correlations for items E28, E30 (*"In our class, students have opportunities to choose their group members"*), E35 (*"In* *our class, students have opportunities to be independent problem solvers"*), and E36 were slightly lower compared to the other items in the scale. The results revealed that item E30 would increase the current Cronbach's alpha to .844 if deleted. The results are depicted in Table 4.25.

Table 4.25

Autonomy subscale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.842	.846	10

Item Statistics

	Mean	Std. Deviation	N
E28	4.23091	.890821	563
E29	3.54707	1.186747	563
E30	3.56483	1.336847	563
E31	3.32504	1.197207	563
E32	3.73002	1.091020	563
E33	3.77620	1.005148	563
E34	3.75311	1.045820	563
E35	3.65364	1.015415	563
E36	4.08171	.874960	563
E37	3.85790	.988035	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.752	3.325	4.231	.906	1.272	.069	10
Item Variances	1.149	.766	1.787	1.022	2.334	.100	10
Inter-Item Covariances	.399	.141	.738	.597	5.247	.021	10
Inter-Item Correlations	.355	.132	.682	.550	5.152	.013	10

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
E28	33.28952	41.512	.447	.255	.835
E29	33.97336	38.617	.503	.313	.831
E30	33.95560	38.833	.409	.254	.844
E31	34.19538	36.706	.641	.458	.817
E32	33.79041	38.725	.554	.347	.826
E33	33.74423	37.828	.696	.556	.813
E34	33.76732	37.456	.694	.569	.813
E35	33.86679	40.699	.441	.285	.836
E36	33.43872	41.635	.446	.305	.835
E37	33.66252	38.989	.606	.407	.822

Taking the basket of evidence into consideration, E30 was removed from the scale and the analysis was rerun. The deletion of item E30 resulted in an increase of Cronbach's alpha to .844. No new problems items came to the fore.

4.4.5.5.2 Dimensionality analysis: Autonomy subscale

All the correlations in the correlation matrix for the *autonomy* subscale were statistically significant ($p < .05$), although some correlations were smaller than .3. The subscale obtained a KMO of .885 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable.

In the literature study it was highlighted that three types of autonomy exists: *procedural, organisation*, and *cognitive*. For the purpose of the study, *autonomy* was conceptualised as a single latent variable with items related to organisational and procedural autonomy (E28-E32) and items related to cognitive autonomy (E33-E37). The eigenvalue-greater-than-one rule suggested the extraction of two factors[24]. The pattern matrix is displayed in Table 4.26.

Table 4.26

Rotated factor structure for the autonomy subscale

	Factor	
	1	2
E28	.457	.189
E29	.608	.086
E31	.637	.234
E32	.529	.273
E33	.690	.384
E34	.689	.403
E35	.176	.647
E36	.225	.600
E37	.501	.467

[24] This suggests that it may have been a premature decision to remove item E30 from the scale as it may have loaded modestly on the second factor. To assess the possibility, the factor analysis was rerun with item E30. Ten of the correlations in the correlation matrix for the *autonomy* subscale were statistically insignificant ($p > .05$). The subscale obtained a KMO of .880 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable. The results indicated that item E30 obtained a factor loading of .495 on factor 1 and a loading of factor .086 on factor 2. The obtained factor loading is similar to the factor loading of item E36, which obtained a factor loading of .496 in the forced extraction of one factor for the scale. However, due to the strict requirements items (delivering similar results) from other (sub)scales had to adhere to, it was decided to exclude the item from the scale.

Stefanou and colleagues (2004) defined *organisational autonomy support* as the encouragement of student ownership of the environment and includes instructional behaviours that provide students with opportunities for choice over environmental procedures for example, collaboratively developing rules and deciding on due dates for assignment. *Procedural autonomy support* involves the encouragement of student ownership of the form in which communication occurs and includes instructional behaviours such as offering students choice of media to present ideas. *Cognitive autonomy support* relates to the encouragement of student independence in thinking and allowing students to choose how they think. The former two dimensions appear to be closely related, as both involve students proving input into the organisation or management of the class, i.e. how the class is run and presented. This bipartite distinction view seems to be supported by Stefanou and colleagues (2004) as they argue autonomy support exists through providing students with choices and opportunities for decision-making about procedures and organisation, but also when students are encouraged to think independently.

The loading pattern reflects this to some extent as the last four items in the scale load strongly on the second factor in the scale, although E34 (*"In our class, students have opportunities to find many different ways of solving problems"*) loads stronger on the first factor. E37 (*"In our class, students have opportunities to say why the solutions they found are so good so that everyone can learn"*) loads strongly on both the factors, albeit loading somewhat stronger on factor 1. Item E35 (*"In our class, students have opportunities to be independent problem solvers"*) and E36 *("In our class, students have opportunities to use mistakes as learning experiences"*) were the two items that most strongly related to cognitive autonomy and therefore loaded strongest on the second factor. E28 (*"In our class, students have opportunities to take responsibility for due dates for assignments"*) failed to obtain a loading great than .5 on either one of the two factors. The item was deleted and the analysis was rerun. Table 4.27 shows the obtained factor structure after the deletion of E28.

Table 4.27

Rotated factor structure for the autonomy subscale without item E28.

	Factor	
	1	2
E29	.561	.108
E31	.657	.214
E32	.555	.247
E33	.702	.365
E34	.709	.379
E35	.213	.613
E36	.197	.637
E37	.512	.461

Forced extraction of one factor was performed on the scale to determine whether the remaining items showed satisfactory loadings on a single factor. The results of the forced extraction of one factor revealed that item E35 had a loading equal to .5 and E36 had a loading of less than .5 on the single extracted factor. The loading of item E36 was just below the cut-off of .5. In order to include the *cognitive autonomy* dimension in the scale, it was decided to retain the item in the scale. *Cognitive autonomy* forms a crucial theoretical component of student autonomy. Item analysis was rerun on the scale. The analyses reported a Cronbach's alpha of .838 and all item statistics were satisfactory. The resultant final single-factor factor structure is shown in Table 4.28.

Table 4.28
Factor structure when forcing the extraction of a single factor for the autonomy subscale

	Factor
	1
E29	.517
E31	.658
E32	.599
E33	.789
E34	.804
E35	.500
E36	.496
E37	.686

As can be expected, the credibility of the single-factor solution as an explanation for the inter-item correlation matrix is at best tenuous. A large percentage 28% of the estimated inter-item correlations derived from the factor structure depicted in Table 4.28 deviated with more than

.05 from the observed correlation. This contrasts with 3% of the residual correlations that are large when the estimates are derived from the two factor structure.

4.4.5.6 Reliability the complete learning climate scale

The coefficient of internal consistency has been calculated for each of the five sub-scales by means of Cronbach's alpha. The Cronbach alpha values for the five sub-scales were found to be:

- Teacher emotional support: *r=.866*
- Teacher academic support: *r=.855*
- Psychological safety and fairness: *r=.864*
- Interest and involvement: *r=.878*
- Autonomy: *r=.844*

To calculate the reliability of the *learning climate* scale, the reliability coefficient for the unweighted total scores was calculated according the following formula (Nunnally, 1978):

$$r_{tot} = [1 - \frac{\sum S^2{}_i - \sum r_{tti} S^2{}_i}{S^2{}_t}]$$

The calculation of a single Cronbach alpha across all the items for the complete Learning Climate would have provided an underestimation of the reliability of the total scores to the extent to which the sub-scales correlate amongst themselves. The unweighted total score reliability for the *learning climate* scale was calculated as .95[25]

4.4.5.7 Confirmatory factor analysis of the Learning climate scale

CFA was conducted on the *learning climate* scale to determine the degree to which the model as a whole is consistent with the empirical data at hand. The measurement model in which

[25] 1 – [(149.975 – 129.3419)/455.706]

each of the five *learning climate* latent variables were represented by their item indicators was fitted to the scale data.[26]

Before conducting analysis on the fit of the learning climate measurement model it was necessary to assess the extent to a number of critical assumptions typically associated with multivariate statistics and structural equation modelling were met (Tabachnick & Fidell, 2007). The individual items were firstly evaluated in terms of their univariate and multivariate normality before a normalisation procedure was undertaken. The item parcels were re-examined in terms of their univariate and multivariate normality. The chi-square value for skewness and kurtosis indicated that all 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 ($\chi^2 = 8236.624$; $p < .05$).

Since the quality of the solution obtained in structural equation modelling is to a large extent dependent on multivariate normality, it was decided to normalise the variables through PRELIS. The results indicated that the normalisation procedure partially succeeded in rectifying the univariate normality problem on some the indicator variables. The results furthermore 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 ($\chi^2 = 3029.487$; $p < .05$). In conclusion, the decrease in the chi-square statistic showed that the normalisation procedure succeeded in reducing the deviation of the observed composite indicator distribution from the theoretical multivariate normal distribution. The majority of the indicator variables do not display univariate normality and there is no evidence of multivariate normality. Robust maximum likelihood estimation was thus selected for the evaluation of the measurement model. This estimation technique is the recommended for fitting measurement models of continuous data not satisfying the multivariate normality assumption (Mels, 2003). The normalised data set was used in the subsequent analyses since

[26] Although the evaluation of the learning climate scale could easily be a study in its own right, the focus of this research is on the empirical evaluation of the trainer-instructor competency model. Nevertheless, it is important to establish the reliability and validity of the instruments used to operationalise the latent variables used in the structural model. For this reason and for the sake of brevity, only a brief overview of the univariate and multivariate results before and after normalisation will be provided for the learning climate measurement model. For a more extended discussion of normalisation, please refer to paragraph 4.7.

the normalisation procedure succeeded in reducing the deviation of the observed indicator distribution from the theoretical multivariate normal distribution to some degree although it failed to salvage the situation altogether.

Initial analysis revealed a Satorra-Bentler scaled chi-square value of 2157.68 with 584 degrees of freedom. The Satorra-Bentler chi-square sample estimate was statistically significant which meant that the hypothesis of exact model fit had to be rejected ($p < .05$). A Root Mean Square Error of Approximation (RMSEA) of .069 with a confidence interval of (.066; .072) was obtained, thus indicating reasonable fit. The null hypothesis of close fit was rejected ($p < .05$).

Examination of the magnitude and the significance of the slope of the regression of the observed variables on their respective latent variables in the unstandardised lambda-X matrix, Λ^X, indicated that all the slope coefficients that describe the regression of the manifest (item) variables on the latent variables are statistically significant ($p < .05$). All the indicator variables loaded significantly on the latent variables that they were designed to reflect.

An examination of the squared multiple correlations (R^2) of the item indicators was required to determine the validity of the indicators. Large R^2 values (>.25) are indicative of valid indicators as this indicates that a satisfactory proportion of variance in each indicator variable is explained by its underlying latent variable. Items E29 and E34 demonstratedvalidities lower than .25 (or in the case of E35 equal to .25). This comments favourable on the fit of the model and the validity of the indicators as it implies that a limited amount of variance can be attributed to systematic and random measurement error[27].

The modification indices were examined to determine whether adding one or more paths would significantly improve the fit of the model. The aim of examining the modification indices is to estimate the decrease that would occur in the χ^2 statistic if parameters that are currently fixed to zero are set free and the model is re-estimated. The largest modification index value was found for E9 "*In our class, students feel respected*". The item is intended to load onto the psychological safety and fairness scale, however, the index shows that loading the item onto *teacher emotional support* would significantly improve the fit of the model. This

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[27] The factor loading for an individual item (in contrast to a composite indicator or item parcel) was considered to be acceptable if λ_{ij} exceeded .50. Squared factor loadings can also be interpreted as lower bound estimates of the reliability of the items indicators

made substantive sense as the other items in the *teacher emotional support scale* taps into the teacher's respect and understanding for the students.

A path from E9 to *teacher emotional support* was included and the analysis was rerun.

The second round of CFA on the learning climate scale showed Satorra-Bentler Scaled Chi-Square value of 1883.00 with 583 degrees of freedom. A Root Mean Square Error of Approximation (RMSEA) of .063 with a confidence interval of (.060; .066) was obtained, thus indicating an improvement in the fit of the model. The null hypothesis of close fit was, however, still rejected ($p < .05$).

Examination of the unstandardised Λ^X estimates indicated that the loading of item E9 on *teacher emotional support* was significant ($p < .05$). The loading of E9 on its original latent dimension, *psychological safety and fairness,* remained significant. Further examination of the modification indices showed the largest modification index value was found for E10 "*In our class, students are treated fairly and equally*". The item was intended to load onto the *psychological safety and fairness scale*, however, the index shows that loading the item onto *teacher emotional support* would significantly improve the fit of the model. Once again, this made substantive sense as the other items in the *teacher emotional support scale* taps into the teacher's respect and understanding for the students.

A path from E10 to *teacher emotional support* was included and the analysis was rerun.

The third round of CFA on the learning climate scale showed Satorra-Bentler Scaled Chi-Square value of 1747.60 with 582 degrees of freedom. A Root Mean Square Error of Approximation (RMSEA) of .060 with a confidence interval of (.056; .063) was obtained, thus indicating an improvement in the fit of the model. The null hypothesis of close fit was still rejected ($p < .05$).

Examination of the unstandardised Λ^X estimate indicated that the loading of item E10 on *teacher emotional support* was significant ($p < .05$). The loading of E10 on its original latent dimension, *psychological safety and fairness,* remained significant. Further examination of the modification indices showed the largest modification index value was found for E25 (*In our class, students share their ideas with one another).* The item was intended to load onto the *interest and involvement* scale, however, the index shows that loading the item onto *teacher academic support* would significantly improve the fit of the model. The content of item E25 is, however, focused on the behaviour of the student and not academic support behaviour provided by the instructor. As such, it was decided not to include a loading from item E25 to *teacher academic support*.

The second largest modification index value was obtained for item E28 (*In our class students have opportunities to take responsibility for due dates for assignments)*. The index shows that loading the item onto *interest and involvement* would significantly improve the fit of the model. Examination of the content of the item did not, however, warrant the freeing of this item to load onto *teacher academic support.* The focus of *interest and involvement* is on the student's involvement in the academic task. In contrast, the content of item E28 is focused on the procedural arrangements of the tasks. It was decided not to include a loading from item E28 to *interest and involvement*.

The results suggested that freeing the path from item E7, "*In our class, the instructor wants students to do their best*" to the *teacher emotional support* subscale would significantly improve the fit of the model. Admittedly, academic and emotional support behaviours are closely related. However, the focus of *teacher academic support* is on the instructor helping the student and wanting them to do their best (academically) whereas *teacher emotional support* has a more humanistic focus. It was decided not to include a loading from item E7 to *teacher emotional support.*

Although additional parameters with large modification index values (>6.645) were present in Λ^x, either no substantive theoretical argument could be found to support the addition of the paths or the completely standardised change did not to support the addition of the paths. Therefore no further paths were added to the measurement model at this stage of the analysis. No further modifications were considered for the learning climate measurement model.

Statistical power is referred to as the ability to find a statistically significant statistic when the null hypothesis is in fact false. Alternatively stated, in the context of SEM power is the ability to reject a model when the model fits poorly. Generally, high power is good, and typically power greater than 80% is (arbitrarily) considered sufficient. Power analysis was conducted to illustrate the power associated with various RMSEA values assumed under H_a. For this purpose, the power calculator of Preacher and Coffman (2006) was utilised. Table 4.29 shows that only when the value of the RMSEA assumed under H_a falls below .6, the power decreases below one. The power associated with the test of the close fit of a *learning climate measurement* model that shows a fit of RMSEA = .60 is still almost one. This suggests that the SEM analysis with the current sample size is very sensitive to changes in the effect size. It is only if the model fit in the parameter becomes close to .05 that a chance exists of not rejecting the close fit null hypothesis.

Table 4.29

Power analysis for the learning climate scale measurement model

RMSEA under H_a	Power
.8	1
.75	1
.7	1
.65	1
.6	.9996
.55	.80062

4.4.6 Psychometric evaluation of the inspiring professional vision scale

4.4.6.1 CTT item analysis: Inspiring professional vision

The *inspiring professional vision* scale consisted of eight items measured on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree.* The scale was developed for the purpose of this study.

The scale obtained a highly satisfactory Cronbach's alpha of .914. The item means centered on the upper-end of the scale and ranged from 4.107 to 4.555 and the item standards deviation ranged from .737 to .956. Item F4 (*"In our class, students believe they will have successful careers"*) returned the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between .470 and .744. The item total correlations raised no concerns, indicating that the correlation between each item and the total score calculated from the remaining items was satisfactory and that the items were reflecting the same underlying factor. In addition, the squared multiple correlations were satisfactory and the results revealed that none of the items, if deleted, would increase the current Cronbach alpha. The basket of evidence suggests that items F1 (*"In our class, students are positive about their careers"*) and F5 (*"In our class, students have a clear idea of where they want to be in 5 years"*) are the weaker items in the scale and items F2 (*"In our class, students can picture themselves as competent employees/professionals"*) and F7 (*"In our class, students see the value of learning to their careers"*) are the stronger items in the scale. As none of the items were flagged as problematic, all the items were retained. The results for the item analysis for the *inspiring professional vision* scale are depicted in Table 4.30.

Table 4.30

Inspiring professional vision scale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.914	.916	8

Item Statistics

	Mean	Std. Deviation	N
F1	4.17584	.886425	563
F2	4.36945	.836399	563
F3	4.36234	.771007	563
F4	4.45471	.737403	563
F5	4.10657	.955975	563
F6	4.15453	.784135	563
F7	4.23446	.825582	563
F8	4.30195	.812128	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.270	4.107	4.455	.348	1.085	.015	8
Item Variances	.687	.544	.914	.370	1.681	.014	8
Inter-Item Covariances	.391	.319	.481	.162	1.508	.002	8
Inter-Item Correlations	.576	.470	.744	.274	1.583	.004	8

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	29.98401	21.147	.671	.487	.907
F2	29.79041	20.899	.759	.632	.899
F3	29.79751	21.553	.734	.607	.901
F4	29.70515	21.835	.729	.550	.902
F5	30.05329	20.741	.660	.450	.909
F6	30.00533	21.475	.731	.606	.902
F7	29.92540	20.895	.772	.672	.898
F8	29.85790	21.357	.717	.563	.903

4.4.6.2 Dimensionality analysis: Inspiring professional vision

As none of the items included in the *inspiring professional vision* scale were deleted during item analysis, the full scale was subjected to factor analysis.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .918 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item F7 (*"students see the value of learning to their careers"*) obtained the highest factor loading and F5 (*"students have a clear idea of where they want to be in 5 years"*) obtained the lowest loading. Forty-two percent of the non-redundant residuals obtained absolute values greater than .05, thus making the obtained factor solution somewhat tenuous. The resultant factor structure is shown in Table 4.31.

Table 4.31

Factor matrix for the inspiring professional vision scale

	Factor
	1
F1	.703
F2	.799
F3	.776
F4	.767
F5	.691
F6	.767
F7	.814
F8	.758

4.4.6.3 IRT item analysis: Inspiring professional vision

The scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 5.69 and is 8.65 times greater than the second factor. The assumption of unidimensionality was met. The covariance matrix and item-pair H-coefficients contained only positive correlations. No significant violations were present in the monotonicity summary and the fit index values were below the critical cut-off value of 40. The monotonicity assumption holds for the data. The AISP procedure partitioned all the items into one Mokken scale.

The residual value for item pair F6 and F7 for RSM exceeded the critical cut-off value, indicating misfit. All the residuals in the two-way margins for the GRM model were smaller than the critical chi-square value. For the RSM, the following item triplets were flagged as showing misfit: item triplet 1, 3 and 5; item triplet 1, 5 and 6; item triplet 1, 5 and 8; item triplet 1, 6 and 8; item triplet 2, 3 and 5; item triplet 3, 5, and 8; and item triplet 5, 6 and 7. Items F1 and F5 appears to be the recurring item in these triplets. For the GRM the following item triplets were flagged as exceeding the critical chi-square value: item triplet 1, 5 and 6; item triplet 2, 3, and 6; and item triplet 2, 3, and 7. Items F2 and F6 are the only recurring items in the misfitting triplets of the GRM. The AIC and BIC indicated that the GRM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit ($p < .01$). The GRM thus describes the data best.

Table 4.32 shows below that all the discrimination parameters are very high, ranging from 2.087 to 3.390. The location parameters function mostly below the mean of the *inspiring professional vision* scale. It is only for items F1, F5, F6, F7, and F8, that respondents need to lie above the mean to have a .5 probability of obtain the highest category score, 4. The option response functions (not shown) show the general trend that respondents that lie above the mean on *inspiring professional vision* are most likely to select the category *strongly agree*.

F7 contributed the most information to the scale whereas item F5 contributed the least. The H coefficients indicate that all the items have strong scalability and result in a scale H-coefficient of .631. Furthermore, items F2, F3, and F4 discriminate particularly poorly among individuals with above average self-efficacy. This is generally true for all items and therefore also for the scale. This is reflected in the test information function displayed below in Figure

4.4. The graph shows that the scale is most informative below the mean. Person parameters will be estimated most accurately for individuals falling 1 to 3 standards deviations below the mean on inspiring professional vision.

Table 4.32

Inspiring professional vision scale: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*a*	Item *H*	% of information contributed
F1	-3.307	-2.081	-1.176	.200	2.143	.586	9.09
F2	-3.080	-2.095	-1.213	-.172	3.043	.660	13.92
F3	-3.293	-2.436	-1.311	-.071	2.910	.638	13.53
F4	-3.533	-2.543	-1.395	-.254	3.018	.656	14.39
F5	-3.096	-1.962	-.948	.203	2.087	.585	8.56
F6	-2.974	-2.172	-1.184	.415	2.896	.658	13.42
F7	-2.732	-1.891	-1.229	.192	3.390	.661	15.66
F8	-3.066	-2.207	-1.334	.036	2.625	.618	11.45

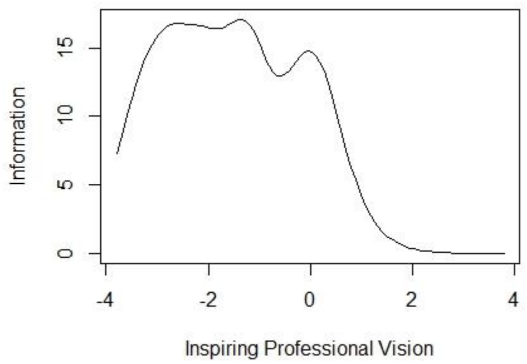

Figure 4.4. ***Inspiring professional vision scale information function***

4.4.7 Psychometric evaluation of the enhancing student academic self-efficacy

4.4.7.1 CTT item analysis: Enhancing student academic self-efficacy

The scale consisted of 20 items and obtained a Cronbach's alpha of .935. The item means ranged from 3.37 to 4.00 and the item standard deviations ranged from .857 to 1.46. The values for the correlations in the inter-item correlation matrix ranged from .178 and .750. The inter-item correlations, corrected item-total correlation and squared multiple correlation for item G7 ("*The instructor wants students to believe that if they fail it is because they have not tried hard enough and encourage them to try harder*"), G10 ("*The instructor uses students to show other students how to do the work right*"), and G11 ("*The instructor uses students that are doing the task correctly as examples to remind us that we can do it to*") were lower compared to the other items in the scale. The results revealed that item G7 does not substantially contribute to the internal stability of the scale as the deletion of the items does not affect the current Cronbach's alpha of the scale. The item was consequently deleted and the analysis was rerun. The item analysis results before deletion of item G7 are depicted in Table 4.33.

Table 4.33

CTT item statistics: Enhancing student academic self-efficacy

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.935	.937	20

Item Statistics

	Mean	Std. Deviation	N
G1	4.29485	.895873	563
G2	4.02487	1.088317	563
G3	4.28597	.946015	563
G4	4.09414	1.041839	563
G5	4.58259	.857155	563
G6	4.33393	.948141	563
G7	4.40320	1.053273	563
G8	4.12789	1.057756	563
G9	4.20249	1.013184	563
G10	3.49201	1.322347	563
G11	3.78686	1.307263	563
G12	3.83481	1.231003	563
G13	3.65009	1.298827	563
G14	3.88988	1.198436	563
G15	4.20426	1.102819	563
G16	3.97513	1.112571	563
G17	3.94494	1.197040	563
G18	3.36590	1.457967	563
G19	3.84369	1.261421	563
G20	3.68384	1.328394	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.001	3.366	4.583	1.217	1.361	.099	20
Item Variances	1.316	.735	2.126	1.391	2.893	.141	20
Inter-Item Covariances	.550	.209	1.335	1.126	6.391	.028	20
Inter-Item Correlations	.428	.178	.750	.571	4.204	.010	20

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	75.72647	218.534	.602	.456	.932
G2	75.99645	216.320	.555	.432	.933
G3	75.73535	215.686	.673	.621	.931
G4	75.92718	214.580	.643	.576	.931
G5	75.43872	218.777	.622	.634	.932
G6	75.68739	214.639	.711	.677	.931
G7	75.61812	220.066	.451	.256	.935
G8	75.89343	213.825	.658	.488	.931
G9	75.81883	213.761	.692	.512	.931
G10	76.52931	212.442	.547	.521	.933
G11	76.23446	214.037	.511	.527	.934
G12	76.18650	210.782	.643	.472	.931
G13	76.37123	209.600	.638	.503	.932
G14	76.13144	208.107	.744	.648	.929
G15	75.81705	214.349	.611	.532	.932
G16	76.04618	213.204	.641	.549	.931
G17	76.07638	208.626	.729	.610	.930
G18	76.65542	207.002	.623	.553	.932
G19	76.17762	208.328	.697	.539	.930
G20	76.33748	208.772	.645	.554	.931

After the deletion of item G7 the *Enhancing student academic self-efficacy* scale had a Cronbach alpha of .935. None of the items were flagged as problematic. The results did, however, reveal that the deletion of item G11 would only result in a small decrease in the current Cronbach alpha (.934), indicating the item does not contribute much to the internal consistency of the scale. Given the size of the decrease, it was decided to retain item G11. All the remaining items in the scale were retained.

4.4.7.2 Dimensionality analysis: Enhancing student academic self-efficacy

All the correlations in the correlation matrix for the *Enhancing student academic self-efficacy* scale were statistically significant ($p < .05$), although some correlations were smaller than .3. The subscale obtained a KMO of .941 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable. The results indicated that three factors with eigenvalues greater than 1 would be required to explain the covariance in the data. The results of the obtained rotated factor structure are displayed in Table 4.34.

The table shows that items G1 to G6 load most strongly on the second factor. All these items reflect *constructive feedback strategies* used to increase student academic self-efficacy. Items G12 to G20 load strongly onto the first factor. These items reflect *goal-setting strategies* (G12 to G17) and *reward and recognition strategies* (G18 to G20) used by the trainer-instructor. Items G8 to G11 also load on factor 2 and reflect the *modelling strategies* employed by the trainer-instructor. Factor 2 therefore seems to represent a *show-you-can strategy*. Only items G10 and G11 load onto the third factor. Although items G10 and G11 also reflect modelling strategies, they differ slightly from the other modelling items. The content of items G8 and G9 reflect the instructor's direct involvement in the demonstration or modelling activity, whereas G10 and G11 involve the instructor making use of other students to demonstrate the task. Items G8 and G9 are complex items, with loadings of approximately .4 on both factor one and two.

Forced extraction of one factor was performed on the scale to determine whether a satisfactory loading could be obtained on a single factor. This was due to the fact that the design intention of the scale was to reflect a unidimensional construct. The results of the forced extraction of one factor revealed that all the items obtained a factor loading of at least .5 on the first factor. Item G11 obtained the lowest factor loading (.508) of all the items. Table 4.35 displays the results of the forced extraction of a single factor on the scale.

Table 4.34

Rotated factor structure for the enhancing student academic self-efficacy scale

	Factor		
	1	2	3
G1	.385	**.556**	.059
G2	.269	**.563**	.139
G3	.319	**.740**	.102
G4	.247	**.740**	.158
G5	.223	**.753**	.124
G6	.347	**.737**	.156
G8	.404	.428	.346
G9	.437	.490	.296
G10	.284	.187	**.681**
G11	.257	.084	**.842**
G12	**.507**	.271	.372
G13	**.591**	.248	.256
G14	**.715**	.309	.227
G15	**.567**	.298	.170
G16	**.587**	.253	.253
G17	**.736**	.308	.165
G18	**.587**	.257	.193
G19	**.627**	.365	.165
G20	**.571**	.308	.192

Table 4.35

Factor structure when forcing the extraction of a single factor for the enhancing student academic self-efficacy scale

	Factor
	1
G1	.635
G2	.589
G3	.712
G4	.683
G5	.661
G6	.751
G8	.676
G9	.720
G10	.545
G11	.508
G12	.655
G13	.655
G14	.766
G15	.640
G16	.655
G17	.755
G18	.636
G19	.722
G20	.658

Forty-three percent of the non-redundant residuals obtained absolute values greater than .05, thus making the obtained single-factor factor solution somewhat tenuous. This stands in contrast to the 10% large residual correlations that was obtained for the three-factor solution.

4.4.8 Psychometric evaluation of fostering psychological safety and fairness

4.4.8.1 CTT item analysis: Fostering psychological safety and fairness

The *fostering psychological safety and fairness* scale consists of ten items measured on a 5-point Likert scale ranging from *never* to *often.* The scale obtained a highly satisfactory Cronbach's alpha of .921. The item means ranged from 3.93 to 4.72 and the item standard deviations ranged from .696 to 1.267. Item H3 (*"The instructor expects students to treat each other with respect"*) returned the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between .401 and .749. None of the items were flagged as problematic. The item-total correlations raised no concerns, indicating that the correlation between each item and the total score calculated from the remaining items was satisfactory and that the items were reflecting the same underlying factor. In addition, the squared multiple correlations were satisfactory and the results revealed that none of the items, if deleted, would increase the current Cronbach alpha. The basket of evidence suggests that item H3 is the weakest item in the scale and item H8 (*"The instructor* *shows respect and positive regard for others and wants us to do the same"*) is the strongest item in the scale. The results for the item analysis for the *fostering psychological safety* scale are shown in Table 4.36.

Table 4.36

Fostering psychological safety scale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.921	.924	10

Item Statistics

	Mean	Std. Deviation	N
H1	4.27709	1.020061	563
H2	4.52575	.860746	563
H3	4.71758	.695814	563
H4	3.98757	1.263301	563
H5	4.29663	1.049880	563
H6	3.93428	1.267278	563
H7	4.13854	1.162273	563
H8	4.34991	.958264	563
H9	4.33215	1.062871	563
H10	4.46714	.933884	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.303	3.934	4.718	.783	1.199	.057	10
Item Variances	1.084	.484	1.606	1.122	3.317	.129	10
Inter-Item Covariances	.584	.324	1.103	.779	3.402	.031	10
Inter-Item Correlations	.550	.401	.749	.348	1.870	.006	10

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
H1	38.74956	52.231	.688	.492	.914
H2	38.50089	54.282	.661	.569	.916
H3	38.30906	56.470	.617	.532	.919
H4	39.03908	49.668	.682	.562	.916
H5	38.73002	51.080	.748	.627	.911
H6	39.09236	48.525	.752	.657	.911
H7	38.88810	50.035	.731	.623	.912
H8	38.67673	51.593	.792	.641	.909
H9	38.69449	51.494	.707	.596	.913
H10	38.55950	52.745	.722	.604	.912

4.4.8.2 Dimensionality analysis: Fostering psychological safety and fairness

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .914 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item H8 (*"The instructor shows respect and positive regard for others and wants us to do the same"*) obtained the highest factor loading and H3 (*"The instructor expects students to treat each other with respect"*) the lowest loading. The resultant factor structure is shown in Table 4.37.

Table 4.37

Factor matrix for the fostering psychological safety and fairness scale

	Factor
	1
H1	.719
H2	.701
H3	.653
H4	.707
H5	.773
H6	.776
H7	.757
H8	.829
H9	.745
H10	.760

The results indicated that 28% of the non-redundant residuals obtained absolute values greater than .05, suggesting that the rotated factor solution provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was thus corroborated.

4.4.8.3 IRT item analysis: Fostering psychological safety and fairness

The scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 6.92 and is 9.5 times greater than the second factor. The assumption of unidimensionality was met. The covariance matrix and item-pair H-coefficients showed only positive correlations. No significant violations were present in the monotonicity summary and the fit index values were below the critical cut-off value of 40. The monotonicity assumption held for the data. The AISP procedure partitioned all the items into a single Mokken scale, indicating all the items are scalable.

The residual values in the two-way margins for RSM indicated one item pair (H7 and H6) showed misfit. None of the item-pairs in the GRM two-way margins showed misfit. For both the RSM and the GRM no item triplets were flagged as exceeding the critical chi-square value. The AIC and BIC indicated that the GRM had superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit (p <.01). The GRM thus describes the data best.

Table 4.38 shows that the items under the GRM possess very high discrimination ($1.97<a<3.23$). The location parameters appear to function mostly below the mean of the *fostering psychological safety and fairness* scale. It appears that for item H4, H6, and H7, a trainer-instructor needs to be much higher on the latent trait (although still below the mean) in order to have a .5 probability of obtaining a score of 1 or higher (versus 0). Items H4 and H6 are the only items that the trainer-instructor requires to fall above the mean in order to have a probability of .5 to obtain the highest category score 4.

Table 4.38

Fostering psychological safety and fairness scale: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*A*	Item *H*	% of information contributed
H1	-2.539	-1.930	-1.138	-.204	2.091	.573	8.5
H2	-2.786	-2.457	-1.646	-.637	1.977	.570	7.42
H3	-3.152	-2.819	-1.969	-1.132	2.022	.570	7.47
H4	-1.694	-1.407	-.856	.089	2.193	.581	7.88
H5	-2.178	-1.652	-1.154	-.232	2.771	.616	11.78
H6	-1.613	-1.274	-.667	.135	2.767	.636	11.08
H7	**-1.811**	-1.509	-.940	-.079	2.657	.609	10.34
H8	-2.264	-1.906	-1.117	-.244	3.226	.655	14.84
H9	-2.182	-1.799	-1.121	-.372	2.468	.588	9.56
H10	-2.358	-1.915	-1.344	-.502	2.724	.609	11.21

Items H2 and H3 contribute the least information to the scale, whereas items H5 and H6 contribute the most information. The H coefficients indicate that all the items have strong scalability. The scale can be considered to possess strong scalability, with a scale H-coefficient of .602. Furthermore, the option response functions (not shown) generally reflect that trainer-instructors that fall above the mean on *fostering psychological safety and fairness* is most likely to receive a category score of category 4. That is, they are most likely to be rated as *often* displaying a specific behaviour.

All the items, but in particular items H4 and H6 can be considered to discriminate poorly among instructors with above average competence on fost*ering psychological safety and fairness.* The test information function (see Figure 4.5) shows that the scale is most informative between two standard deviations below the mean and the mean.

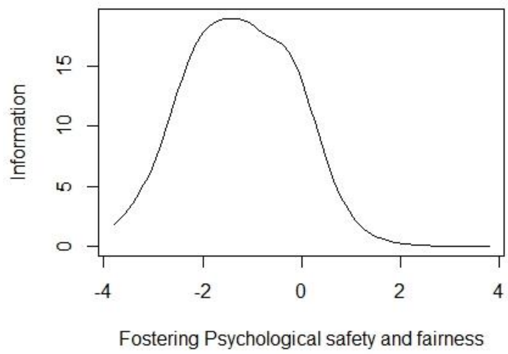

Figure 4.5. ***Fostering psychological safety and fairness information function***

4.4.9 Psychometric evaluation of the Demonstrating individual consideration scale

4.4.9.1 CTT item analysis: Demonstrating individual consideration scale

The *demonstrating individual consideration* scale consists of 13 items measured on a 5-point Likert scale ranging from *never* to *often.* A highly acceptable Cronbach's alpha of .912 was obtained for the scale. The item means ranged from 3.726 to 4.560 and the item standard deviations ranged from .696 to 1.267. Item I6 returned the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between .401 and .749. See Table 4.39 for the results of the item analysis for the *demonstrating individual consideration* scale.

Table 4.39

Demonstrating individual consideration: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.912	.915	13

Item Statistics

	Mean	Std. Deviation	N
I1	4.18650	1.167027	563
I2	4.42629	.939155	563
I3	3.95737	1.226180	563
I4	4.17052	1.066833	563
I5	4.04796	1.061880	563
I6	4.55950	.801196	563
I7	4.37123	.985133	563
I8	3.95737	1.224728	563
I9	4.17229	1.043782	563
I10	4.00355	1.239901	563
I11	4.17762	1.095314	563
I12	3.81705	1.120940	563
I13	3.72647	1.291827	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.121	3.726	4.560	.833	1.224	.057	13
Item Variances	1.221	.642	1.669	1.027	2.600	.085	13
Inter-Item Covariances	.540	.242	.937	.694	3.864	.027	13
Inter-Item Correlations	.454	.183	.714	.531	3.907	.017	13

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
I1	49.38721	89.957	.400	.470	.915
I2	49.14742	87.816	.651	.506	.905
I3	49.61634	85.650	.573	.559	.908
I4	49.40320	86.707	.620	.450	.905
I5	49.52575	85.129	.710	.547	.902
I6	49.01421	90.121	.618	.529	.906
I7	49.20249	85.884	.729	.655	.902
I8	49.61634	83.087	.698	.558	.902
I9	49.40142	84.198	.777	.662	.899
I10	49.57016	83.637	.661	.521	.904
I11	49.39609	83.731	.760	.668	.900
I12	49.75666	86.672	.586	.454	.907
I13	49.84725	85.083	.563	.420	.909

Item I1 (*"The instructor is friendly towards individual students"*) was flagged as a problematic item. The Cronbach's alpha changing from .912 to.915 if the item was to be deleted from the scale, the low item-total correlation (.40) and the low squared multiple correlation (.47) prompted the decision to remove item I1. The somewhat lower corrected item-total correlations, squared multiple correlations and the inter-item correlations for items I3 (*"The instructor has a genuine interest in individual students"*), I12 (*"The instructor views students as individuals with particular needs and special personalities"*) and I13 (*"The instructor provides students with individual feedback"*) also alluded to the possibility that these items might be problematic. It was, however, decided to only remove item I1.

The deletion of I1 brought item I3 to the fore as a possible problematic item. The item reported low corrected item-total correlations (.516) and low squared multiple correlations (.306). Deletion of I3 would result in a zero change to the Cronbach's alpha, indicating the item does not contribute to the internal consistency of the scale. The item was removed from the scale and the analysis was subsequently re-run.

Item I13 surfaced as a possible problematic item. I13 reported lower corrected item-total correlations (.547) and low squared multiple correlations (.405) compared to the other items. Deletion of I13 would result in a zero change to the Cronbach's alpha. Item I13 was therefore also removed from the scale.

The analysis was again re-run, and brought item I12 to the fore as a possible problematic item. The item reported lower corrected item-total correlations (.551) and lower squared multiple correlations (.340) compared to the other items. Deletion of item I12 would result in a zero change to the Cronbach's alpha, once again indicating the item does not contribute to the internal consistency of the scale. The item I12 was consequently removed from the scale. No further items were flagged for deletion. The final 9-item scale obtained a Cronbach's alpha of .915.

The manner in which a subset of items sequentially came to the fore as additional problematic items upon the deletion of previously problematic suggests that these items load on a second, less dominant factor that accounts for less variance in the data set. Retaining these items because of this would in this instance, however, most likely have caused these items to load unacceptably low on a single factor when forcing the extraction of a single factor.

4.4.9.2 Dimensionality analysis: Demonstrating individual consideration scale

All the correlations in the reduced inter-item correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .930 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Items I9 (*"The instructor builds good relationships with students in the classroom"*) and I11 (*"The instructor shows concern for students"*) obtained the highest factor loading and I4 ("*The instructor makes sure he/she is available when students need him/her after class or during office hours*") the lowest loading. The resultant factor structure is shown in Table 4.40.

The results indicated that 27% of the non-redundant residual correlations obtained absolute values greater than .05. The factor solution provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was corroborated.

Table 4.40

Factor matrix for the demonstrating individual consideration scale

	Factor
	1
I2	.690
I4	.646
I5	.719
I6	.693
I7	.817
I8	.732
I9	.841
I10	.709
I11	.841

4.4.9.3 IRT item analysis: Demonstrating individual consideration scale

The scree plot indicated the presence of one dominant factor. The dominant factor obtained an eigenvalue of 6.27 and is 9.95 times greater than the second factor. The assumption of unidimensionality was met. The covariance matrix and item-pair H-coefficients showed only positive correlations. One significant violation in monotonicity was present for item I10. The fit index value for item I10 was 44, which places it within the questionable range of 40-80. Due to the fact that all the correlations with item I10 in the covariance matrix exceeded the critical cut-off value and that the monotonicity fit index also exceeded the critical cut-off value, it was decided to retain the item. The AISP procedure partitioned all the items into a single Mokken scale, indicating all the items are scalable.

For both the RSM and the GRM, the results showed that none of the item-pairs in two-way margins or item triplets in the three-way margin showed misfit. The AIC and BIC indicated that the GRM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit ($p < .01$). The GRM thus describes the data best.

Table 4.41 shows that the items in the GRM possess very high discrimination ($1.82<a<3.43$). The location parameters appear to function mostly below the mean of the scale. It appears that for item I8 and I11, a trainer-instructor needs to be much higher on the latent trait (although still below the mean) in order to have a .5 probability of obtaining a score of 1 or higher (versus 0). For items I5, I8, I9 and I10 the trainer-instructor needs to be above average on *demonstrating individual consideration* in order to have a probability of .5 to obtain the highest category score 4.

Items I7, I9, I11 contributed the most information to the scale. The H coefficients indicate that all the items have strong scalability. The scale can be considered to possess strong scalability, with a scale H-coefficient of .593. Furthermore, the option response functions generally reflect that trainer-instructors falling above the mean are most likely to receive a rating of *often* and those falling below two standard deviations below the mean are most likely to obtain a rating of *never*.

Items I2, I4, I6, I7 and I11 discriminate poorly among instructors with above average competence on *demonstrating individual consideration*. The test information function below (see Figure 4.6) shows that the scale is most informative between two standard deviations below the mean and the mean.

Table 4.41

Demonstrating individual consideration: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*a*	Item *H*	% of information contributed
I2	-2.481	-2.115	-1.411	-.452	2.237	.560	8.76
I4	-2.469	-1.976	-1.095	-.020	1.823	.517	7.11
I5	-2.222	-1.835	-.875	.232	2.230	.583	9.52
I6	-2.672	-2.309	-1.557	-.622	2.520	.573	10.50
I7	-2.193	-1.798	-1.086	-.362	3.291	.645	14.89
I8	**-1.814**	-1.444	-.738	.174	2.247	.586	8.76
I9	-2.050	-1.578	-.935	.012	3.406	.652	16.47
I10	-2.880	-1.390	-.853	.053	2.157	.568	8.15
I11	-1.944	-1.532	-.819	-.110	3.429	.653	15.86

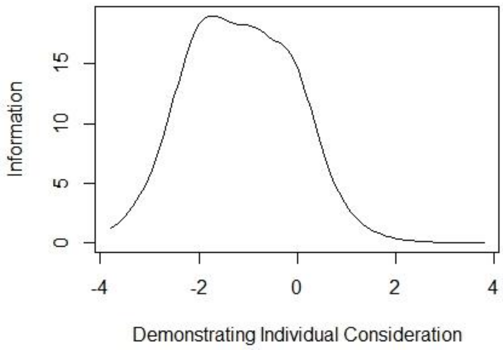

Figure 4.6. Demonstrating individual consideration information function

4.4.10 Psychometric evaluation of the stimulating involvement and interest scale

4.4.10.1 CTT item analysis: Stimulating involvement and interest

The *stimulating involvement and interest* scale consists of 12 items measured on a 5-point Likert scale ranging from *never* to *often.* A highly acceptable Cronbach's alpha of .916 was obtained for the scale. The item means ranged from 3.66 to 4.44 and the item standard deviations ranged from .696 to 1.267. Item H3 returned the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between .834 and 1.307. The results for the item analysis for the s*timulating involvement and interest* scale are shown in Table 4.42.

Item J6 was flagged as a problematic item (*"The instructor challenges students' beliefs"*). The Cronbach's alpha shifting from .916 to .922 if the item is deleted, a low item-total correlation (.422) and a low squared multiple correlation (.306) prompted the decision to remove item J6 from the scale. The analysis was rerun, but no further items were flagged for deletion. The final 11-item scale obtained a Cronbach's alpha of .922.

Table 4.42

Stimulating involvement and interest: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.916	.921	12

Item Statistics

	Mean	Std. Deviation	N
J1	4.44938	.957558	563
J2	4.24334	1.027784	563
J3	3.91474	1.229752	563
J4	4.41918	.834182	563
J5	4.28064	.872330	563
J6	3.66252	1.306893	563
J7	4.07460	.997209	563
J8	4.10657	1.027734	563
J9	4.05151	1.125178	563
J10	4.18295	.989407	563
J11	4.18828	.983894	563
J12	4.12078	1.111079	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.141	3.663	4.449	.787	1.215	.046	12
Item Variances	1.096	.696	1.708	1.012	2.454	.086	12
Inter-Item Covariances	.522	.270	.772	.502	2.860	.011	12
Inter-Item Correlations	.494	.248	.734	.487	2.966	.011	12

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
J1	45.24512	70.445	.663	.532	.909
J2	45.45115	68.743	.717	.582	.907
J3	45.77975	68.065	.613	.425	.912
J4	45.27531	71.317	.711	.593	.908
J5	45.41385	71.140	.688	.532	.908
J6	**46.03197**	**70.604**	**.442**	**.306**	**.922**
J7	45.61989	69.894	.668	.507	.909
J8	45.58792	70.777	.589	.393	.912
J9	45.64298	67.319	.728	.595	.906
J10	45.51155	68.503	.766	.669	.905
J11	45.50622	68.823	.749	.652	.905
J12	45.57371	67.757	.712	.556	.907

4.4.10.2 Dimensionality analysis: Stimulating involvement and interest

Item J6 was deleted from the *stimulating involvement and interest* scale during item analysis. The factor analysis was performed on the remainder of the items in the scale.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .936 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item J10 (*"The instructor gives students the chance to explain their ideas and to assess and refine them"*) obtained the highest factor loading and item J8 (*"The instructor asks questions and delivers presentations that make students think deeply"*) obtained the lowest loading. The resultant factor structure is shown in Table 4.43.

The results indicated that 29% of the non-redundant residual correlations obtained absolute values greater than .05. The factor solution provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was corroborated.

Table 4.43

Factor matrix for the* stimulating involvement and interest *scale

	Factor
	1
J1	.706
J2	.757
J3	.637
J4	.762
J5	.723
J7	.658
J8	.610
J9	.756
J10	.813
J11	.802
J12	.759

4.4.10.3 IRT item analysis: Stimulating involvement and interest

The location of the elbow in the scree plot confirmed the unidimensionality of the scale. The covariance matrix and item-pair H-coefficients showed only positive correlations. No significant violations were present in the monotonicity summary. The monotonicity assumption was met. The AISP procedure partitioned all the items into a single Mokken scale, indicating all the items are scalable.

The item pair J2 and J6 and the item triplet J1, J2 and J6 were flagged for the RSM as showing misfit. None of the item pairs and one item triplet (J8, J10, and J12) were flagged for the GRM as showing misfit. The AIC and BIC indicated that the GRM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit ($p < .01$). The GRM thus describes the data best.

Table 4.44 shows that the items of the GRM show high to very high discrimination ($1.55 < a < 3.07$). The location parameters appear to function mostly below the mean of the scale. For item J5, trainer-instructors need to be much lower on the latent trait in order to have a .5 probability of obtaining a score of 1 or higher (versus 0) compared to the other items in the scale. For item J3 and items J7 to J10, trainer-instructors need to be above average on *stimulating involvement and interest* in order to have a probability of .5 of obtaining the highest category score 4.

Table 4.44

Stimulating involvement and interest: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	a	Item H	% of information contributed
J1	-2.475	-2.063	-1.592	-.562	2.268	.567	7.77
J2	-2.231	-1.920	-1.236	-.150	2.512	.579	9.35
J3	-2.300	-1.753	-.930	.213	1.573	.501	3.51
J4	-2.823	-2.302	-1.496	-.309	2.671	.608	11.33
J5	-3.119	-2.383	-1.346	-.033	2.198	.562	9.47
J7	-2.870	-2.274	-1.135	.256	1.783	.517	6.85
J8	-2.857	-2.274	-1.256	.188	1.550	.474	5.57
J9	-2.101	-1.710	-1.042	.124	2.447	.578	9.31
J10	-2.256	-1.915	-1.120	.048	3.070	.613	13.05
J11	-2.321	-1.892	-1.131	-.037	2.968	.605	12.69
J12	-2.199	-1.688	-1.018	-.017	2.432	.575	9.29

Items J4, J10, and J11 contributed the most information to the scale. Items J3 and J8 contributed the least amount of information to the scale, which can probably be ascribed to the low discrimination parameters obtained (relative to the other items in the scale). The H coefficients indicate that all the items have strong scalability. The scale can be considered to possess strong scalability, with a scale H-coefficient of .560. Furthermore, the option response functions (not displayed) generally reflect that trainer-instructors that fall above the mean on are most likely to receive a rating of *often* and those falling below two standard deviations below the mean are most likely to obtain a rating of *never*. Items J1, J2, J4, J5, J11 and J12 discriminate poorly among instructors with above average competence on *stimulating involvement and interest*. The test information function (see Figure 4.7) shows that the scale is most informative between two standard deviations below the mean and mean.[28]

If the analysis is rerun without item J8 (given the item's low H coefficient), the GRM fits perfectly. The decision was taken not to remove the item for the sake of making the model fit perfectly, as this would be contradictory to the philosophy of non-Rasch models.

[28] As discussed earlier, if model misfit is found under a non-Rasch model, the model is usually discarded (and not the data).

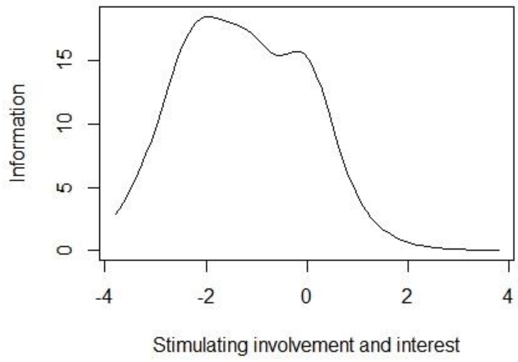

Figure 4.7. ***Stimulating involvement and interest information function***

4.4.11 Psychometric evaluation of the providing inspirational motivation scale

4.4.11.1 CTT item analysis: Providing inspirational motivation scale

The *providing inspirational motivation* scale consists of 10 items measured on a 5-point Likert scale ranging from *never* to *often.* The scale obtained a highly acceptable Cronbach's alpha of .955. The item means ranged from 4.33 to 4.52 and the item standards deviation ranged from .801 to .934. Item K5 (*"The instructor encourages students to see future challenges as learning opportunities"*) obtained the highest mean and the second lowest standard deviation. The mean is, however, not sufficiently extreme to have significantly curtailed the variance of the distribution.

The inter-item correlation matrix revealed substantial correlations ranging between .586 and .826. None of the items were flagged as problematic. The item total correlations raised no concerns, indicating that the correlation between each item and the total score calculated from the remaining items was satisfactory and that the items were reflecting the same underlying factor. In addition, the squared multiple correlations were satisfactory and the results revealed that none of the items, if deleted, would increase the current Cronbach alpha. The results for the item analysis for the *providing inspirational motivation* scale are depicted in Table 4.45.

Table 4.45

Providing inspirational motivation scale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.955	**.955**	**10**

Item Statistics

	Mean	Std. Deviation	N
K1	4.51687	.844271	563
K2	4.46536	.914566	563
K3	4.44760	.884026	563
K4	4.40675	.914352	563
K5	**4.47780**	**.800881**	563
K6	4.33037	.934273	563
K7	4.33037	.924701	563
K8	4.34991	.910660	563
K9	4.33748	.912428	563
K10	4.35879	.870149	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.402	4.330	4.517	.187	1.043	.005	10
Item Variances	.796	.641	.873	.231	1.361	.005	10
Inter-Item Covariances	.540	.441	.686	.245	1.557	.003	10
Inter-Item Correlations	.680	.586	.826	.239	1.409	.003	10

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
K1	39.50444	46.980	.764	.649	.952
K2	39.55595	46.009	.781	.696	.951
K3	39.57371	46.014	.812	.693	.950
K4	39.61456	45.494	.827	.719	.949
K5	39.54352	46.843	.825	.701	.949
K6	39.69094	45.748	.784	.699	.951
K7	39.69094	45.588	.808	.715	.950
K8	39.67140	45.602	.821	.765	.949
K9	39.68384	45.619	.818	.755	.949
K10	39.66252	46.299	.800	.692	.950

4.4.11.2 Dimensionality analysis: Providing inspirational motivation scale

As none of the items included in the *providing inspirational motivation* was deleted during item analysis, the complete scale was subjected to factor analysis.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .943 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The position of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item K4 (*"The instructor helps students to create a positive vision of their career"*) obtained the highest factor loading and item K1 (*"The instructor believes in students' ability to become what they want to become"*) obtained the lowest loading. The resultant factor structure is shown in Table 4.46.

Twenty four percent of the non-redundant residuals obtained absolute values greater than .05. The factor solution provides a credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was corroborated.

Table 4.46

Factor matrix for the providing inspirational motivations scale

	Factor
	1
K1	.782
K2	.801
K3	.833
K4	.849
K5	.846
K6	.805
K7	.828
K8	.843
K9	.839
K10	.821

4.4.11.3 IRT item analysis: Providing inspirational motivation scale

The scree plot confirmed the unidimensionality of the scale. Only non-negative correlations were contained in the covariance matrix and item-pair H-coefficients matrix. No significant violations were present in the monotonicity summary and, consequently, the monotonicity assumption was met. The AISP procedure partitioned all the items into a single Mokken scale, indicating all the items are scalable.

None of the item pairs were flagged as showing misfit for the RSM. Twenty-seven item triplets, however, showed misfit. For the GRM, the item pair K4 and K8 showed misfit and 26 item triplets showed misfit. The AIC and BIC indicated that the RSM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM did not significantly improve the model fit (p<.01). The RSM thus describes the data best. The large number of item triplets that were flagged for both models suggest that neither model provides a satisfactory description of the item data. The item parameter estimates derived from the RSM was therefore interpreted with great circumspection.

Table 4.47 shows that the items under the RSM show very high discrimination (*a=3.312*). All the location parameters function below the mean of the scale. For item K1, a trainer-instructor requires a standing of .472 standard deviations below the mean on the latent variable in order to have a .5 probability of obtaining a score of 4 or higher. In contrast, item J9 requires a trainer-instructor to lie .082 standard deviation units below the mean in order to have a probability of .5 of obtaining the highest category score 4. For item K1, it is thus easiest to obtain a score of 4, whereas for item J9 it is most difficult to obtain a score of 4.

Table 4.7 indicates that all the items contributed approximately equal amount of information, albeit slightly more for items K5, K7, K8, K9, and K10. The H coefficients indicate that all the items have strong scalability. The scale can be considered to possess strong scalability, with a scale H-coefficient of .715. The option response functions (not displayed) reflect the general trend that trainer-instructors falling above the mean are most likely to receive a rating of *often* and those falling below two standard deviations below the mean are most likely to obtain a rating of *never*.

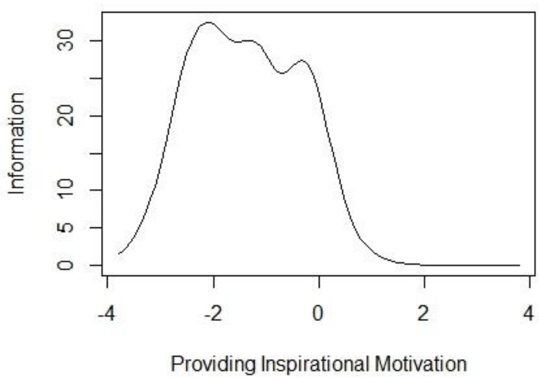

Figure 4.8. ***Providing inspirational motivation information function***

Table 4.47

Providing inspirational motivation: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	a	Item H	% of information contributed
K1	-2.403	-2.038	-1.410	-.472	3.312	.619	9.34
K2	-2.293	-1.926	-1.190	-.446	3.312	.702	9.24
K3	-2.488	-2.012	-1.219	-.348	3.312	.721	9.93
K4	-2.385	-1.932	-1.192	-.274	3.312	.727	9.84
K5	-2.943	-2.158	-1.358	-.299	3.312	.741	10.97
K6	-2.282	-1.841	-1.148	-.112	3.312	.694	9.87
K7	-2.342	-1.887	-1.122	-.103	3.312	.713	10.04
K8	-2.378	-1.908	-1.195	-.112	3.312	.722	10.05
K9	-2.437	-1.861	-1.177	-.082	3.312	.722	10.29
K10	-2.569	-2.102	-1.105	-.125	3.312	.714	10.42

4.4.12 Psychometric evaluation of the providing autonomy support scale

The *providing autonomy support* scale consists of 14 items. The items are measured on a 5-point Likert scale ranging from *never* to *often.*

4.4.12.1 CCT item analysis: Providing autonomy support scale

The scale obtained a highly satisfactory Cronbach's alpha of .90. The item means ranged from 3.329 to 4.449 and the item standards deviation ranged from .87 to 1.458. Item L1 obtained the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between a low .136 and .696. Items L1 (*"The instructor encourages students to take personal responsibility for their learning"*) and L4 (*"The instructor encourages students to work independently"*) had patterns of lower correlations compared to the other items in the scale. The corrected item-total correlations and the squared multiple correlations of these items were lower in comparison with the other items in the scale. Item L4 was the only item, however, that when deleted would have no effect on the current Cronbach's alpha. The item does thus not contribute the internal consistency of the scale. Item L4 was subsequently deleted and the analysis was rerun.

The Cronbach's alpha if item deleted and the slightly lower squared multiple correlations and corrected item-total score indicated that items L1, L5, and L6 did not contribute much to the internal consistency of the scale. It was, however, decided to postpone a final decision on the inclusion of these items after the exploratory factor analysis. The items were thus provisionally retained. The final 13-item subscale had a Cronbach alpha of .90. The results of the item analysis before deletion of item L4 is shown in Table 4.48.

Table 4.48

Providing autonomy support scale: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.900	.904	14

Item Statistics

	Mean	Std. Deviation	N
L1	4.44938	.869928	563
L2	4.04796	1.010360	563
L3	4.12078	1.020943	563
L4	4.29840	.937427	563
L5	3.59503	1.378318	563
L6	3.32860	1.457713	563
L7	3.55595	1.366209	563
L8	4.01421	1.080304	563
L9	3.77265	1.169678	563
L10	4.05861	1.051237	563
L11	4.32149	.949630	563
L12	4.12611	1.122439	563
L13	4.14387	1.013561	563
L14	4.10835	1.055734	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.996	3.329	4.449	1.121	1.337	.102	14
Item Variances	1.252	.757	2.125	1.368	2.808	.175	14
Inter-Item Covariances	.489	.174	1.015	.841	5.842	.028	14
Inter-Item Correlations	.403	.136	.696	.560	5.130	.014	14

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
L1	51.49201	97.322	.487	.327	.897
L2	51.89343	93.679	.600	.438	.892
L3	51.82060	92.297	.668	.515	.890
L4	51.64298	98.326	.389	.273	.900
L5	52.34636	90.914	.519	.350	.897
L6	52.61279	90.081	.515	.375	.898
L7	52.38544	90.237	.552	.494	.895
L8	51.92718	90.669	.710	.565	.888
L9	52.16874	90.657	.647	.470	.890
L10	51.88277	91.150	.707	.535	.888
L11	51.61989	94.649	.590	.422	.893
L12	51.81528	91.493	.638	.560	.891
L13	51.79751	91.422	.722	.655	.888
L14	51.83304	91.958	.660	.526	.890

4.4.12.2 Dimensionality analysis: Providing autonomy support scale

Item L4 was deleted from the *providing autonomy support* scale. Factor analysis was consequently conducted on the remaining items in the scale.

All the correlations in the correlation matrix for the *providing autonomy support* subscale were statistically significant ($p < .05$), although some correlations obtained values lower than .30. The scale obtained a KMO of .926 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, presenting sufficient evidence that the correlation matrix was factor analysable. There were two factors that obtained eigen values greater than one. This was confirmed by the position of the elbow in the scree plot that also suggested the extraction of two factors. The results of the obtained rotated factor structure are displayed in Table 4.49.

Table 4.49 shows that items L1 to L3 and items L11 to L14 load most strongly on the first factor. All these items reflect the providing cognitive support component of the construct, except for items L13 (“*The instructor provides students with choices and options”*) and L14 (“*The instructor tries to understand how students see things before the instructor gives any advice on how to handle a problem”*) which reflect the providing organisational autonomy support component. Items L5 to L7 loads most strongly onto the second factor. These items reflect the providing organisational autonomy support component of the construct. Items L8 to L10 are complex items loading onto both factors. Items L8 (*“The instructor encourages students to find multiple solutions to problems”*) and L10 (*“The instructor provides students with enough time for decision-making”*) has the highest loading on factor one (the cognitive component) and item L9 (*“The instructor wants students to defend their solutions so everyone can learn from that student”*) has the highest loading on the second factor. All three the items were intended to reflect the cognitive component.

Table 4.49

Rotated factor structure for the providing autonomy support scale

	Factor	
	1	2
L1	**.520**	.155
L2	**.614**	.239
L3	**.636**	.303
L5	.281	**.509**
L6	.213	**.610**
L7	.141	**.832**
L8	***.550***	***.518***
L9	***.454***	***.528***
L10	***.568***	***.489***
L11	**.610**	.220
L12	**.706**	.234
L13	**.790**	.265
L14	**.684**	.281

Forced extraction of a single factor was performed on the scale to determine whether a satisfactory loading could be obtained on a single factor. The design intention of the scale was to reflect a unidimensional construct and not to distinguish between two separate constructs. The results of the forced extraction of a single factor revealed that all the items obtained a factor loading of at least .5 on the first factor (See Table 4.50). As expected, items L1 ("*The instructor encourages students to take personal responsibility for their learning*"), L5 ("*The instructor gives students opportunity to choose group members*"), L6 ("*The instructor involves students in creating and implementing classroom rules*"), and L7 ("*The instructor gives students the options to choose the material to use in class assignments*") obtained the lowest factor loading of all the items. Items L5 to L7 reflect the organisational autonomy support component whereas item L1 reflects being encouraged to take responsibility for one's learning. Despite the somewhat marginal performance of item L1, L5, and L6 it was nonetheless decided, given the results of the exploratory factor analysis, to retain these three items in the *providing autonomy support* scale.

Forty-two percent of the non-redundant residuals obtained absolute values greater than .05, thus making the obtained single-factor factor solution acceptable yet somewhat tenuous. This stands in contrast to the 15% large residual correlations obtained when the two-factor was used to reproduce the observed inter-item correlations

Table 4.50

Factor structure when forcing the extraction of a single factor for the providing autonomy support scale

	Factor
	1
L1	**.512**
L2	.638
L3	.695
L5	**.523**
L6	**.520**
L7	.567
L8	.753
L9	.678
L10	.751
L11	.623
L12	.705
L13	.789
L14	.718

4.4.13 Psychometric evaluation of the promoting a mastery goal structure scale

The *promoting a mastery goal structure* scale consisted of 10 items measured on a 5-point Likert scale ranging from *never* to *often.*

4.4.13.1 CCT item analysis: Promoting a mastery goal structure scale

A highly satisfactory Cronbach's alpha of .926 was obtained for the *promoting a mastery goal structure* scale. The item means ranged from 3.95 to 4.48 and the item standard deviations ranged from .797 to 1.133. Item M3 (*"The instructor explains the use and purpose of tasks and assignments"*) obtained the highest mean and the lowest standard deviation. The inter-item correlation matrix revealed correlations ranging between .325 and .723. The results for the item analysis for the *promoting a mastery goal structure* scale are shown in Table 4.51.

Item M4 was flagged as a problematic item. The low inter-item correlations characterising the item, the Cronbach's alpha changing from .926 to .930 if the item is deleted, a low corrected item-total correlation (.489) and a low squared multiple correlation (.279) prompted the decision to remove item M4. The analysis was rerun, but no further items were flagged for deletion. The final 9-item scale obtained a Cronbach's alpha of .930.

Table 4.51

Promoting a mastery goal structure: CTT item statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.926	.926	10

Item Statistics

	Mean	Std. Deviation	N
M1	4.28419	.924681	563
M2	4.15808	.997266	563
M3	4.48845	.796651	563
M4	4.22380	.990885	563
M5	4.31972	1.003952	563
M6	4.15098	1.128857	563
M7	3.94671	1.133760	563
M8	4.18650	1.081565	563
M9	4.11901	1.009763	563
M10	4.22025	1.094055	563

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.210	3.947	4.488	.542	1.137	.020	10
Item Variances	1.042	.635	1.285	.651	2.025	.040	10
Inter-Item Covariances	.578	.316	.864	.548	2.736	.024	10
Inter-Item Correlations	.556	.325	.723	.398	2.226	.011	10

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
M1	37.81350	51.736	.743	.578	.917
M2	37.93961	52.146	.648	.435	.922
M3	37.60924	54.132	.657	.464	.922
M4	37.87389	54.349	.489	.279	.930
M5	37.77798	50.376	.778	.632	.915
M6	37.94671	48.663	.796	.662	.914
M7	38.15098	49.566	.728	.559	.918
M8	37.91119	49.561	.771	.655	.915
M9	37.97869	50.387	.772	.633	.915
M10	37.87744	49.286	.781	.627	.914

4.4.13.2 Dimensionality analysis: Promoting a mastery goal structure scale

Item M4 was excluded from the factor analysis of the *promoting a mastery goal structure* scale as it was deleted during item analysis.

All the correlations in the correlation matrix were larger than .30 and statistically significant ($p < .05$). The scale obtained a KMO of .947 and the Bartlett's Test of Sphericity allowed for the identity matrix null hypothesis to be rejected, providing strong evidence that the correlation matrix was factor analysable.

One factor was extracted, since only one factor obtained an eigenvalue greater than 1. The location of the elbow in the scree plot also suggested that a single factor should be extracted. The factor matrix indicated that all the items loaded on one factor satisfactorily as all factor loadings were larger than .50. Item M6 (*"The instructor gives struggling students hope by helping them see how they are making progress"*) obtained the highest factor loading and item M2 (*"The instructor emphasises becoming skilled at tasks and learning"*) obtained the lowest loading one the extracted factor. The resultant factor structure is shown in Table 4.52.

Eleven percent of the non-redundant residuals obtained absolute values greater than .05. The factor solution provides a very credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was corroborated.

Table 4.52
Factor matrix for the Promoting a mastery climate scale

	Factor
	1
M1	.779
M2	.661
M3	.677
M5	.809
M6	.828
M7	.752
M8	.818
M9	.812
M10	.818

4.4.13.3 IRT item analysis: Promoting a mastery goal structure

The scree plot indicated the presence of one dominant factor. The covariance matrix and item-pair H-coefficients showed only positive correlations. No significant violations were present in the monotonicity summary. The unidimensionality and monotonicity assumptions were met. The AISP procedure partitioned all the items into a single Mokken scale, indicating all the items are scalable.

The item pair M7 and M2 and the item triplet M2, M3 and M5 were flagged for the RSM as showing misfit. None of the item pairs or triplets were flagged for the GRM. The AIC and BIC indicated that the GRM has superior fit. The LRT revealed that moving from the more restrictive RSM to the less restrictive GRM significantly improved the model fit ($p < .01$). The GRM thus describes the data best.

The discrimination parameters in Table 4.53 show that under the GRM the items possess very high discrimination ($1.91<a<3.13$). The location parameters appear to function mostly below the mean of the latent trait continuum. For item M6, trainer-instructors need to be much lower on the latent trait in order to have a .5 probability of obtaining a score of 1 or higher (versus 0) compared to the other items in the scale. For items M3, M7, M8, and M9 trainer-instructors need to be above average on promoting a mastery goal structure in order to have a probability of .5 to obtain the highest category score 4.

Table 4.53

Promoting a mastery goal structure: IRT Item statistics

	Item parameters						
	b_1	b_2	b_3	b_4	*A*	Item *H*	% of information contributed
M1	-2.509	-2.193	-1.225	-.070	2.493	.645	10.27
M2	-2.619	-2.216	-1.171	-.085	1.912	.554	7.35
M3	-3.169	-2.675	-1.6337	.470	2.137	.591	8.73
M5	-2.157	-1.910	-1.157	-.251	3.012	.667	12.01
M6	-1.969	-1.529	-.963	-.080	3.119	.671	12.83
M7	-2.128	-1.638	-.769	.277	2.398	.638	9.82
M8	-2.078	-1.628	-1.000	.089	3.129	.662	13.3
M9	-2.223	-1.886	-.924	.141	2.949	.670	12.95
M10	-2.094	-1.619	-1.013	-.180	3.035	.666	12.55

Items M5, M6, M9, and M10 contributed the most information to the scale. The H coefficients indicate that all the items have strong scalability. The scale can be considered to possess strong scalability, with a scale H-coefficient of .642. Furthermore, the option response functions (not displayed) generally reflect that trainer-instructors that fall above the mean on the latent trait continuum are most likely to receive a rating of *often* and those falling below two standard deviations below the mean are most likely to obtain a rating of *never*.

Items M1, M2, M5, M6 and M10 discriminate poorly among instructors with above average competence on promoting a mastery goal structure. The test information function below (see Figure 4.9) shows that the scale is most informative between two standard deviations below the mean and the mean.

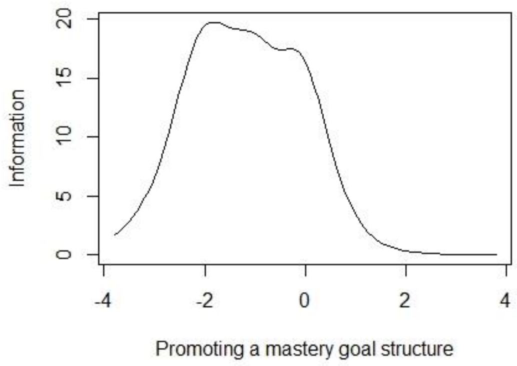

Figure 4.9. ***Promoting a mastery goal structure information function***

4.4.14 Summary of item- and dimensionality analysis

The item analyses revealed all the scales achieved acceptable reliability obtaining alpha values meeting and/or exceeding the desired threshold of .80. The *mastery goal orientation* scale fell marginally below the acceptable internal consistency value with a Cronbach alpha value of .799. At a more detailed level, the item statistics revealed that there were some poor items which were flagged. After gaining a basket of evidence incriminating these items, only 10 of the 176 items included in the *Teaching-Learning Questionnaire* were deleted across the 17 (sub)scales.

With regard to the dimensionality analyses, nine of the 17 (sub)scales passed the unidimensionality assumption as was originally hypothesised and eight did not. Four of the subscales that did not meet the unidimensionality assumption marginally exceeded the cut-off value of 40 percent non-redundant residuals obtaining absolute values greater than .05. In all instances the items were successfully forced onto a single factor solution. No items were deleted due to an inadequate loading on the extracted single factor. A summary of the reliability and dimensionality results can be found in Table 4.54.

Table 4.54

Summary of reliability and dimensionality results

Scale	Reliability	Unidimensionality	Items deleted	Final # of items
Self-efficacy	.866	Somewhat tenuous	None	8
Learning motivation	.817	Confirmed	None	6
Mastery goal orientation	.799	Confirmed	None	5
Mastery goal structure	.810	Tenuous	D6	**5**
Classroom learning climate	**.955**	**Reasonable**	**E30**	**36**
- *Teacher emotional support*	*.866*	*Confirmed*	*None*	*4*
- *Teacher academic support*	*.855*	*Confirmed*	*None*	*4*
- *Psychological safety and fairness*	*.864*	*Tenuous*	*None*	*9*
- *Interest and involvement*	*.878*	*Tenuous*	*None*	*10*
- *Autonomy*	*.844*	*Tenuous*	*E30*	*8*
Inspiring professional vision	.914	Somewhat tenuous	None	8
Enhancing student academic self-efficacy	.935	Somewhat tenuous	G7	19
Fostering Psychological safety and fairness	.921	Confirmed	None	10
Demonstrating individual consideration	.915	Confirmed	I1, I3, I12, I13	9
Stimulating involvement and interest	.922	Confirmed	J6	11
Providing inspirational motivation	.955	Confirmed	None	10
Providing autonomy support	.900	Somewhat tenuous	L4	13
Promoting a mastery goal structure	.930	Confirmed	M4	9

4.4.15 A note on the Likert scale response category wording

All the scales included in the *Teaching-Learning Questionnaire* made use of a 5-point Likert scale. Two sets of scale response categories were utilised: one ranging from *strongly disagree* to *strongly agree*; the other ranging from *never* to *often.*

The response category set ranging from *strongly disagree* to *strongly agree* can be described as a symmetrical or balanced scale as there are an equal number of positive and negative categories included in the scale. Six of the scales in the study utilised this response format. An evaluation of the response frequencies indicates that for these scales, the majority of respondents endorsed either the *neither agree nor disagree, agree,* and *strongly agree* response category. Only a small number of respondents endorsed the *strongly disagree* or *disagree* response categories.

The remainder of the scales made use of the scale categories ranging from *never* to *often.* More specifically, the response categories were as follow: *never, almost never, rarely, sometimes,* and *often.* This scale can be described as unbalanced or negatively balanced as it contains three unfavourable response and two favourable response categories. An evaluation of the response frequencies indicated that for these scales, the majority of respondents endorsed either the *sometimes* or *often* response category. Only a small number of respondents endorsed the three negative response categories.

In their research, Brown, Copeland and Millward (1973) made use of an unbalanced rating scale with the following response categories: *excellent, extremely good, very good, good, fair, and poor.* According to Brown and colleagues this scale was "almost guaranteed to provoke an apparently positive response, and as such not very effective in uncovering respondents' opinion regarding the issue in question.

According to Friedman and Amoo (1999) an unbalanced rating scale should only be used when the researcher is fairly certain that all respondents are leaning in one direction. Consequently, when one can ascertain a priori that one side of the scale is unlikely to be utilised, one would want to obtain precision on the side of the scale that will most likely be utilised.

In hindsight it is apparent that in addition to the use of the unbalanced scale, the use of the descriptors in these scales may also have been flawed. Friedman and Amoo (1999) cautioned that researchers who are interested in creating interval scales must carefully select category descriptors that are truly equal-interval. Respondents need to view the perceived psychological distance between response categories as equal. Various researchers have developed lists providing the scale value means of selected adjectives and descriptors that might be used to create rating scales. Furthermore, Bartram and Yielding (1973) tested various general evaluative phrases such as "extremely," "very," "quite," "usually," "fairly," "almost," and "not at all." Their results suggested that researchers should use descriptors of lesser strength on the negative extreme of the scale as respondents were more willing to assign positive descriptors. Selecting the correct adjectives to anchor one's scale is crucial as it can lead to distorted results which may bias the research.

The use of the adjectives *never, almost never, rarely, sometimes,* and *often* resulted in an unbalanced and unequal-interval scale. This may have had an effect on the scales' effectiveness in discriminating among individuals of varying ability. The majority of the scales (as displayed by the scale information functions) were effective in discriminating between individuals two standard deviations below the mean and the mean on the latent trait. Ideally, for the purpose of this research, the scale should be able to discriminate among individuals of varying ability along the full extent of latent trait (i.e. between high scorers, low scores, and average scores).

It is thus apparent from the IRT item analysis results (in the case of the unidimensional subscales subjected to the analysis[29]) that the items generally discriminated more effectively between cases falling below the mean on the latent trait continuum. At first glance, this appears to be an anomalous finding given the fact that respondents avoided the lower end of the response scale when they respond to items; yet the items still discriminated quite well among individuals falling below the mean of the latent trait continuum. This however, makes logical sense. Upon examination of the information curves, it is clear that the most information was available around and/or below the mean. Consequently, cases falling below the mean have the highest likelihood of obtaining an accurate latent trait score. It appears that there was a large amount of "noise" above the mean on the latent trait continuum. As such, cases falling above the mean are likely to receive a latent trait estimate with a large degree of measurement error. There is therefore a need for items/behavioural incidents that are symptomatic of latent trait levels above the mean. That is, these items should be incidents/behaviours to which the below average individual would have to use the lower end of the scale.

It is beyond the scope of this study to determine whether these particular scale categories triggered in a response bias in participants. Future research should, however, investigate and carefully consider the labelling of scale categories to ensure a (more) normal distribution of responses across scale categories.

4.5 Item parcelling

The decision to utilise item parcelling was explained and the procedure that was used described in section 3.9.3. Only the items that remained in the scale after the item and

[29] This includes the following scales: *self-efficacy, learning motivation, Mastery goal structure; Inspiring professional vision; demonstrating individual consideration; stimulating involvement and interest; providing inspirational motivation; and promoting a mastery goal structure.*

dimensionality analyses were used in the calculation of indicator variables to represent each of the latent variables in the structural model. Two parcels per latent variable were utilised.

4.6 Assessing data assumptions prior to fitting the measurement and structural model

Before conducting analysis on the fit of the measurement and structural model it was necessary to assess the extent to a number of critical assumptions typically associated with multivariate statistics and structural equation modelling were met (Tabachnick & Fidell, 2007). If the data fails to satisfy these assumptions, the quality of the obtained results can be seriously affected. In particular, the effect of non-normality was considered. Maximum likelihood estimate, the default method of estimation when fitting measurement and structural models to continuous data, assumes that the distribution of indicator variables follow a multivariate normal distribution (Mels, 2003). If this assumption is not satisfied it could lead to incorrect standard errors and chi-square estimates (Du Toit & Du Toit, 2001; Mels, 2003).

PRELIS was utilised to evaluate the univariate and multivariate normality of the composite item parcels. The univariate tests examine each variable individually to determine to what extent it departs from univariate normality. This is achieved by examining whether the standardised coefficients of skewness and kurtosis are significantly different from zero. Significant skewness and/or kurtosis values highlight departures from normality. To corroborate the univariate findings, tests of multivariate normality test are performed. The multivariate distribution would fail to meet normality if any of the observed variables deviate substantially from univariate normality. However, if all the univariate distributions are normal, it does not necessarily mean multivariate normality. As such, the examination of univariate normality as well the examination of multivariate values of skewness and kurtosis are critical.

The item parcels were firstly evaluated in terms of their univariate and multivariate normality before a normalisation procedure had been undertaken. This was followed by a process of normalisation via PRELIS. The item parcels were re-examined in terms of their univariate and multivariate normality. The results of the tests of univariate and multivariate normality of the trainer-instructor competency model indicator variable distributions before normalisation are depicted in Tables 4.55 and 4.56.

4.6.1 Results before normalisation

The chi-square value for skewness and kurtosis indicated that all 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 ($\chi^2 = 6001.569$; $p < .05$).

Table 4.55

Test of univariate normality before normalisation

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z score	P value	Z Score	P value	Chi-square	P value
SelfEff1	-9.483	.000	6.078	.000	126.861	.000
SelfEff2	-8.952	.000	5.383	.000	109.116	.000
LearnMot1	-9.838	.000	6.498	.000	139.021	.000
LearnMot2	-10.862	.000	7.324	.000	171.641	.000
MasteryGO1	-14.278	.000	10.99	.000	324.685	.000
MasteryGO2	-12.791	.000	9.924	.000	262.103	.000
MasteryGS1	-10.357	.000	6.131	.000	144.850	.000
MasteryGS2	-10.861	.000	6.783	.000	163.965	.000
Learning Climate						
TeachEmoSup1	-8.690	.000	3.159	.002	85.497	.000
TeachAcaSup1	-12.915	.000	8.344	.000	236.414	.000
PsychSafFair1	-5.167	.000	1.156	.248	28.038	.000
Interest&Invol1	-6.338	.000	3.460	.001	52.139	.000
Autonomy1	-5.947	.000	2.126	.033	39.885	.000
InspiringProfVis1	-9.141	.000	4.979	.000	108.352	.000
InspiringProfVis2	-10.765	.000	6.886	.000	163.306	.000
EnhanStuSelfEff1	-9.250	.000	3.799	.000	100.001	.000
EnhanStuSelfEff2	-7.948	.000	2.351	.019	68.693	.000
FosteringPsychSaf1	-12.150	.000	6.914	.000	195.411	.000
FosteringPsychSaf2	-11.224	.000	5.729	.000	158.796	.000
DemonIndivConsi1	-9.955	.000	4.593	.000	120.199	.000
DemonIndivConsi2	-10.334	.000	4.674	.000	128.636	.000
StimulatingInv&Int1	-9.788	.000	4.651	.000	117.441	.000
StimulatingInv&Int2	-10.150	.000	5.079	.000	128.821	.000
ProvidingInspMot1	-12.357	.000	7.358	.000	206.837	.000
ProvidingInspMot2	-12.093	.000	7.103	.000	196.702	.000
ProvidingAutoSup1	-8.356	.000	3.712	.000	83.599	.000
ProvidingAutoSup2	-8.901	.000	4.307	.000	97.775	.000
PromMastGoalStr1	-10.644	.000	5.358	.000	141.999	.000
PromMastGoalStr2	-10.082	.000	3.983	.000	117.499	.000
Res_1 (MGO1*MGS1)	22.786	.000	15.883	.000	771.459	.000
Res _2 (MGO1*MGS2)	12.699	.000	11.860	.000	301.167	.000
Res_3 (MGO2*MGS1)	20.054	.000	14.986	.000	626.739	.000
Res _4 (MGO2*MGS2)	7.319	.000	8.282	.000	122.148	.000

Table 4.56

Test of multivariate normality before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Values	Z-Score	P-Value	Values	Z-Score	P-Value	Chi-Square	P-Value
384.404	131.526	.000	1779.880	39.010	.000	18820.850	.000

Since the quality of the solution obtained in structural equation modelling is to a large extent dependent on multivariate normality, it was decided to normalise the variables through PRELIS. The results of the tests for univariate normality on the normalised indicator variables after normalisation are presented in Table 4.57 and the results of the test for multivariate normality in Table 4.58.

4.6.2 Results after normalisation

The results indicate that the normalisation procedure partially succeeded in rectifying the univariate normality problem on some the indicator variables. Only 12 of 33 indicator variables are displaying univariate normal distributions.

Table 4.57

Test of univariate normality after normalisation

Variable	Skewness		Kurtosis		Skewness and Kurtosis	
	Z score	P value	Z Score	P value	Chi-square	P value
SelfEff1	-1.746	.081	-2.430	.015	8.953	.011
SelfEff2	-.862	.389	-1.117	.264	1.991	**.369**
LearnMot1	-2.819	.005	-3.441	.001	19.791	.000
LearnMot2	-2.882	.004	-3.275	.001	19.030	.000
MasteryGO1	-3.532	.000	-3.953	.000	28.107	.000
MasteryGO2	-4.477	.000	-4.113	.000	36.955	.000
MasteryGS1	-2.984	.003	-3.526	.000	21.341	.000
MasteryGS2	-4.858	.000	-3.854	.000	38.454	.000
Learning Climate						
TeachEmoSup1	-2.005	.045	-3.564	.000	16.724	.000
TeachAcaSup1	-5.100	.000	-4.033	.000	42.279	.000
PsychSafFair1	-.393	.694	-.738	.460	.699	**.705**
Interest&Invol1	-.570	.569	-1.018	.308	1.362	**.506**
Autonomy1	-.236	.814	-.401	.688	.216	**.897**
InspiringProfVis1	-2.091	.037	-3.016	.003	13.468	.001
InspiringProfVis2	-2.476	.013	-3.310	.001	17.086	.000
EnhanStuSelfEff1	-.856	.392	-1.417	.157	2.741	**.254**
EnhanStuSelfEff2	-.333	.739	-.641	.522	.522	**.770**
FosteringPsychSaf1	-3.492	.000	-4.264	.000	30.377	.000

FosteringPsychSaf2	-2.929	.003	-3.943	.000	24.129	.000
DemonIndivConsi1	-2.521	.012	-3.446	.001	18.229	.000
DemonIndivConsi2	-3.371	.001	-4.334	.000	30.151	.000
StimulatingInv&Int1	-1.720	.086	-2.647	.008	9.962	.007
StimulatingInv&Int2	-2.368	.018	-3.356	.001	16.869	.000
ProvidingInspMot1	-4.323	.000	-4.424	.000	38.258	.000
ProvidingInspMot2	-4.174	.000	-4.564	.000	38.254	.000
ProvidingAutoSup1	-.734	.463	-1.248	.212	2.096	**.351**
ProvidingAutoSup2	-.880	.379	-1.675	.094	3.580	**.167**
PromMastGoalStr1	-2.522	.012	-3.372	.001	17.730	.000
PromMastGoalStr2	-3.036	.002	-4.086	.000	25.914	.000
Res_1 (MGO1*MGS1)	-.174	.862	-.063	.950	.034	**.983**
Res _2 (MGO1*MGS2)	-.072	.942	.044	.965	.007	**.996**
Res_3 (MGO2*MGS1)	-.172	.863	-.064	.949	.034	**.983**
Res _4 (MGO2*MGS2)	-.066	.947	.049	.961	.007	**.997**

Table 4.58

Test of multivariate normality after normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Values	**Z-Score**	**P-Value**	**Values**	**Z-Score**	**P-Value**	**Chi-Square**	**P-Value**
126.862	37.874	.000	1288.386	19.530	.000	1815.885	.000

The results furthermore indicate 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 ($\chi^2 = 1815.885$; $p < .05$). In conclusion, the decrease in the chi-square statistic showed that the normalisation procedure succeeded in reducing the deviation of the observed composite indicator distribution from the theoretical multivariate normal distribution. The majority of the indicator variables do not display univariate normality and there is no evidence of multivariate normality.

Due to the fact that normalisation did not have the desired effect and the data still did not meet the multivariate normality assumption the default maximum likelihood method cannot be utilised. Consequently, the use of an alternative method was considered and robust maximum likelihood estimation was selected for the evaluation of the measurement model. This estimation technique is the recommended for fitting measurement models of continuous data not satisfying the multivariate normality assumption (Mels, 2003). The normalised data set was used in the subsequent analyses since the normalisation procedure succeeded in reducing the deviation of the observed indicator distribution from the theoretical multivariate normal distribution to some degree although it failed to salvage the situation altogether.

4.7 Evaluating the fit of the measurement model

The relationships between the latent variables included in the trainer-instructor competency model and their corresponding indicator variables are represented by the measurement model. The fit of the estimated trainer-instructor competency measurement model and the credibility of the measurement model parameter estimates are discussed. The results of the analysis will be discussed by (1) evaluating of overall model fit, based on the array of model fit indices as reported by LISREL; (2) interpreting the measurement model parameter estimates; (3) assessing the standardised residuals; and (4) examining modification indices. The fitted measurement model is visually represented in Figure 4.10.

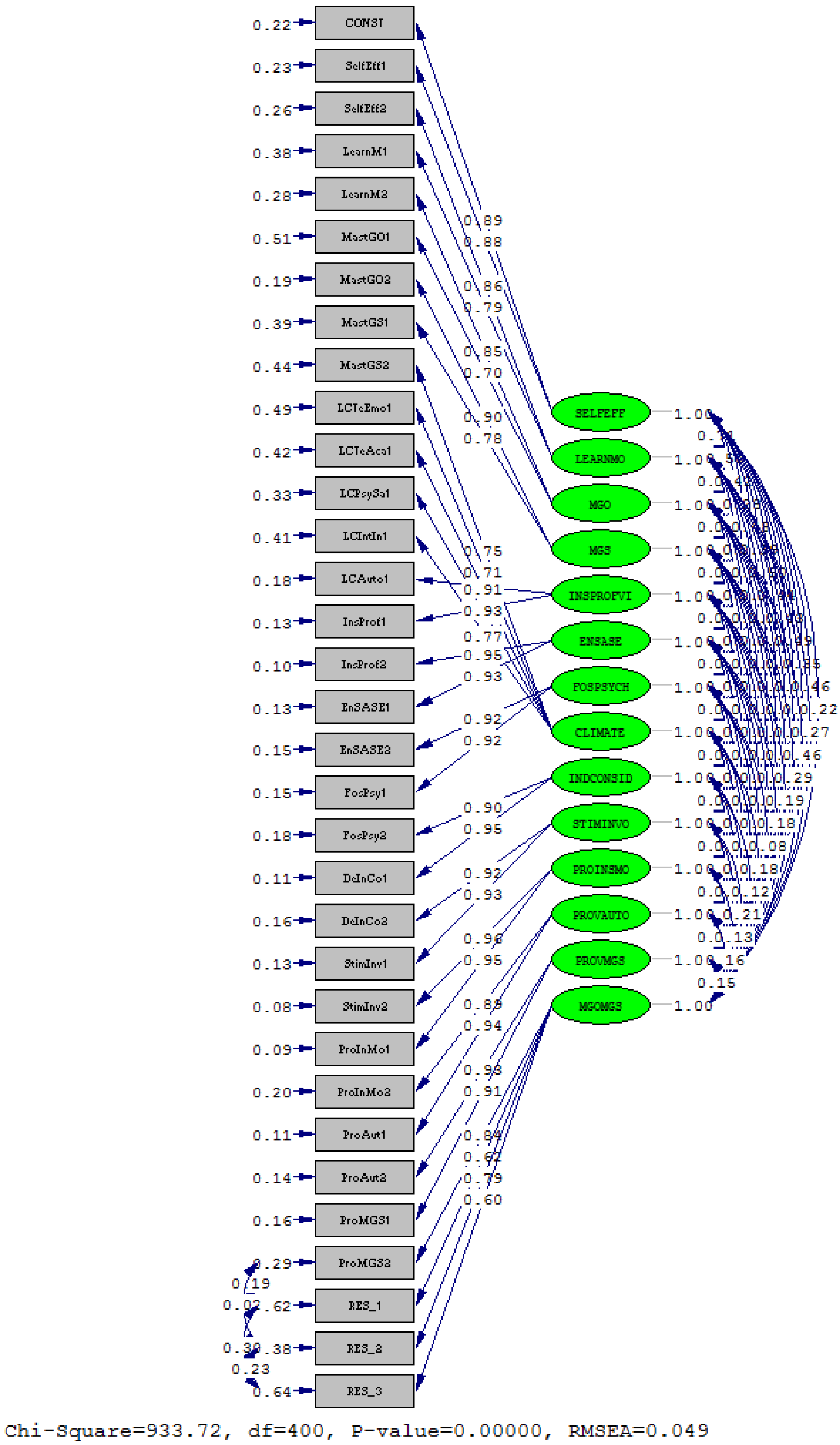

Figure 4.10. *Representation of the fitted learning potential measurement model (completely standardised solution)*

4.7.1 Assessing the overall goodness-of-fit of the measurement model

The purpose of assessing the overall fit of a model is to determine the degree to which the model as a whole is consistent with the empirical data at hand (Diamantopoulos & Siguaw, 2008). A variety of goodness-of-fit indices are available that summarise the overall fit of the model. Diamantopoulos and Siguaw (2008), caution, however, that certain indices operate somewhat differently under various conditions and none of the indices can be considered as unequivocally superior to the rest in all circumstances. The statistical power of the indices can be influenced by sample size, estimation procedure, model complexity, degree of multivariate normality and variable independence, or a combination of these factors. As such, a brief description of each index is provided with the interpretation of the reported value for the data. The results of the full range of fit indices are reported in Table 4.59.

Table 4.59

Goodness of fit statistics for the trainer-instructor performance measurement model

Degrees of Freedom = 400
Minimum Fit Function Chi-Square = 977.965 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1025.412 (P = .0)
Satorra-Bentler Scaled Chi-Square = 933.724 (P = .0)
Chi-Square Corrected for Non-Normality = 2214.798 (P = .0)
Estimated Non-centrality Parameter (NCP) = 533.724
90 Percent Confidence Interval for NCP = (448.433 ; 626.718)
Minimum Fit Function Value = 1.740
Population Discrepancy Function Value (F0) = .950
90 Percent Confidence Interval for F0 = (.798 ; 1.115)
Root Mean Square Error of Approximation (RMSEA) = .0487
90 Percent Confidence Interval for RMSEA = (.0447 ; .0528)
P-Value for Test of Close Fit (RMSEA < 0.05) = .691
Expected Cross-Validation Index (ECVI) = 2.234
90 Percent Confidence Interval for ECVI = (2.083 ; 2.400)
ECVI for Saturated Model = 1.996
ECVI for Independence Model = 94.988
Chi-Square for Independence Model with 528 Degrees of Freedom = 53317.346
Independence AIC = 53383.346
Model AIC = 1255.724
Saturated AIC = 1122.000
Independence CAIC = 53559.344
Model CAIC = 2114.382
Saturated CAIC = 4113.970
Normed Fit Index (NFI) = .982
Non-Normed Fit Index (NNFI) = .987
Parsimony Normed Fit Index (PNFI) = .744
Comparative Fit Index (CFI) = .990
Incremental Fit Index (IFI) = .990
Relative Fit Index (RFI) = .977
Critical N (CN) = 283.122
Root Mean Square Residual (RMR) = .0204

Standardised RMR = .0387
Goodness of Fit Index (GFI) = .900
Adjusted Goodness of Fit Index (AGFI) = .860
Parsimony Goodness of Fit Index (PGFI) = .642

The chi-square statistic (χ^2) is the traditional measure for evaluating overall model fit in covariance structure models and provides a test of perfect fit for the hypothesis of exact model fit (H_{01a}: $\Sigma = \Sigma(\Theta)$ or H_{01a}: RMSEA = 0). The χ^2 test statistic tests the null hypothesis that the model fits the population data perfectly. A statistically significant chi-square results in the rejection of the null hypothesis (implying imperfect model fit) and possible rejection of the model. Although the chi-square seems an attractive measure of the model's fit, caution needs to be exercised as it is sensitive to normality, sample size, and also assumes that the model fits perfectly in the population. For these reasons it has been suggested that it should be regarded as a goodness-of-fit measure in the sense that large χ^2 values correspond to bad fit and small χ^2 values to good fit. The degrees of freedom serve as a standard by which to judge whether χ^2 is large or small. A well-fitting model would ideally be indicated by a chi-square value that approximates the degrees of freedom. In practice, χ^2 / df ratios between 2 and 5 seem to be regarded as indicative of good fit (Diamantopoulos & Siguaw, 2008).

Table 4.59 indicates that this model achieved a Satorra-Bentler Scaled Chi-Square value of 933.724 with 400 degrees of freedom. The evaluation of the fit on the basis on the normed chi-square statistics χ^2 / df (933.724/400 = 2.334) for the measurement model suggested good fit. According to Kelloway (1998) the good fit guidelines (ratios between 2 and 5) have very little justification other than the researcher's personal modelling experience. As such, Kelloway (1998) does not advise a strong reliance on the normed chi-square.

The p-value associated with the χ^2 (p=.000) indicated a significant test statistic ($p < .05$). This is indicative of a significant discrepancy between the covariance matrix implied by the measurement model and the observed covariance matrix. The exact fit null hypothesis (H_{01a}: RMSEA = 0) consequently had to be rejected (Kelloway, 1998). The measurement model could not reproduce the observed covariance matrix to a degree of accuracy in the sample that can be explained by sampling error only. The discrepancy between the observed and reproduced covariance matrices in the sample would therefore have unlikely arisen by chance if the exact fit null hypothesis is true in the population.

The non-centrality parameter (NCP) provides an assessment of the degree of lack of fit of the model. NCP tests the hypothesis that the model fit is not perfect and obtains an estimate of λ by subtracting the degrees of freedom from the chi-square statistic. The larger the λ, the farther apart is the true alternative hypothesis from the null hypothesis. The NCP of 533.724 was obtained with a 90 percent confidence interval of (448.433 - 626.718).

The Root Mean Square Error of Approximation (RMSEA) is typically viewed as one of the most informative fit indices. The RMSEA shows how well the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available. A test of the significance of the obtained value is performed by LISREL by testing H_{02}: RMSEA ≤ .05 against H_a2: RMSEA > .05. The RMSEA value for the sample is .0487 with a confidence interval of (.0447 - .0528). According to Diamantopoulos and Siguaw (2008) RMSEA values less than .05 are indicative of good fit, RMSEA values greater than .05 but less than .08 of reasonable fit, RMSEA values greater than .08 but less than .10 of mediocre fit and RMSEA values greater than .10 are indicative of poor fit. According to these criteria, the model RMSEA value of .0487 suggested good model fit. Since the upper end of the 90 percent confidence interval for RMSEA (.0447 - .0528) fell just above the target value of .05, it provided further evidence of the good fit of the model. LISREL also explicitly tests the null hypothesis of close fit. The fact that the 90% confidence interval included the cut-off value of .05 means that the close fit null hypothesis was not rejected. Table 4.59 also explicitly indicated that the null hypothesis of close model fit (H_{01b}: RMSEA ≤ .05) is not rejected at a five percent significance level (p > .05).

The Expected Cross-Validation Index (ECVI) focuses on overall error. The ECVI measures the discrepancy between the fitted covariance matrix in the analysed sample, and the expected covariance matrix that would be obtained in another sample of equivalent size. It, therefore, focuses on the difference between Σ and Σ(θ). To assess the model's ECVI, it must be compared to the independence model and the saturated model. The model ECVI (2.234) was smaller than the value obtained for the independence model (94.988). The model ECVI (2.234) was, however, larger the saturated model (1.996). Therefore, a model more closely resembling the saturated model seems to have a better chance of being replicated in a cross-validation sample than the independence model.

Akaike's Information Criterion (AIC) and the consistent version of AIC (CAIC) are information criteria that are used to compare models. Information criteria attempt to incorporate the issue of model parsimony in the assessment of model fit by taking the number of estimated parameters into account. The AIC and the CAIC are two such information criteria. As with the EVCI, the AIC and CAIC must be compared to the independence model and the saturated model. The model AIC (1255.724) achieved a value lower than the independence model (53383.346), but not lower than the saturated model (1122.000). Therefore, when viewed from the perspective of the AIC, a model more closely resembling the saturated model seems to have a better chance of being replicated in a cross-validation sample than the independence model. The CAIC in contrast to the ECVI and the AIC (2114.382) achieved a value lower than both the independence model (53559.344) and the saturated model (4113.970). Therefore, when viewed from the perspective of the CAIC, 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 model and the saturated model.

The Standardised Root Mean Residual (SRMR) is the standardised square root of the mean of the squared residuals, in other words, an average of the residuals between individual observed and estimated covariance and variance terms. Lower SRMR values represent better fit and higher values represent worse fit. More specifically, values smaller than .05 indicate acceptable fit. The model produced a SRMR of .0387. As this is substantially lower than .05, it indicates good model fit.

The Goodness-of-Fit Index (GFI) is an indicator of the relevant amount of variance and covariance accounted for by the model. This shows how closely the model comes to perfectly reproducing the observed covariance matrix. The Adjusted Goodness-of-Fit Index (AGFI) is the GFI adjusted for the degrees of freedom in the model. Values of the GFI and AGFI range between 0 and 1. GFI and AGFI values greater than .90 are indicative of acceptable fit. The model achieved a GFI of .90, indicating acceptable fit. The AGFI obtained a value of .86, falling below the cut-off for acceptable model fit.

The assessment of parsimonious fit acknowledges that model fit can always be improved by including additional paths to the model and estimating more parameters until perfect fit is achieved in the form of a saturated or just-identified model with no degrees of freedom

(Kelloway, 1998). The parsimonious normed fit index (PNFI = .744) and the parsimonious goodness-of-fit index (PGFI = .642) approach model fit from this perspective. PNFI and PGFI range from 0 to 1, but do not have recommended guidelines on how high these values should be to achieve parsimonious fit. It has however been suggested that neither index is likely to reach the .90 cut-off used for other fit indices. According to Kelloway (1998) and Hair, Black, Babin, Anderson, and Tatham (2006) these indices are more meaningfully used when comparing two competing theoretical models and are not very useful indicators in this CFA analysis. For this reason emphasis will not be placed on the relatively low values achieved on these indices in this study.

The following set of fit indices contrast how much better the given model reproduce the observed covariance matrix than a baseline model which is usually an independence or null model. The fit indices presented include the normed fit index (NFI= .982), the non-normed fit index (NNFI= .987), the comparative fit index (CFI= .990), the incremental fit index (IFI=.990) and the relative fit index (RFI =.977). All indices in this group have a range between 0 and 1 with values between .9 and 1 representing good fit. All the reported indices fell comfortably above the recommended cut-off value for good model fit.

The Critical N (CN=283.122) shows the size that a sample must reach in order to accept the data fit of a given model on a statistical basis. As a rule-of-thumb, a CN greater than 200 is indicative of a model that adequately represents the data. The obtained CN was well above the recommended threshold.

In conclusion, the results of the overall fit assessment, especially the RMSEA, SRMR, and the NFI, NNFI, CFI, IFI, and RFI, suggested that good measurement model fit was achieved.

4.7.2 Interpretation of the freed measurement model parameter estimates

Through the examination of the magnitude and the statistical significance of the slope of the regression of the observed variables on their respective latent variables, an indication of the validity of the various indicator variables measured is obtained. In other words, if a measure is designed 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 substantial and statistically significant (Diamantopoulos & Siguaw, 2008).

Table 4.60 below contains the regression coefficients of the regression of the manifest variables on the latent variables they were linked to. The unstandardised $\boldsymbol{\Lambda_x}$ matrix indicate the average change expressed in the original scale units in the manifest variable associated with one unit change in the latent variable. The regression coefficients of the manifest variables on the latent variables are significant ($p < .05$) if the absolute value of the z-values exceed 1.6449[30]. Significant indicator loadings provide validity evidence in favour of the indicators (Diamantopoulos & Siguaw, 2008). Thus, if the slope of the regression of X_i on ξ_i in the fitted measurement model is substantial and significant, the measure can be considered a valid reflection of a specific latent variable. Table 4.60 shows that all the indicator variables load significantly on the latent variables that they were designed to reflect.

Table 4.60

Unstandardised lambda matrix

	ACADEMIC SELF-EFFIC	**LEARNING MOTIVATION**	**MASTERY GOAL ORIENTATION**	**MASTERY GOAL STRUCTURE**
SelfEff1	.500 (.019) 25.898			
SelfEff2	.537 (.022) 24.866			
LearnMot1		.501 (.020) 25.018		
LearnMot2		.449 (.020) 22.785		
MasteryGO1			.426 (.018) 24.015	
MasteryGO2			.368 (.021) 17.690	
MasteryGS1				.588 (.024) 24.995
MasteryGS2				.509 (.024) 21.346

[30] It has become common practice to interpret the test-statistics calculated by LISREL to determine the statistical significance of unstandardised measurement model parameter estimates. These test statistics are usually referred to as Student t values. Strictly speaking, however, given the sample sizes typically involved, when performing SEM, the values that are calculated should be interpreted as z-scores (Guilford & Fruchter, 1978). Moreover, since the alternative hypotheses are typically formulated as directional alternative hypotheses the test of the significance of the unstandardised parameter estimates should be treated as a directional test. Assuming a 5% significance level the critical z-score should therefore be |1.6449| rather than |1.96|.A critical z-value of 1.96 would be appropriate if the alternative hypothesis would be formulated as a non-directional hypothesis

	LEARN CLIMA	PROF VISION	ENHANC SELF-EFF	FOSTERIN PSYCH SAFETY	DEMON IND CON	STIM INVO & INTER	PROVID INSPIRA MOTIVA
TeachEmoSup1	.687 (.030) 22.715						
TeachAcaSup1	.456 (.022) 20.782						
PsychSafFair1	.593 (.026) 22.463						
Interest&Invol1	.533 (.022) 23.965						
Autonomy1	.533 (.025) 21.056						
InspiringProfVis1		.629 (.024) 26.544					
InspiringProfVis2		.612 (.021) 28.548					
EnhanStuSelfEff1			.732 (.023) 31.307				
EnhanStuSelfEff2			.767 (.025) 30.141				
FosteringPsychSaf1				.724 (.023) 31.528			
FosteringPsychSaf2				.781 (.025) 31.418			
DemonIndivConsi1					.725 (.024) 30.446		
DemonIndivConsi2					.841 (.024) 34.424		
StimulatingInv&Int1						.718 (.024) 30.377	
StimulatingInv&Int2						.736 (.022) 32.914	
ProvidingInspMot1							.719 (.020) 35.883
ProvidingInspMot2							.741 (.021) 35.674

	PROVIDING AUTONOMY SUPPORT	PROMOTING A MASTERY GOAL STRUCTURE	MGO*MGS (INTERACTION EFFECT)
ProvidingAutoSup1	.682 (.025) 27.346		
ProvidingAutoSup2	.780 (.025) 31.252		
PromMastGoalStr1		.738 (.023) 32.476	
PromMastGoalStr2		.828 (.026) 31.553	
Res_1 (MGO1*MGS1)			.360 (.032) 11.233
Res _2 (MGO1*MGS2)			.205 (.020) 10.154
Res_3 (MGO2*MGS1)			.334 (.029) 11.702
Res _4 (MGO2*MGS2)			.189 (.018) 10.242

Diamantopoulos and Siguaw (2008) state that relying on unstandardised factor loadings and associated z-values may be problematic as it makes a comparison of the validity of different indicators measuring a different constructs difficult. They consequently recommend the interpretation of the magnitudes of the completely standardised factor loadings. The completely standardised factor loading matrix is presented in Table 4.61.

The values shown in Table 4.61 could be interpreted as the slopes of the regression of the standardised indicator variables on the standardised latent variables. The completely standardised factor loadings therefore indicate the average change expressed in standard deviation units in the indicator variable associated with one standard deviation change in the latent variable. Factor loading estimates was considered to be satisfactory if the completely standardised factor loading estimates exceeded .71 (Hair et al., 2006). Satisfaction of this criterion would imply that at least 50% of the variance in the indicator variables can be explained by the latent variables they were assigned to represent. All loadings are greater than .71 except for the loading of MGO2 on *Mastery Goal Orientation* (λ=.701) and Res_2 (λ=.615) and Res_4 (λ=.60) on the interaction effect, *MGO*MGS*.

Table 4.61

Completely standardised lambda matrix

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	LEARN CLIMA	PROF VISION	ENHANC SELF-EFF	FOSTE PSYCH SAFETY
SelfEff1	.886							
SelfEff2	.877							
LearnMot1		.859						
LearnMot2		.788						
MasteryGO1			.847					
MasteryGO2			**.701**					
MasteryGS1				.902				
MasteryGS2				.781				
TeachEmoSup1					.751			
TeachAcaSup1					.714			
PsychSafFair1					.763			
Interest&Invol1					.819			
Autonomy1					.770			
InspiringProfVis1						.905		
InspiringProfVis2						.933		
EnhanStuSelfEff1							.947	
EnhanStuSelfEff2							.931	
FosteringPsychSaf1								.920
FosteringPsychSaf2								.920

	DEMON INDIV CONSI	STIM INV & INTER	PROV INSPI MOTI	PROV AUTO SUPP	PROM MGS	MGO*MGS
DemonIndivConsi1	.903					
DemonIndivConsi2	.946					
StimulatingInv&Int1		.918				
StimulatingInv&Int2		.935				
ProvidingInspMot1			.962			
ProvidingInspMot2			.955			
ProvidingAutoSup1				.893		
ProvidingAutoSup2				.945		
PromMastGoalStr1					.926	
PromMastGoalStr2					.914	
Res_1 (MGO1*MGS1)						.840
Res _2 (MGO1*MGS2)						**.615**
Res_3 (MGO2*MGS1)						.787
Res _4 (MGO2*MGS2)						**.600**

An examination of the squared multiple correlations (R^2) of the indicators was required to determine the validity of the indicators. The R^2 indicates the amount of variance in the indicator variable that is accounted for by the latent variable that is assigned to it in the measurement model. Large R^2 values (> .50) High R^2 values are desirable as they imply that the indicators assigned to the specific latent variable are reliable. The R^2 for any given indicator can simultaneously be interpreted as the lower bound of the reliability of that indicator. The reliability will be equal to R^2 if all the measurement error (δ) that causes variance in the indicator variable can be classified as random error. The reliability will be bigger than R^2 if some of the measurement error (δ) that causes variance in the indicator variable can be classified as systematic error. Table 4.62 shows that MGO2, Res_2 and Res_4 possess validities lower than .50. This is comments negatively on the validities of the indicators as it implies that a significant amount of variance can be attributed to random measurement error.

Table 4.62

Squared multiple correlations for item parcels

SelfEff1	SelfEff2	LearnMo1	LearnMo2	MGO1	MGO2	MGS1	MGS2	LCTeachEmo1
.784	.769	.739	.622	.717	**.491**	.813	.609	.563
LCTeachAca1	**LCPsychSaf1**	**LCInterstIn1**	**LCAutono1**	**InsProf1**	**InsProf2**	**EnSASE1**	**EnSASE2**	**FosPsy1**
.510	.582	.671	.593	.820	.870	.896	.867	.847
FosPsy2	**DeInCo1**	**DeInCo2**	**StimInv1**	**StimInv2**	**ProInMo1**	**ProInMo2**	**ProAut1**	**ProAut2**
.847	.816	.894	.842	.879	.925	.912	.797	.892
ProMGS1	**ProMGS2**	**RES_1**	**RES_2**	**RES_3**	**RES_4**			
.857	.836	.706	**.379**	.620	**.360**			

The theta-delta matrix shown in Table 4.63 indicates the variance in measurement error terms. In other words, the percentage of variance in the indicator variable attributed to systematic and random measurement error that cannot be explained in terms of the latent variable the indicator variable is tasked to represent. Table 4.63 represents the converse of the squared multiple correlations (R^2) of the indicators presented in Table 4.61. Table 4.63 therefore represents the amount of variance that can be attributed to systematic and random measurement error. Again MGO2, Res_2 and Res_4 are flagged as problematic indicators of their respective latent variables in that more variance is explained by measurement error than is explained by the latent variable these indicators are meant to reflect. Table 4.63 also indicates the correlation between the measurement error terms of the indicator variables of the latent interaction effect in the measurement model. The measurement error terms of those indicator variables that have the same original indicator variable involved in the product term (Little et al., 2006) were allowed to correlate. Table 4.63 indicate that these correlations were generally quite low.

Table 4.63

Completely standardised theta-delta matrix

SelfEff1	SelfEff2	LearnMo1	LearnMo2	MGO1	MGO2	MGS1	MGS2	LCTeEmo1
.216	.231	.261	.378	.283	**.509**	.187	.391	.437

LCTeAca1	LCPsySa1	LCIntIn1	LCAuto1	InsProf1	InsProf2	EnSASE1	EnSASE2	FosPsy1
.490	.418	.329	.407	.180	.130	.104	.133	.153

FosPsy2	DeInCo1	DeInCo2	StimInv1	StimInv2	ProInMo1	ProInMo2	ProAut1	ProAut2
.153	.184	.106	.158	.127	.075	.088	.203	.108

ProMGS1	ProMGS2
.143	.164

	RES_1	RES_2	RES_3	RES_4
RES_1	.294			
RES_2	.190	**.621**		
RES_3	.022		.380	
RES_4		.298	.229	**.640**

The unstandardised theta-delta matrix (indicated in Table 4.64) indicate that all indicators are statistically significantly plagued by measurement error as is evident in the fact that all indicators report absolute z-values greater than 1.64. Perfectly reliable and valid measures of latent variables represent an unattainable ideal. Insignificant measurement error variances would therefore have raised suspicion on the measurement model. Table 4.64 indicates that the correlation between the measurement error terms of Res_1 and Res_3 was statistically insignificant ($p > .05$). The remaining freed correlations between the measurement error terms of the latent interaction effect were all statistically significant ($p < .05$).

Table 4.64

Unstandardised theta-delta matrix

SelfEff1	SelfEff2	LearnMo1	LearnMo2	MGO1	MGO2	MGS1	MGS2	LCTeEmo1
.069	.087	.089	.123	.072	.140	.080	.166	.366
(.010)	(.012)	(.011)	(.010)	(.010)	(.011)	(.017)	(.016)	(.027)
7.139	7.377	7.834	12.465	7.546	13.273	4.624	10.243	13.626

LCTeAca1	LCPsySa1	LCIntIn1	LCAuto1	InsProf1	InsProf2	EnSASE1	EnSASE2	FosPsy1
.199	.253	.193	.195	.087	.056	.062	.090	.095
(.013)	(.019)	(.012)	(.014)	(.017)	(.014)	(.009)	(.010)	(.012)
14.806	13.043	11.736	13.714	5.148	3.883	6.764	9.280	8.092

FosPsy2	DeInCo1	DeInCo2	StimInv1	StimInv2	ProInMo1	ProInMo2	ProAut1	ProAut2
.110	.119	.084	.097	.079	.042	.053	.118	.074
(.014)	(.011)	(.012)	(.012)	(.009)	(.007)	(.008)	(.013)	(.011)
8.166	10.924	6.697	8.305	8.430	6.017	6.932	9.072	6.640

ProMGS1	ProMGS2
.091	.134
(.010)	(.015)
8.904	8.794

	RES_1	RES_2	RES_3	RES_4
	.054			
RES_1	(.021)			
	2.596			
	.027	.069		
RES_2	(.010)	(.010)		
	2.606	7.062		
	.004		.068	
RES_3	**(.014)**		(.017)	
	.286		3.928	
		.031	.031	.064
RES_4		(.007)	(.007)	(.008)
		4.733	4.213	7.568

According to Diamantopoulos and Siguaw (2008), the examination of the standardised residuals and the modification indices provide relevant diagnostic information that can be used for modifications of the model with the focus on improving model fit. At the same time, however, the standardised residuals and the modification indices calculated for Λ_X and $\boldsymbol{\theta}_\delta$ comment on the quality of the fit of the measurement model. If a limited number of ways exist in which model fit can be improved this comments favourably on the fit of the model.

4.7.3 Examination of measurement model residuals

Standardised residuals are z-scores and can be interpreted as large if they exceed +2.58 or – 2.58 (Diamantopoulos & Siguaw, 2008). Ideally, residuals should be distributed approximately symmetrical around zero. A large positive residual indicates that the model underestimates the covariance between two variables, while a large negative residual indicates that the model overestimates the covariance between variables. If the model generally underestimates covariance terms it indicates that additional explanatory paths should be added to the model, which could better account for the covariance between the variables. If, however, the model tends to overestimate the covariance between indicator variables paths that are associated with the particular covariance terms should be deleted from the model (Jöreskog & Sörbom, 1993).

Table 4.65 indicates 37 standardised residuals that were larger than 2.58 and 35 standardised residuals that were smaller than -2.58. The fact that only 72 extreme residuals were reported is again indicative of good model fit. This implies that only 12.83%[31] of all the variance-covariance estimates that were derived from the measurement model parameters can be considered poor estimates.

Table 4.65

Summary statistics for standardised residuals

	Value
Smallest Standardised Residual	-39.996
Median Standardised Residual	.000
Largest Standardised Residual	21.125
Largest Negative Standardised Residuals	
Residual for LearnM2 and SelfEff2	-2.623
Residual for MastGO1 and LearnM1	-4.042
Residual for LCTeEmo1 and MastGO1	-2.643
Residual for LCTeEmo1 and MastGS1	-3.262
Residual for LCPsySa1 and SelfEff1	-3.348
Residual for LCPsySa1 and LearnM2	-3.976
Residual for LCPsySa1 and MastGO1	-3.132
Residual for LCIntIn1 and LCTeEmo1	-12.569
Residual for InsProf1 and LCTeEmo1	-7.308
Residual for InsProf1 and LCTeAca1	-4.802
Residual for InsProf2 and LCTeEmo1	-7.961
Residual for InsProf2 and LCTeAca1	-3.807
Residual for EnSASE1 and LCPsySa1	-39.996
Residual for EnSASE1 and LCIntIn1	-5.062
Residual for EnSASE2 and LCPsySa1	-6.322
Residual for EnSASE2 and LCIntIn1	-3.724
Residual for FosPsy1 and LCIntIn1	-5.979
Residual for FosPsy1 and LCAuto1	-3.155
Residual for FosPsy2 and LCIntIn1	-4.624
Residual for FosPsy2 and LCAuto1	-2.715

[31] Value obtained by the following formula: 72/ ([33*34]/2) = 72/561 = 12.83%

Residual for DeInCo1 and LCPsySa1	-5.410
Residual for DeInCo1 and LCIntIn1	-3.248
Residual for DeInCo2 and LCIntIn1	-7.105
Residual for DeInCo2 and LCAuto1	-4.796
Residual for StimInv1 and LCPsySa1	-16.659
Residual for StimInv1 and LCIntIn1	-5.289
Residual for ProInMo2 and LCAuto1	-3.086
Residual for ProAut1 and LCPsySa1	-4.191
Residual for ProAut1 and LCIntIn1	-3.552
Residual for ProMGS1 and LCPsySa1	-20.089
Residual for ProMGS1 and LCIntIn1	-4.246
Residual for ProMGS2 and LCPsySa1	-5.176
Residual for ProMGS2 and LCIntIn1	-2.577
Residual for RES_1 and MastGS2	-2.577
Residual for RES_4 and FosPsy1	-2.763
Largest Positive Standardised Residuals	
Residual for LCTeAca1 and SelfEff1	3.689
Residual for LCTeAca1 and SelfEff2	3.053
Residual for LCTeAca1 and LearnM1	2.619
Residual for LCTeAca1 and LCTeEmo1	9.808
Residual for LCIntIn1 and MastGO1	2.690
Residual for LCIntIn1 and LCPsySa1	21.125
Residual for LCAuto1 and LCIntIn1	3.826
Residual for InsProf1 and LCIntIn1	4.081
Residual for InsProf1 and LCAuto1	2.799
Residual for InsProf2 and LearnM1	3.924
Residual for InsProf2 and LCIntIn1	5.297
Residual for InsProf2 and LCAuto1	3.121
Residual for EnSASE1 and LCTeEmo1	7.650
Residual for EnSASE1 and LCTeAca1	2.985
Residual for EnSASE2 and LCTeEmo1	7.766
Residual for EnSASE2 and LCTeAca1	3.160
Residual for FosPsy1 and LCTeEmo1	5.658
Residual for FosPsy2 and LCTeEmo1	4.888
Residual for DeInCo1 and LCTeEmo1	5.084
Residual for DeInCo1 and LCTeAca1	4.197
Residual for DeInCo2 and LCTeEmo1	6.239
Residual for DeInCo2 and LCTeAca1	4.473
Residual for StimInv2 and LCTeEmo1	4.843
Residual for StimInv2 and LCTeAca1	5.766
Residual for StimInv2 and InsProf2	4.014
Residual for ProInMo1 and LCTeEmo1	6.666
Residual for ProInMo1 and LCTeAca1	4.637
Residual for ProInMo2 and LearnM1	3.261
Residual for ProInMo2 and LCTeEmo1	6.205
Residual for ProInMo2 and LCTeAca1	4.310
Residual for ProInMo2 and InsProf2	3.424
Residual for ProAut1 and StimInv1	3.356
Residual for ProAut2 and LCTeEmo1	3.051
Residual for ProMGS1 and LCTeEmo1	5.428
Residual for ProMGS1 and LCTeAca1	5.793
Residual for ProMGS2 and LCTeEmo1	4.616
Residual for ProMGS2 and LCTeAca1	5.327

The stem-leaf residual plot captures the individual residual values and provides graphical information on the standardised residual distribution. Similarly to the above discussion, if a model fits well, the stem-leaf plots will be characterised by residuals which are clustered symmetrically around the zero-point, with most residuals lying in the middle of the distribution and fewer in the tails. The stem-leaf plot (refer to Figure 4.11) confirmed that the median of the distribution is zero with a slightly negatively skewed distribution. This indicates that there was a slightly stronger tendency for the model to underestimate the observed covariance terms.

The Q-plot displayed below in Figure 4.12 provides an additional graphical display of residuals. When interpreting the Q-plot it is important to note whether the data points fall on the 45° reference line, or not. If the data points fall on the 45° reference line it is indicative of good model fit. To the extent that the data points deviate from the 45° reference line indicate less satisfactory fit. Figure 4.12 provides further evidence of reasonable model fit as it illustrates the fact that the standardised residuals for all pairs of observed variables tended to only moderately depart from the 45° reference line and only via the seventy-two poorly estimated variance-covariance terms.

```
-4|0
-3|
-3|
-2|0
-2|
-1|7
-1|3
-0|877665555555
-0|4444444433333333333222222222222222222222222222222222222221111111111111111111+95
 0|1111111111111111111111111111111111111111111111111111111111111111111111111111+58
 0|5555555566666788
 1|0
 1|
 2|1
```

Figure 4.11. **Stem-and-leaf plot of standardised residuals**

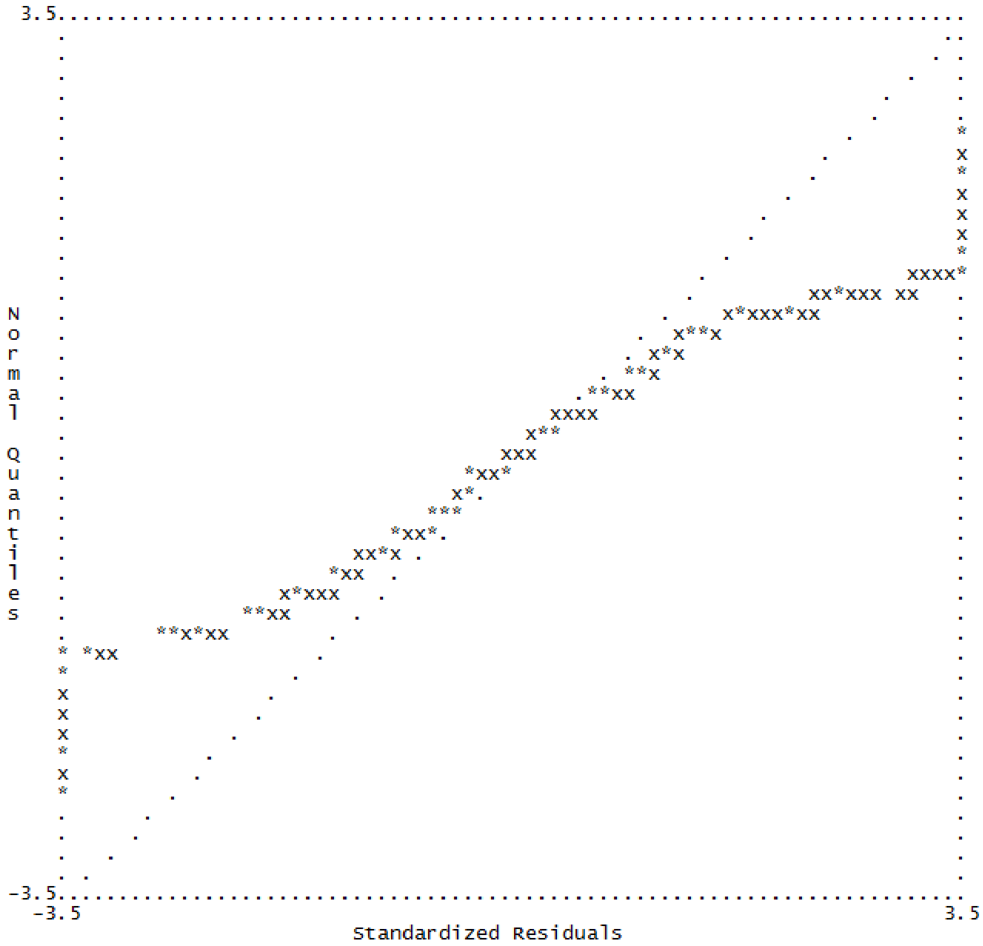

Figure 4.12. **Q-Plot of standardised residuals**

4.7.4 Measurement model modification indices

Examining the modification indices for the currently fixed parameters of the model may also provide an additional way of determining if adding one or more paths would significantly improve the fit of the model. The aim of examining the modification indices is to estimate the decrease that would occur in the χ^2 statistic if parameters that are currently fixed are set free and the model is re-estimated[32]. Modification indices with values larger than 6.64 (Theron, 2010) identify currently fixed parameters that would improve the fit of the model significantly ($p < .01$) if set free (Diamantopoulos & Siguaw, 2000). Diamantopoulos and Siguaw (2000) suggest that modifications to the model based on these statistics should be

[32] Care should be taken in interpreting the modification indices in the case where the model was fitted to non-normal data via robust maximum likelihood estimation. The modification indices still reflect the decrease in the normal theory chi-square if a currently fixed parameter is freed (Mels, personal communication August 2014).

theoretically/substantially justified. Modification indices calculated for the $\mathbf{\Lambda_x}$ and $\mathbf{\Theta_\delta}$ matrices were examined.

Examination of the modification index values calculated for the $\mathbf{\Lambda_x}$ matrix shown in Table 4.66, indicated that 43 values are greater than the cut-off of 6.64. This suggests that additional paths would significantly improve the fit of the model. It appears that it is mostly the *Learning Climate* item parcels that load on the other latent variables. More specifically, *Teacher Emotional Support* loads onto *Mastery Goal Structure, Inspiring Professional Vision, Enhancing Student Academic Self-efficacy, Fostering Psychological Safety and Fairness, Providing Individual Consideration, Stimulating Involvement and Interest, Providing Inspirational Motivation* and *Promoting a Mastery Goal Structure. Teacher Academic Support* loads on to *Academic Self-Efficacy, Learning Motivation, Inspiring Professional Vision Enhancing Student Academic Self-efficacy, Fostering Psychological Safety and Fairness, Providing Individual Consideration, Stimulating Involvement and Interest, Providing Inspirational Motivation* and *Promoting a Mastery Goal Structure. Psychological Safety and Fairness* appears to load on *Academic Self-Efficacy, Learning Motivation, Mastery Goal Orientation, Enhancing Student Academic Self-efficacy, Providing Individual Consideration, Stimulating Involvement and Interest, Providing Inspirational Motivation* and *Promoting a Mastery Goal Structure*. *Interest and Involvement* appears to load on *Mastery Goal Structure Inspiring Professional Vision, Enhancing Student Academic Self-efficacy, Fostering Psychological Safety and Fairness, Providing Individual Consideration, Stimulating Involvement and Interest, Providing Inspirational Motivation, Providing Autonomy Support* and *Promoting a Mastery Goal Structure*. *Academic Self-Efficacy* appears to load onto *Providing Autonomy Support* and *Promoting a Mastery Goal Structure. Stimulating Involvement and Interest* appears to load on *Learning Climate. Mastery Goal Structure* appears to load on the *Mastery Goal Structure-Mastery Goal Orientation interaction effect.*

An examination of the corresponding completely standardised expected change values did not seem to support freeing any of the additional parameters. In addition, only 43 out of a possible 429 ways of modifying the factor loading pattern (10%) would result in a significant improvement in model fit. This small percentage commented very favourably on the fit of the model.

Examination of the **θ_δ** matrix in Table 4.67 revealed the presence of 30 covariance terms that, if set free, would result in significant decreases in the χ^2 measure. However, the values of the completely standardised expected changes did support the setting free of these free. There is also no persuasive theoretical argument to justify correlated measurement error terms. Again, the small percentage of covariance terms identified to significantly improve model fit if set free, is a positive comment on the merits of the measurement model.

The limited number of large positive and negative standardised residuals in conjunction with the limited number of large modification index values calculated for **Λ_x** and **θ_δ** commented favourably on the fit of the measurement model.

Table 4.66
Modification indices for lambda matrix

	ACA SELF EFF	LEARN MOTIV	MGO	MGS	PROF VISIO	ENHANC SELF-EFF	FOSTE PSYCH SAFETY	LEARN CLIMA	INDIVI CONSID	STIM INVOL & INTER	PROV INSPIR MOTIV	PROV AUTO SUPPOR	PROMO MGS	MGO* MGS
SelfEff1	-	1.461	1.588	4.661	.016	4.560	2.662	.901	2.613	6.322	4.492	6.640	**8.510**	.588
SelfEff2	-	1.832	1.706	4.505	.016	5.030	2.773	.931	2.712	6.416	4.831	**6.750**	**8.912**	.596
LearnMot1	.201	-	.926	.116	.968	4.758	3.070	1.932	.460	1.136	3.310	.405	.915	.383
LearnMot2	.230	-	1.137	.105	.956	3.736	3.092	1.888	.398	1.069	3.250	.398	.856	.332
MasteryGO1	1.110	2.736	-	**10.00**	2.031	5.899	2.299	.2875	1.624	2.354	2.148	1.668	4.471	-
MasteryGO2	.908	1.839	-	1.873	1.974	3.409	1.794	.172	1.239	1.648	1.693	1.209	2.535	-
MasteryGS1	.087	6.440	.025	-	.614	.860	.754	2.136	.520	.841	.631	1.038	2.444	.677
MasteryGS2	.080	2.894	.018	-	.499	.809	.708	1.764	.444	.789	.589	.960	2.148	**35.203**
TeachEmoSup1	4.801	.000	3.774	**8.953**	**47.94**	**52.511**	**40.018**	-	**44.639**	**18.731**	**25.208**	**9.282**	**34.32**	**21.321**
TeachAcaSup1	**27.841**	**12.017**	3.065	.004	**17.72**	**21.950**	**15.975**	**-**	**35.335**	**23.776**	**34.972**	4.202	**50.99**	1.391
PsychSafFair1	**17.459**	**14.878**	**10.15**	3.013	.065	**42.311**	3.572	-	**14.192**	**13.446**	**12.072**	6.390	**23.506**	2.331
Interest&Invol1	2.447	.830	5.365	**14.44**	**49.90**	**33.427**	**27.543**	**-**	**30.441**	**18.392**	**22.806**	**15.351**	**28.78**	3.784
Autonomy1									4.072	.095	2.911	4.913	1.123	.002
	.902	.197	.719	.095	10.87	2.587	5.412	-						2.752
InspiringProfVis1	1.829	5.164	2.318	1.065	-	3.065	.736	.572	1.921	.742	.592	.003	2.147	.079
InspiringProfVis2	1.892	4.878	2.177	1.008	-	3.194	.790	.623	2.022	.786	.640	.004	2.207	.079
EnhanStuSelfEff1	1.465	.082	.064	.140	1.300	-	1.360	.675	.147	.056	6.896	2.412	.306	1.376
EnhanStuSelfEff2	1.411	.079	.062	.138	1.244	-	2.374	.929	.244	.085	**7.663**	3.111	.438	1.381
FosteringPsychSaf1	.000	.242	.001	.011	.003	.030	-	.119	.535	.068	.102	.068	.000	1.849
FosteringPsychSaf2	.000	.239	.001	.011	.003	.027	-	.107	.470	.067	.091	.067	.000	1.840
DemonIndivConsi1	.041	.150	.870	.931	.020	.005	.222	.370	-	.242	.521	.061	.023	3.679
DemonIndivConsi2	.041	.160	.935	.389	.020	.004	.174	.307	-	.194	.454	.054	.017	4.002
StimulatingInv&Int1	.001	3.007	2.053	5.211	4.963	2.185	.000	**8.204**	.267	-	.000	1.893	.738	.040
StimulatingInv&Int2	.001	2.967	1.962	5.385	4.842	1.617	.000	5.820	.196	-	.000	1.005	.321	.038
ProvidingInspMot1	2.085	1.913	1.588	3.362	3.034	1.164	.337	.188	.006	2.002	-	.137	.050	.470
ProvidingInspMot2	2.120	1.917	1.590	3.339	2.941	1.250	.339	.191	.006	2.079	-	.138	.050	.471
ProvidingAutoSup1	1.908	.294	1.161	.804	1.469	1.903	.532	1.921	.017	.287	.913	-	.386	1.860
ProvidingAutoSup2	1.913	.279	1.137	.772	1.456	1.116	.387	1.342	.014	.175	.858	-	.148	1.909
PromMastGoalStr1	.588	.672	.366	.495	.856	1.290	.007	.027	.787	.170	.402	.123	-	.521
PromMastGoalStr2	.583	.692	.377	.505	.878	1.068	.005	.025	.702	.136	.336	.092	-	.523

Res_1 (MGO1*MGS1)	.174	.005	.025	.072	2.046	.061	.135	.285	.085	.360	.013	1.174	.106	-
Res _2 (MGO1*MGS2)	.414	.375	.490	.006	.402	.031	.199	.873	.395	.140	.071	.609	.131	-
Res_3 (MGO2*MGS1)	1.400	.474	.163	1.752	1.205	1.748	3.070	2.461	1.636	2.246	2.738	2.720	1.656	-
Res _4 (MGO2*MGS2)	2.581	1.821	1.070	3.341	.024	2.389	4.986	5.056	3.634	2.229	4.016	2.165	2.519	-

Table 4.67

Modification indices for theta-delta matrix

	SelfEff1	**SelfEff2**	**Learn Mot1**	**Learn Mot2**	**MGO1**	**MGO 2**	**MGS1**	**MGS2**	**TeachE moSup1**	**TeachAc aSup1**	**PsychSa fFair1**	**Interest &Invol1**	**Autono my1**	**Inspirin gProfVis 1**
SelfEff1	-													
SelfEff2	-	-												
LearnMot1	3.792	3.685	-											
LearnMot2	6.578	6.593	-	-										
MasteryGO1	.004	.003	**14.55**	**6.811**	-									
MasteryGO2	.108	.241	**7.857**	3.014	-	-								
MasteryGS1	2.407	.785	.0223	.805	.177	1.855	-							
MasteryGS2	.014	.884	.024	2.230	.046	.574	-							
TeachEmoSup1	.345	.146	.120	1.575	**7.470**	4.489	.074	.027	-					
TeachAcaSup1	4.497	.447	.128	2.519	.011	1.339	.814	.029	**80.149**	-				
PsychSafFair1	1.551	.173	1.336	3.141	2.543	.002	3.115	.413	.080	**27.667**	-			
Interest&Invol1	.195	.801	.478	.040	**8.023**	3.451	1.022	.312	**58.045**	**16.798**	**79.781**	-		
Autonomy1	3.546	3.130	.039	1.571	2.890	2.959	1.355	.724	**28.142**	**21.855**	5.855	**27.648**	-	
InspiringProfVis1	.015	.085	4.477	1.560	.611	3.019	3.048	5.352	.281	5.162	6.062	.064	1.690	-
InspiringProfVis2	.086	.010	4.997	1.983	.017	.718	1.539	2.839	**10.977**	.037	5.059	**10.115**	.176	-
EnhanStuSelfEff1	.975	.046	.359	5.150	.123	2.752	.874	1.756	**13.285**	.561	3.607	1.798	1.547	1.248
EnhanStuSelfEff2	1.601	.215	.239	1.172	1.539	.331	.793	1.686	.099	.477	3.134	.449	**15.574**	.010
FosteringPsychSaf1	.100	.002	.525	.076	.053	.328	1.411	1.925	.469	.100	**9.164**	.489	3.233	.779
FosteringPsychSaf2	.352	.108	.043	.624	.006	.139	.789	1.06	.24	.003	1.810	.020	.003	.451
DemonIndivConsi1	4.076	3.810	2.835	1.989	.875	.354	.000	.042	.165	.474	.096	.201	.225	.690
DemonIndivConsi2	1.096	.947	.027	.088	.156	.004	.360	.258	.438	.690	.921	.771	.323	2.418
StimulatingInv&Int1	.0127	2.011	.278	3.145	.570	.998	.196	.554	.975	5.990	.300	5.985	6.371	.696
StimulatingInv&Int2	.000	1.019	.425	3.424	.230	.393	.530	1.116	.011	5.468	.015	**8.48**	3.488	.294
ProvidingInspMot1	.036	.342	.105	.003	.604	.200	1.921	.635	.890	2.351	.000	3.633	.013	.734

ProvidingInspMot2	.062	.290	1.204	.894	.838	.393	3.112	1.553	.060	.010	.013	.307	.670	2.199
ProvidingAutoSup1	.004	1.076	1.737	.057	.008	.769	.468	.091	1.571	.035	3.185	4.440	1.394	1.672
ProvidingAutoSup2	.279	.189	.428	.161	.000	.770	.265	.148	.000	5.922	6.059	2.417	2.868	.251
PromMastGoalStr1	.016	.012	.586	.326	.679	.034	.083	.596	.043	1.808	2.765	.040	.533	.000
PromMastGoalStr2	1.329	2.00	.068	.000	.478	.156	3.008	.794	.015	4.948	.003	.011	1.158	3.693
Res_1 (MGO1*MGS1)	.021	.168	.407	.673	.339	.698	**15.249**	**18.771**	.037	.175	.019	4.873	.163	.266
Res _2 (MGO1*MGS2)	.031	.528	.550	.756	.110	.070	**14.510**	**13.585**	.004	.058	1.766	2.236	.029	1.210
Res_3 (MGO2*MGS1)	.234	.818	1.892	2.904	.391	.018	8.292	4.255	.121	.000	.135	.288	.772	4.022
Res _4 (MGO2*MGS2)	.033	.251	.033	.051	.043	.006	3.234	1.004	.001	.037	.690	.001	.872	**7.443**

	Inspiring ProfVis2	**EnhanStuSelfEff1**	**EnhanSelfEff2**	**FosterPsychSaf1**	**FostePsychSaf2**	**DemonIndivConsi1**	**DemonIndivConsi2**	**StimInv&Int1**	**StimInv&Int1**	**ProvidingInspMot1**	**ProvidingInspMot2**	**ProvidingAutoSup1**	**ProvidingAutoSup1**	**PromMastGoalStr1**	**PromMastGoalStr2**
InspiringProfVis2	-														
EnhanStuSelfEff1	.077	-													
EnhanStuSelfEff2	.548	-	-												
FosteringPsychSaf1	1.269	.272	.334	-											
FosteringPsychSaf2	.851	.169	.151	-	-										
DemonIndivConsi1	.830	.547	.247	.711	.190	-									
DemonIndivConsi2	2.583	.396	.783	.109	.483	-	-								
StimulatingInv&Int1	1.678	.162	1.723	1.444	2.010	.586	.204	**-**							
StimulatingInv&Int2	.979	.297	1.167	.113	.291	.170	.022	-	-						
ProvidingInspMot1	.008	**9.487**	2.725	.002	.009	3.407	.086	**7.013**	.000	-					
ProvidingInspMot2	.250	1.749	.046	.117	.042	1.291	.130	**7.104**	.002	-	-				
ProvidingAutoSup1	.127	.431	3.666	1.323	.364	.663	.300	**9.799**	5.623	.004	.246	-			
ProvidingAutoSup2	1.613	1.410	.021	.390	.019	.646	.334	2.798	.952	.062	.016	-	-		
PromMastGoalStr1	.188	.012	1.000	.134	.235	.686	3.329	.145	.837	.042	.720	.063	.027	-	
PromMastGoalStr2	1.979	.420	.230	.112	.300	.058	1.780	.293	.007	1.434	.300	.697	.121	-	-
Res_1 (MGO1*MGS1)	2.637	.832	1.426	.076	.082	.284	.002	.006	.280	.484	1.358	.501	3.679	.203	.114
Res _2 (MGO1*MGS2)	2.822	.339	.017	.208	.266	.689	1.152	.001	.126	.023	1.363	.439	1.663	.213	.516
Res_3 (MGO2*MGS1)	**12.032**	.027	.040	.832	.016	.201	1.292	.528	.608	.112	1.404	.913	2.970	.025	2.379
Res _4 (MGO2*MGS2)	**13.658**	.327	.021	5.754	1.706	.688	.481	.790	.001	.515	2.179	1.572	1.352	.159	.000

4.7.5 Discriminant validity

The 14 latent variables comprising the structural model are expected to correlate. Given that the 14 latent variables are conceptualised as 14 qualitatively distinct, although related, latent variables they should, however, not correlate excessively high with each other. The latent variable inter-correlations are shown in the phi matrix in Table 4.68.

All the inter-latent variables are statistically significant ($p < .05$) except the correlation between *Fostering Psychological Safety and Fairness* and the interaction effect, *MGO*MGS*. Correlations are considered excessively high if they exceed a value of .90. Judged by this criterion, none of the correlations in the phi matrix are excessively high. Ten of the 91 inter-latent variable correlations exceed .802 but fall below .873. The fact that there are no excessively high correlations between the latent variables in Table 4.68 does not, however, provide convincing evidence of discriminant validity. It is possible that latent variables correlate unity in the population while correlating less than unity in the sample because of sampling error. To determine this possibility a 95% confidence interval was calculated for each sample estimate in Φ utilising an Excel macro developed by Scientific Software International (Mels, 2009). If the value of one is included in any confidence interval it implies that the null hypothesis H_0: ρ=1 cannot be rejected. Confidence in the claim that the two latent variables are unique, qualitatively distinct constructs would thereby be seriously eroded.

Table 4.68

The measurement model phi matrix

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	PROF VISION	ENHANC SELF-EFF	FOSTE PSYCH SAFETY	LEARN CLIMATE
ACA SELF-EFFIC								
	1.000							
LEARN MOTIV	.707							
	(.037)							
	19.298	1.000						
MGO	.495	.781						
	(.047)	(.037)						
	10.601	21.390	1.000					
MGS	.416	.542	.538					
	(.046)	(.044)	(.045)					
	9.135	12.393	11.97	1.00				

PROF VISION	.284	.389	.361	.475				
	(.051)	(.047)	(.048)	(.044)				
	5.569	8.280	7.545	10.85	1.000			
ENHANC SELF-EFF	.475	.405	.256	.294	.305			
	(.041)	(.045)	(.050)	(.047)	(.048)			
	11.582	8.968	5.101	6.222	6.317	1.000		
FOSTE PSYCH SAFETY	.393	.303	.184	.244	.256	.791		
	(.047)	(.048)	(.053)	(.048)	(.047)	(.019)		
	8.413	6.317	3.476	5.112	5.473	40.814	1.000	
LEARN CLIMATE	.499	.542	.379	.548	.505	.748	.748	
	(.043)	(.041)	(.047)	(.040)	(.039)	(.026)	(.026)	
	11.508	12.686	8.085	13.64	12.865	28.356	28.754	1.000
DEMON INDIV CONSID	.437	.310	.179	.265	.219	**.802**	**.839**	.745
	(.042)	(.047)	(.050)	(.048)	(.046)	**(.019)**	**(.018)**	(.026)
	10.419	6.583	3.553	5.562	4.710	**41.608**	**45.858**	28.628
STIM INV & INTER	.426	.342	.206	.296	.292	.787	**.802**	.761
	(.045)	(.047)	(.051)	(.048)	(.046)	(.021)	**(.022)**	(.025)
	9.528	7.243	4.043	6.152	6.381	37.905	**36.285**	30.514
PROV INSPI MOTI	.489	.386	.233	.279	.343	.753	.778	.709
	(.040)	(.044)	(.051)	(.046)	(.044)	(.021)	(.022)	(.026)
	12.327	8.867	4.612	6.042	7.724	36.069	36.148	27.710
PROV AUTO SUPP	.354	.285	.221	.257	.280	.747	.725	.705
	(.047)	(.047)	(.051)	(.047)	(.045)	(.023)	(.026)	(.030)
	7.538	6.071	4.317	5.439	6.152	32.571	28.090	23.278
PROM MGS	.459	.367	.193	.266	.234	**.811**	.776	.704
	(.043)	(.046)	(.052)	(.049)	(.047)	**(.019)**	(.024)	(.030)
	10.272	8.013	3.701	5.402	4.972	**43.364**	31.841	23.674
MGO*MGS	.217	.271	.456	.293	.187	.176	**.080**	.176
	(.061)	(.073)	(.092)	(.075)	(.054)	(.053)	**(.051)**	(.058)
	3.564	3.710	4.981	3.891	3.452	3.308	**1.561**	3.048

	DEMON INDIV CONSI	**STIM INV & INTER**	**PROV INSPI MOTI**	**PROV AUTO SUPP**	**PROM MGS**	**MGO*MGS**
DEMON INDIV CONSID	1.000					
STIM INV & INTER	**.821**					
	(.021)					
	38.317	1.000				
PROV INSPI MOTI	.770	.797				
	(.023)	(.021)				
	33.841	37.702	1.000			
PROV AUTO SUPP	.740	**.808**	.738			
	(.026)	**(.023)**	(.023)			
	28.717	**35.249**	32.25	1.000		
PROM MGS	**.826**	**.874**	**.842**	**.843**		
	(.020)	**(.019)**	**(.017)**	**(.018)**		
	40.729	**45.298**	**50.84**	**46.840**	1.000	
MGO*MGS	.124	.210	.132	.162	.155	
	(.052)	(.052)	(.051)	(.053)	(.053)	
	2.378	4.018	2.583	3.066	2.902	1.000

*p > .05

Table 4.69

95% confidence interval for sample phi estimates

ESTIMATE	STANDARD ERROR ESTIMATE	LOWER LIMIT OF 95% CONFIDENCE INTERVAL	UPPER LIMIT OF 95% CONFIDENCE INTERVAL	PHI CELL
.707	.037	.627	.772	PHI(2,1)
.495	.047	.397	.581	PHI(3,1)
.416	.046	.322	.502	PHI(4,1)
.284	.051	.181	.381	PHI(5,1)
.475	.041	.391	.551	PHI(6,1)
.393	.047	.297	.481	PHI(7,1)
.499	.043	.410	.578	PHI(8,1)
.437	.042	.351	.516	PHI(9,1)
.426	.045	.334	.510	PHI(10,1)
.489	.040	.407	.563	PHI(11,1)
.354	.047	.259	.442	PHI(12,1)
.459	.043	.371	.539	PHI(13,1)
.217	.061	.095	.333	PHI(14,1)
.781	.037	.697	.844	PHI(3,2)
.542	.044	.450	.623	PHI(4,2)
.389	.047	.293	.477	PHI(5,2)
.405	.045	.313	.489	PHI(6,2)
.303	.048	.206	.394	PHI(7,2)
.542	.041	.457	.617	PHI(8,2)
.31	.047	.215	.399	PHI(9,2)
.342	.047	.247	.431	PHI(10,2)
.386	.044	.297	.469	PHI(11,2)
.285	.047	.190	.374	PHI(12,2)
.367	.046	.274	.454	PHI(13,2)
.271	.073	.123	.407	PHI(14,2)
.538	.045	.444	.620	PHI(4,3)
.361	.048	.263	.451	PHI(5,3)
.256	.050	.156	.351	PHI(6,3)
.184	.053	.078	.285	PHI(7,3)
.379	.047	.283	.467	PHI(8,3)
.179	.050	.080	.275	PHI(9,3)
.206	.051	.104	.304	PHI(10,3)
.233	.051	.131	.330	PHI(11,3)

.221	.051	.119	.318	PHI(12,3)
.193	.052	.089	.293	PHI(13,3)
.456	.092	.259	.617	PHI(14,3)
.475	.044	.384	.557	PHI(5,4)
.294	.047	.199	.383	PHI(6,4)
.244	.048	.148	.336	PHI(7,4)
.548	.040	.465	.622	PHI(8,4)
.265	.048	.169	.356	PHI(9,4)
.296	.048	.199	.387	PHI(10,4)
.279	.046	.187	.366	PHI(11,4)
.257	.047	.163	.347	PHI(12,4)
.266	.049	.168	.359	PHI(13,4)
.293	.075	.140	.432	PHI(14,4)
.305	.048	.208	.396	PHI(6,5)
.256	.047	.162	.346	PHI(7,5)
.505	.039	.425	.577	PHI(8,5)
.219	.046	.127	.307	PHI(9,5)
.292	.046	.199	.379	PHI(10,5)
.343	.044	.254	.426	PHI(11,5)
.28	.045	.190	.366	PHI(12,5)
.234	.047	.140	.324	PHI(13,5)
.187	.054	.079	.290	PHI(14,5)
.791	.019	.751	.825	PHI(7,6)
.748	.026	.692	.795	PHI(8,6)
.802	.019	.762	.836	PHI(9,6)
.787	.021	.742	.825	PHI(10,6)
.753	.021	.709	.791	PHI(11,6)
.747	.023	.698	.789	PHI(12,6)
.811	.019	.770	.845	PHI(13,6)
.176	.053	.071	.278	PHI(14,6)
.748	.026	.692	.795	PHI(8,7)
.839	.018	.800	.871	PHI(9,7)
.802	.022	.755	.841	PHI(10,7)
.778	.022	.731	.818	PHI(11,7)
.725	.026	.670	.772	PHI(12,7)
.776	.024	.724	.819	PHI(13,7)
.08	.051	.020	.179	PHI(14,7)
.745	.026	.690	.792	PHI(9,8)

.761	.025	.708	.806	PHI(10,8)
.709	.026	.654	.756	PHI(11,8)
.705	.030	.641	.759	PHI(12,8)
.704	.030	.640	.758	PHI(13,8)
.176	.058	.060	.287	PHI(14,8)
.821	.021	.775	.858	PHI(10,9)
.77	.023	.721	.811	PHI(11,9)
.74	.026	.685	.787	PHI(12,9)
.826	.020	.783	.861	PHI(13,9)
.124	.052	.021	.224	PHI(14,9)
.797	.021	.752	.835	PHI(11,10)
.808	.023	.758	.849	PHI(12,10)
.874	**.019**	**.831**	**.906**	**PHI(13,10)**
.21	.052	.106	.309	PHI(14,10)
.738	.023	.690	.780	PHI(12,11)
.842	.017	.805	.872	PHI(13,11)
.132	.051	.031	.230	PHI(14,11)
.843	.018	.804	.875	PHI(13,12)
.162	.053	.057	.264	PHI(14,12)
.155	.053	.050	.257	PHI(13,13)
.707	.037	.627	.772	PHI(14,13)

None of the 91 confidence intervals calculated in Table 4.69 include unity, however, one interval falls on the value (.90) earlier considered to be a critical value for excessively large correlations. This result was found for the correlation between *Promoting a Mastery Goal Structure* and *Stimulating Involvement and Interest.* Overall, the findings support the discriminant validity of the trainer-instructor structural model latent variables.

4.7.6 Summary on the measurement model fit and parameter estimates

The results of the overall fit assessment indicated reasonable to good model fit. The null hypothesis of exact measurement model fit (hypothesis 1a) was rejected but the null hypothesis of close measurement model fit (hypothesis 1b) was not rejected. The interpretation of the measurement model, the standardised residuals, and the modification indices all suggested good model fit. The results seem to substantiate the claim that the specific indicator variables reflected the specific latent variables they were meant to reflect.

There is some doubt, however, about the success with which Res_2 and Res_4 represented the interaction effect*, MGO*MGS.* There was also some doubt on the discriminant validity between *Promoting a Mastery Goal Structure* and *Stimulating Involvement and Interest*. Nevertheless, there appears to be sufficient evidence to conclude that the operationalisation of the latent variables in the reduced structural model was adequately successful and that further analysis of the structural model may be undertaken as to investigate the relationship between the latent variables.

Nonetheless, when interpreting the structural model, it will be important to consider that unless there is evidence to suggest that the operational measures do, in fact, reflect the latent variables of interest, the usefulness of using such data to investigate the hypotheses on the assumed nature of the relationships between the latent variables becomes contentious. Under the current circumstances it needs to be acknowledged that if poor model fit would be obtained for the comprehensive LISREL model it would not be possible to unequivocally rule out the possibility that it was not due to inherent structural flaws but rather to shortcomings in the operationalisation of specific latent variables.

4.8 Evaluating the fit of the structural model

The structural model is that component of the comprehensive LISREL model that prescribes relations between latent variables. The purpose of the model is to explain why variables are correlated in a particular fashion. The structural model describes the relationship between the latent variables themselves and indicates the amount of unexplained variance. When evaluating the structural part of a model it is necessary to focus on the substantive relationships of interest (i.e. the linkages between various endogenous and exogenous latent variables). The aim of this process is to determine whether the theoretical relationships specified in the research are supported by the data (Diamantopoulos & Siguaw, 2000). As the measurement model showed reasonable to good fit and the indicator variables generally reflected their designated latent variables well, the structural relationships between latent variables hypothesised by the proposed model depicted in Figure 2.7 were tested via SEM.

LISREL 8.8 was used to evaluate the fit of the comprehensive learning potential structural model. Robust maximum likelihood estimation method was used to produce the estimates.

An admissible final solution of parameter estimates for the revised reduced learning potential structural model was obtained after 33 iterations.

4.8.1 Assessing the overall goodness-of-fit of the structural model (Model A)

The full spectrum of fit indices provided by LISREL to assess the absolute fit of the model is presented in Table 4.70.

Table 4.70

Goodness of fit statistics for the trainer-instructor performance comprehensive model: Model A

Degrees of Freedom = 449
Minimum Fit Function Chi-Square = 1431.850 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1609.613 (P = .0)
Satorra-Bentler Scaled Chi-Square = 1453.135 (P = .0)
Chi-Square Corrected for Non-Normality = 4170.089 (P = .0)
Estimated Non-centrality Parameter (NCP) = 1004.135
90 Percent Confidence Interval for NCP = (892.577 ; 1123.273)

Minimum Fit Function Value = 2.548
Population Discrepancy Function Value (F0) = 1.787
90 Percent Confidence Interval for F0 = (1.588 ; 1.999)
Root Mean Square Error of Approximation (RMSEA) = .0631
90 Percent Confidence Interval for RMSEA = (.0595 ; .0667)
P-Value for Test of Close Fit (RMSEA < .05) = .000
Expected Cross-Validation Index (ECVI) = 2.984
90 Percent Confidence Interval for ECVI = (2.786 ; 3.196)
ECVI for Saturated Model = 1.996
ECVI for Independence Model = 94.988

Chi-Square for Independence Model with 528 Degrees of Freedom = 53317.346
Independence AIC = 53383.346
Model AIC = 1677.135
Saturated AIC = 1122.000
Independence CAIC = 53559.344
Model CAIC = 2274.463
Saturated CAIC = 4113.970
Normed Fit Index (NFI) = .973
Non-Normed Fit Index (NNFI) = .978
Parsimony Normed Fit Index (PNFI) = .827
Comparative Fit Index (CFI) = .981
Incremental Fit Index (IFI) = .981
Relative Fit Index (RFI) = .968
Critical N (CN) = 202.745

Root Mean Square Residual (RMR) = .0346
Standardised RMR = .0843
Goodness of Fit Index (GFI) = .852
Adjusted Goodness of Fit Index (AGFI) = .815
Parsimony Goodness of Fit Index (PGFI) = .682

The p-value associated with the Satorra-Bentler χ^2 value in Table 4.37 clearly indicated a significant test statistic. A non-significant χ^2 indicates model fit in that the model can reproduce the observed covariance matrix to a degree of accuracy that can be explained in terms of sampling error only (Kelloway, 1998). In this case, the model is not able to reproduce the observed covariance matrix sufficiently accurately to allow the discrepancy to be attributed to sampling error only. The exact fit null hypothesis (H_{02a}: RMSEA = 0) was therefore rejected.

The *Root Mean Square Error of Approximation (RMSEA)* of .0631 implies reasonable fit as values between .05 and of .08 indicate reasonable fit. The 90% confidence interval for RMSEA shown in Table 4.35 (.0595 - .0667) indicates reasonable fit. The *p-value for Test of Close Fit* indicates that the close fit null hypothesis (H_{02b}: RMSEA ≤ .05) was also rejected. It was therefore concluded that the reduced structural model did not show good fit in the parameter.

Determining and evaluating the fit of the structural model indicates to what extent the fitted model reproduces the observed sample covariance matrix (Diamantopoulos & Siguaw, 2000). The foregoing evidence indicated that the reduced structural model was unable to reproduce the observed covariance matrix to a degree of accuracy that warranted any faith in the structural model and the derived parameter estimates. The study hypothesised that specific latent variables characterising the learner and characterising the trainer-instructor will affect the learning motivation of the learner. Specific structural relations were hypothesised between these latent variables. The psychological mechanism that was hypothesised to affect the level of learning motivation was depicted in Figure 2.7. The fact that the close fit null hypothesis (H_{02b}: RMSEA ≤ .05) for the comprehensive LISREL model was rejected ($p < .05$) while the close fit null hypothesis (H01b: RMSEA ≤ .05) was not rejected ($p > .05$) means that that the hypothesised structural relations do not provide a valid (i.e. permissible) description of the process that produced the observed variance-covariance matrix. The overarching substantive research hypothesis therefore has to be considered as refuted in terms of the logic of the ex post facto research design as set out in Chapter 3.

Further interpretation of the structural model parameter estimates was therefore not done and the modification indices calculated by LISREL were subsequently inspected to explore possible ways of improving the fit of the model.

4.8.2 Modification to the structural model

Model modification indices indicate whether the freeing any of the currently fixed parameters in the model would significantly improve the fit of the model. This is determined by calculating the extent to which the χ^2 fit statistic decreases when each of the currently fixed parameters in the model is freed and the model is re-estimated (Jöreskog & Sörbom, 1993). Structural parameters currently fixed to zero with large modification index values (>6.6349) are parameters that, if set free, would improve the fit of the model significantly ($p < .01$) (Diamantopoulos & Siguaw, 2000; Jöreskog & Sörbom, 1993). Parameters with high modification indices values should, however, only be freed if it makes substantive sense to do so (Kelloway, 1998). A convincing theoretical argument should be put forward in support of the proposed causal linkage. The completely standardised expected change for the parameter is the extent to which it would change from its currently fixed value of zero in the completely standardised solution if it is freed. The magnitude of the completely standardised expected change should be substantial enough to warrant freeing the parameter. The sign of the completely standardised expected change should in addition make sense in terms of the theoretical argument put forward in support of the proposed path (Jöreskog & Sörbom, 1993).

Jöreskog and Sörbom (1993) suggest that the modification indices calculated for the various matrices defining the structural model (i.e., **Γ**, **B**, and **Ψ**) should be inspected to identify the parameter with the highest modification index value. The parameter with the largest modification index is then freed if a convincing theoretical argument can be put forward in support of the proposed causal linkage and if the magnitude of the completely standardised expected change is substantial enough. If a convincing theoretical argument cannot be put forward in support of the proposed causal linkage, or if the magnitude of the completely standardised expected change is not substantial enough, the parameter with the second largest modification index should be considered. For the purpose of modifying the reduced structural model depicted in Figure 2.7 only the **Γ** and **B** matrices were inspected. The possibility of freeing the fixed off-diagonal elements of the variance-covariance matrix **Ψ** was not considered. Putting forward a theoretical rational for freeing currently fixed covariance terms in **Ψ** in a cross-sectional research design would require the introduction of additional latent variables currently not included in the model.

According to the process suggested by Jöreskog and Sörbom (1993), the parameter with the highest modification index value was found in the beta matrix. Table 4.71 provides the modification indices calculated for the paths in the beta matrix constrained to zero in the original structural model.

Table 4.71
Modification indices for beta matrix

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC		18.434	34.744	42.113	25.915	13.184
LEARN MOTIV				1.551		
MGO					.063	5.781
MGS	43.994	51.995	21.793		**140.302**	84.942
CLIMATE	25.177	72.327	63.365	102.406		75.136
PROF VISION	9.975	45.087	53.669	76.758	50.730	

According to Table 4.71, the parameter with the highest modification index value was that between *learning climate* and *mastery goal structure.* In other words, it is suggested that the addition of a path from *learning climate* to *mastery goal* would significantly improve the fit of the model. The critical question is whether the proposed path makes substantive sense. If it does not, it should not be considered as a possible modification to the model.

A relationship between *learning climate* to *mastery goal structure* does, however, make sense. This suggests that a classroom characterised by a stronger learning climate would for this reason also have a stronger mastery goal structure. This makes substantive sense as a classroom with a strong learning climate would be one in which students would experience *emotional and academic support from their teacher, have higher levels of autonomy, have higher levels of interest and involvement, and experience* mutual respect and trust that allows them to be comfortable with themselves*.* The presence of these positive states are likely to result in the perception characterised by a helping atmosphere where effort is important for improvement, where all students are valued, where trying hard is important, and where all students can be successful if they work hard (i.e. a mastery goal structure). It does make substantive sense that a classroom that is more supportive and safe will result in the perception that effort and improvement is valued.

It was moreover argued earlier [p.129] that Dragoni (2005) "presents a psychological explanation on how an individual comes to adopt the group goal structure. Kopelman, Brief, and Guzzo (1990, as cited in Dragoni, 2005) state that psychological climate represents informational cues to followers regarding a path to achieve valued rewards in the group. Individuals will align their state goal orientation with the achievement focus inherent in the work group climate as this satisfies their need to achieve and maintain harmony with their environment. Due to this drive to achieve and maintain harmony with their environment, individuals adapt their perceptual, motivational, and behaviour responses to complement the shared group climate. They consequently adopt a corresponding state goal orientation endorsed by the group climate. Thus, in the context of learning, students will align their state goal orientation with the classroom goal structure in order to achieve and maintain homeostatic balance with their environment." It can be reasoned that this argument should have resulted in the derivation of the path-specific hypothesis now suggested by the modification indices calculated for **B** during the theorising presented in Chapter 2.

Besides the substantive logic supporting the addition of this path, the magnitude of the completely standardised expected change (1.123) is also substantial enough and the sign in the appropriate direction to support the addition of this path.

According to the procedure suggested by Jöreskog and Sörbom (1993) with regards to the modification of models, currently constrained paths should be freed one at a time as any change to the existing structural model would affect all existing parameter estimates and also all modification index values. Paths that would currently improve the fit of the model would therefore not necessarily do so in the revised model. Therefore, only the addition of the path between *learning climate* and *mastery goal structure* was considered at this stage in the analysis.

The removal of existing paths should also be considered when determining whether the initial structural model should be modified. For this purpose, an examination of the unstandardised beta and gamma matrices are required. The unstandardised beta matrix is depicted in Table 4.72.

Table 4.72
Unstandardised beta matrix

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC						
LEARN MOTIV	.374 (.045) 8.247		.597 (.052) 11.480		.096 (.038) 2.531	.075 (.034) 2.190
MGO	.352 (.051) 6.901			.441 (.055) 8.025		
MGS						
CLIMATE						
PROF VISION						

Analysis of the beta matrix (see Table 4.72) indicates all the paths are statistically significant ($p > .05$). All the z-values are greater than the required 1.6449 and the estimates are therefore statistically significant ($p > .05$).

Table 4.73 provides the results of the unstandarised gamma matrix. As can be seen from Table 4.73, the moderating effect of *mastery goal structure* on the relationship between *mastery goal orientation* and *learning motivation* obtained a z-value of -1.187, which is smaller than the required 1.6449 and the estimate is therefore not statistically significant ($p > .05$). No support was therefore found for the hypothesis of the moderating effect of *mastery goal structure* on the relationship between *mastery goal orientation* and *learning motivation*. All the path specific substantive research hypotheses implicitly hypothesised a specific causal linkage between two latent variables when that relationship forms part of a specific structural model containing specific other structural relations. Deleting paths from the model would alter the overall structural model and its constituent structural relations. The modification indices were calculated for a model containing these paths. In addition the theoretical persuasiveness of the theoretical rationale developed in support of the hypothesis during the theorising in the literature study suggested that it would be premature to abandon the hypothesis after a single study. It is thereby, however, not denied that no empirical support was obtained for the hypothesis that *mastery goal structure* the effect of *mastery goal orientation* and *learning motivation* in this study*.* The argument is not that the empirical finding obtained in this study should be ignored. Rather the argument is that the hypothesis deserves a second chance at testing on a second sample before a decision is made as to whether the specific latent interaction effect should be pruned from the model. This line of reasoning was extended to all insignificant paths. As such, it was decided not to remove insignificant paths from the model. The insignificant moderating effect of *mastery goal structure* on the relationship between *mastery goal orientation* and *learning motivation* was subsequently retained in the model.

Table 4.73
Unstandardised gamma matrix

	ENHANCE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOT	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC	.488 (.049) 9.947							
LEARN MOTIV								**-.049** **(.041)** **-1.187**
MGO								
MGS							.293 (.050) 5.869	
CLIMATE		.280 (.080) 3.490	.190 (.078) 2.426	.268 (.079) 3.374		.148 (.067) 2.198		
PROF VISION					.337 (.049) 6.893			

The structural model was subsequently modified by inserting a path between *learning climate* and *mastery goal structure* and the analysis was rerun.

4.8.3 Assessing the overall goodness-of-fit of the structural model (Model B)

The resultant fit statistics of the modified structural model are shown in Table 4.74.

Table 4.74

Goodness of fit statistics for the trainer-instructor performance comprehensive model: Model B

Degrees of Freedom = 448
Minimum Fit Function Chi-Square = 1329.931 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1446.976 (P = .0)
Satorra-Bentler Scaled Chi-Square = 1308.547 (P = .0)
Chi-Square Corrected for Non-Normality = 4112.403 (P = .0)
Estimated Non-centrality Parameter (NCP) = 860.547
90 Percent Confidence Interval for NCP = (755.982 ; 972.727)

Minimum Fit Function Value = 2.366
Population Discrepancy Function Value (F0) = 1.531
90 Percent Confidence Interval for F0 = (1.345 ; 1.731)
Root Mean Square Error of Approximation (RMSEA) = .0585
90 Percent Confidence Interval for RMSEA = (.0548 ; .0622)
P-Value for Test of Close Fit (RMSEA < .05) = .000

Expected Cross-Validation Index (ECVI) = 2.731
90 Percent Confidence Interval for ECVI = (2.544 ; 2.930)
ECVI for Saturated Model = 1.996
ECVI for Independence Model = 94.988

Chi-Square for Independence Model with 528 Degrees of Freedom = 53317.346
Independence AIC = 53383.346
Model AIC = 1534.547
Saturated AIC = 1122.000
Independence CAIC = 53559.344
Model CAIC = 2137.207
Saturated CAIC = 4113.970

Normed Fit Index (NFI) = .975
Non-Normed Fit Index (NNFI) = .981
Parsimony Normed Fit Index (PNFI) = .828
Comparative Fit Index (CFI) = .984
Incremental Fit Index (IFI) = .984
Relative Fit Index (RFI) = .971
Critical N (CN) = 224.574

Root Mean Square Residual (RMR) = .0316
Standardised RMR = .0766
Goodness of Fit Index (GFI) = .865
Adjusted Goodness of Fit Index (AGFI) = .831
Parsimony Goodness of Fit Index (PGFI) = .691

The Satorra-Bentler Scaled Chi-Square = 1308.547 (p = .00) indicates that the null hypothesis of exact fit is rejected (p < .05) again. The RMSEA value of .0585 indicates reasonable fit. The 90 percent confidence interval for RMSEA (.0548 - .0622) also indicates reasonable fit. The *p-value for Test of Close Fit* indicates that the close fit null hypothesis (H_{02b}: RMSEA ≤ .05) was also rejected again. It was therefore concluded that the reduced structural model did not show good fit. The foregoing evidence indicated that the reduced structural model was again unable to reproduce the observed covariance matrix to a degree of accuracy that warranted any faith in the structural model and the derived parameter estimates. Further interpretation was therefore not done and the modification indices calculated by LISREL as well as the statistical significance of the unstandardised γ and β estimates were subsequently inspected to explore further possible ways of improving the fit of the model.

4.8.4 Modification to the revised structural model (Model B)

The unstandardised beta and gamma matrices were examined to determine whether any further paths needed to be deleted from the model. The unstandardised beta matrix is depicted in Table 4.75. The table shows that none of the z-values were found to be smaller than 1.6449 indicating all the relationships were found to be significant (p < .05). It can also be concluded that the newly inserted path from *learning climate* to *mastery goal structure* is statistically significant (p < .05).

Table 4.75
Unstandardised beta matrix (Model B)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC						
LEARN MOTIV	.373 (.043) 8.583		.589 (.053) 10.556		.098 (.042) 2.333	.071 (.034) 2.080
MGO	.345 (.051) 6.775			.443 (.053) 8.370		
MGS					**.773 (.089) 8.198**	
CLIMATE						
PROF VISION						

The unstandardised gamma matrix shown in Table 4.76 indicates that no additional z-values were found to be smaller than 1.6449 and significant (p < .05) therefore indicating that no additional paths needed to be deleted. However, the previously positive path between *promoting a mastery climate* and *mastery goal structure* has become negative with the inclusion of the path from *learning climate* to *mastery goal structure*. This means that in the current elaborated model, *promoting a mastery climate* is significantly negatively related to *mastery goal structure when* included in a model that already contains *learning climate*. In other words the hypothesis that has been tested in the elaborated model is, in fact, not the original simple hypothesis that *promoting a mastery climate* explains variance in *mastery goal structure*. Rather, in the elaborated model it is the hypothesis that the **unique part of *promoting a mastery climate*** explains **unique** variance in *mastery goal structure* that is not explained by *learning climate*.

The key to the understanding of the negative relationship between *promoting a mastery climate* and *mastery goal structure* therefore lies in conceptualising the unique variance left in *promoting a mastery climate* and *mastery goal structure* when the effect of *learning climate* has been controlled for in *promoting a mastery climate* and *mastery goal structure*. The question is therefore why *promoting a mastery climate* would be negatively related to *mastery goal structure* if students perceive the climate to be supportive of learning. Earlier it was argued that adding a path from *learning climate* to *mastery goal structure* makes sense because a learning climate provides informational cues as to what behaviour will be more likely be appreciated and rewarded in the classroom. Earlier it was argued (Dragoni, 2005) that students will tend to align their state goal orientation with the achievement focus inherent in the classroom climate. Conforming to the classroom climate satisfies students' need to achieve and maintain harmony with their environment. Due to this drive to achieve and maintain harmony with their environment, students tend to adapt their perceptual, motivational, and behaviour responses to complement the shared classroom climate. Students consequently adopt a corresponding state goal orientation endorsed by the classroom climate. Students therefore will align their state goal orientation with the classroom goal structure in order to achieve and maintain homeostatic balance with their environment. *Learning climate* was constitutively defined earlier as the general atmosphere in the classroom related to teacher emotional support, teacher academic support, psychological safety and fairness, autonomy, and involvement and interest that is conducive to student learning. *Promoting a mastery climate* was defined as instructional behaviours that emphasise learning, understanding, and personal improvement rather than focussing only on normative comparison. One plausible explanation for the negative partial regression coefficient describing the slope of the relationship between *promoting a mastery climate* and *mastery goal structure* in the structural equation also containing *learning climate* is that instructor behaviour that (over)emphasises the need/importance of behaviour that has already been accepted/embraced by the class under the influence of the *learning climate* in the class evokes resistance and rebellion against the ideal. The argument seems sufficiently plausible not to reverse the addition of the added path. Future studies will, however, have to cross-validate this finding.

Table 4.76
Unstandardised gamma matrix (Model B)

	ENHANCE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOT	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC	.487 (.049) 9.928							
LEARN MOTIV								-.049 (.040) -1.207
MGO								
MGS							-.271 (.080) -3.392	
CLIMATE		.252 (.081) 3.099	.183 (.079) 2.311	.287 (.080) 3.586		.152 (.067) 2.274		
PROF VISION					.336 (.049) 6.874			

The modification indices of the gamma and beta matrices were again examined to consider possible additional paths in model. In accordance with the process suggested by Jöreskog and Sörbom (1993), the parameter with the highest modification index value was identified first. The parameter β_{56} in the beta matrix had the highest modification index value. Table 4.77 provides the modification indices calculated for the paths in the beta matrix constrained to zero in Model B.

Table 4.77
Modification indices for beta matrix (Model B)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC		18.998	38.235	44.282	32.417	13.139
LEARN MOTIV				1.139		
MGO					.831	4.777
MGS	24.844	17.649	6.300			37.021
CLIMATE	32.216	41.351	23.513			**92.554**
PROF VISION	9.957	45.963	55.047	87.083	65.033	

Table 4.77 shows that the parameter with the highest modification index value is associated with the path between *inspiring professional vision* and *learning climate.* In other words, it is suggested that the addition of a path from *inspiring professional vision* to *learning climate* would significantly improve the fit of the model. A logical theoretical argument can be put forward to support this relationship. As was discussed during the literature review, students who hold an *inspiring professional vision* have a positive image in which they see themselves as professional, successful job incumbents living out their potential. They possess a *positive professional vision in their mind's eye that inspires effort and a desire to learn.* Wofford and Goodin's (1994) explained that a vision encourages adherence to a learning approach that builds skills and competencies that would enable greater subsequent performance. As such, if students experience higher levels of an inspiring profesionnal vision they are more likely to experience the classroom as as one in which they receive emotional and academic support from their teacher, have higher levels of autonomy, are interested and involved, and experience mutual respect and trust that allows them to be comfortable in the classroom. Considering the above, it makes sense to argue that an individual who has an inspiring professional vision will be more likely to contribute, be open to, and experience a learning climate as they would be motivated to learn.

In addition to the theoretical logic that substantiates the inclusion of this path, the magnitude of the completely standardised expected change (not shown) is also substantial enough to support the addition of this path. The sign of the expected change also agrees with the theoretical rationale in terms of which the proposed path is justified. The structural model was subsequently modified by inserting a path from *inspiring professional vision* to *learning* *climate.* No paths were removed at this stage of the analysis. With these changes, the structural model was fitted again.

4.8.5 Assessing the overall goodness-of-fit of the structural model (Model C)

The resultant fit statistics of the modified structural model (Model C) are shown in Table 4.78.

The Satorra-Bentler Scaled Chi-Square = 1148.790 (p = .00) indicated that the null hypothesis of exact fit is again rejected (p < .05). The RMSEA value of .0529 however indicated reasonably good fit. The 90 percent confidence interval for RMSEA (.0491; .0566) also indicated good model fit as it includes the benchmark value of .05. The p-value for the Test of Close Fit also supports that the null hypothesis of close fit cannot be rejected (p = .105). As such, it can be concluded the modifications to the structural model have significantly improved the fit of the model to the data.

Table 4.78

Goodness of fit statistics for the trainer-instructor performance comprehensive model (Model C)

Degrees of Freedom = 447
Minimum Fit Function Chi-Square = 1220.840 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1264.702 (P = .0)
Satorra-Bentler Scaled Chi-Square = 1148.790 (P = .0)
Chi-Square Corrected for Non-Normality = 3963.116 (P = .0)
Estimated Non-centrality Parameter (NCP) = 701.790
90 Percent Confidence Interval for NCP = (605.516 ; 805.722)

Minimum Fit Function Value = 2.172
Population Discrepancy Function Value (F0) = 1.249
90 Percent Confidence Interval for F0 = (1.077 ; 1.434)
Root Mean Square Error of Approximation (RMSEA) = .0529
90 Percent Confidence Interval for RMSEA = (.0491 ; .0566)
P-Value for Test of Close Fit (RMSEA < .05) = .105

Expected Cross-Validation Index (ECVI) = 2.450
90 Percent Confidence Interval for ECVI = (2.278 ; 2.635)
ECVI for Saturated Model = 1.996
ECVI for Independence Model = 94.988

Chi-Square for Independence Model with 528 Degrees of Freedom = 53317.346
Independence AIC = 53383.346
Model AIC = 1376.790
Saturated AIC = 1122.000
Independence CAIC = 53559.344
Model CAIC = 1984.783

Saturated CAIC = 4113.970

Normed Fit Index (NFI) = .978
Non-Normed Fit Index (NNFI) = .984
Parsimony Normed Fit Index (PNFI) = .828
Comparative Fit Index (CFI) = .987
Incremental Fit Index (IFI) = .987
Relative Fit Index (RFI) = .975
Critical N (CN) = 255.139

Root Mean Square Residual (RMR) = .0288
Standardised RMR = .0680
Goodness of Fit Index (GFI) = .880
Adjusted Goodness of Fit Index (AGFI) = .849
Parsimony Goodness of Fit Index (PGFI) = .701

4.8.6 Modification to the structural model (Model C)

The unstandardised beta and gamma matrices were again examined to determine whether any further paths needed to be deleted from the model. The unstandardised beta matrix is depicted in Table 4.79. The table shows that one of the z-values were found to be smaller than 1.6449 indicating all but one of the structural relationships hypothesised by Model C between the endogenous latent variables were found to be significant ($p < .05$). The only insignificant z-value was obtained for the path from *inspiring professional vision* to *learning motivation.* This previously significant path became insignificant with the inclusion of the path from *inspiring professional vision* to *learning climate.* This suggests that the effect of *inspiring professional vision* on *learning motivation* is indirect rather than direct. Alternatively stated, the relationship between *inspiring professional vision* and *learning motivation* is mediated by *learning climate. Inspiring professional vision* would thus lead to higher levels of student *learning motivation* through the effect it has on the creation of a positive *learning climate.* Students that see the value in learning and have a picture of themselves as competent and contributing employees will be motivated to expend energy and effort on the learning material if they find themselves in a positive and supportive learning climate.

Although the indirect path hypothesis presents a compelling argument, a sound theoretical argument was presented to substantiate the direct relationship from *inspiring professional vision* to *learning motivation.* The path was included based on sound humanistic and cognitive motivational theory mechanisms as well as organisational and leadership theories. *The* *theoretical argument that s*uccessful trainer-instructors establish a clear vision of what they want to accomplish, what they want their students to accomplish, and what their students can accomplish provides students with a cognitive road map that structures their activities. As such, trainer instrcutors could evoke high level learning tendencies in their students, such that their abilities will be further developed and they will subsequently demonstrate greater performance on tasks. The feelings of inspiration that are invoked by the trainer-instructor's vision should encourage students to follow a learning approach that builds skills and competencies that would enable greater subsequent performance. In other words, the students are likely to be motivated by the vision to learn and develop themselves. Given this compelling theoretical argument it was decided to retain this path. Future studies should re-test this hypothesis to obtain more definitive evidence whether the hypothesis should be rejected or not.

The unstandardised beta-matrix revealed that the newly inserted path from *inspiring professional vision* to *learning climate* is statistically significant (p < .05).

Table 4.79
Unstandardised beta matrix (Model C)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC						
LEARN MOTIV	.373 (.043) 8.62		.586 (.055) 10.623		.096 (.052) 1.847	**.060** **(.044)** **1.354**
MGO	.344 (.051) 6.750			.444 (.053) 8.422		
MGS					.772 (.088) 8.799	
CLIMATE						**.344** **(.032)** **10.325**
PROF VISION						

The unstandardised gamma matrix shown in Table 4.80 indicates that all the z-value were found to be larger than 1.6449 and therefore that all the freed γ_{ij} estimates were significant (p < .05) therefore indicating that none of the paths needed to be deleted.

Table 4.80
Unstandardised gamma matrix (Model C)

	ENHANCE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOT	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC	.487 (.049) 9.949							
LEARN MOTIV								**-.048** **(.040)** **-1.198**
MGO								
MGS							-.294 (.078) -3.753	
CLIMATE		.197 (.070) 2.80	.025 (.073) 3.063	.214 (.076) 2.833		.121 (.063) 1.907		
PROF VISION					.339 (.046) 7.445			

The modification indices of the gamma and beta matrices were again examined to consider possible additional paths in model. In accordance to the process suggested by Jöreskog and Sörbom (1993), the parameter with the highest modification index value was identified first. The parameter β_{64} in the beta matrix had the highest modification index value. Table 4.81 provides the results of the modification indices calculated for the paths in the beta matrix constrained to zero in Model C.

Table 4.81
Modification indices for beta matrix (Model C)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC		17.981	38.724	44.736	33.777	14.447
LEARN MOTIV				1.189		
MGO					.403	33.907
MGS	22.946	13.468	4.468			33.907
CLIMATE	18.310	12.746	3.614	.689		
PROF VISION	10.682	21.924	27.386	**76.196**	.021	

Table 4.81 shows that the parameter with the highest modification index value is associated with the path between *mastery goal structure* and *inspiring professional vision.* In other words, it is suggested that the addition of a path from *mastery goal structure* to *inspiring professional vision* would significantly improve the fit of the model. A logical theoretical

argument to support this relationship does, however, make sense albeit not immediately apparent. This suggested relationship implies that a classroom characterised by the view where students learn for the sake of learning, understanding, growth and improvement leads to higher levels of an inspiring professional vision. That is, if students value learning for the sake of growth and development, they are more likely to see the importance of learning to their careers and to society and believe that they will be value-adding and competent employees. Considering the above, it makes sense to argue that an individual who experiences the classroom as having a mastery goal structure, will be more likely to hold an inspiring professional vision because of the value they see in learning for the sake of growth and development.

In addition to the theoretical logic that substantiates the inclusion of this path, the magnitude of the completely standardised expected change (not shown) was also substantial enough to support the addition of this path. The sign of the expected change was also in the direction indicated by the theoretical rational led in defence of the proposed path. The structural model was subsequently modified by inserting a path from *mastery goal structure* to *inspiring professional vision.*

With the addition of the path from *mastery goal structure* to *inspiring professional vision* the structural model was fitted again.

4.8.7 Assessing the overall goodness-of-fit of the structural model (Model D)

An admissible final solution of parameter estimates for the modified learning potential structural model (Model D) was obtained after 43 iterations. The completely standardised solution for the comprehensive LISREL model is depicted in Figure 4.13. The full spectrum of fit indices provided by LISREL to assess the absolute fit of the model is presented in Table 4.82

Table 4.82 provides the results of the goodness-of-fit statistics of the trainer instructor structural model after the suggested changes were implemented.

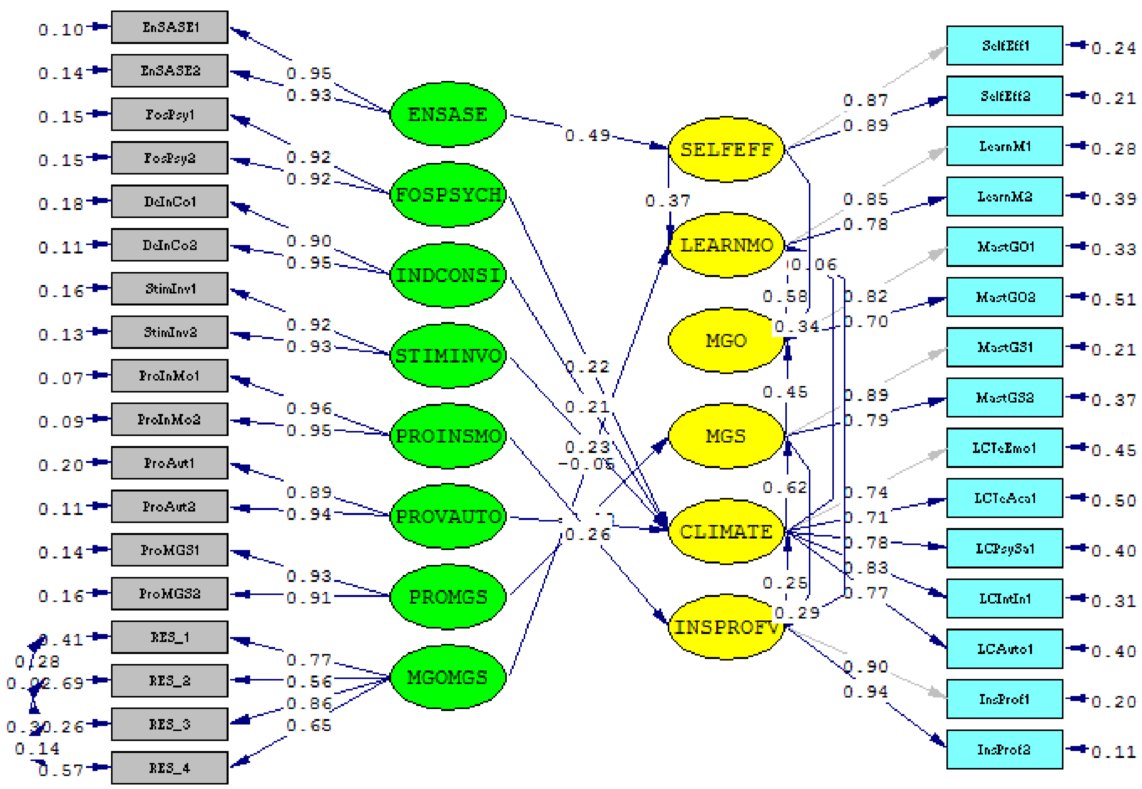

Figure 4.13. **Representation of the modified *trainer-instructor performance comprehensive* model (standardised solution): Model D**

Table 4.82

Goodness of fit statistics for the trainer-instructor performance comprehensive model (Model D)

Degrees of Freedom = 446
Minimum Fit Function Chi-Square = 1195.485 (P = .0)
Normal Theory Weighted Least Squares Chi-Square = 1242.260 (P = .0)
Satorra-Bentler Scaled Chi-Square = 1130.913 (P = .0)
Chi-Square Corrected for Non-Normality = 3864.365 (P = .0)
Estimated Non-centrality Parameter (NCP) = 684.913
90 Percent Confidence Interval for NCP = (589.589 ; 787.904)

Minimum Fit Function Value = 2.127
Population Discrepancy Function Value (F0) = 1.219
90 Percent Confidence Interval for F0 = (1.049 ; 1.402)
Root Mean Square Error of Approximation (RMSEA) = .0523
90 Percent Confidence Interval for RMSEA = (.0485 ; .0561)
P-Value for Test of Close Fit (RMSEA < .05) = .159

Expected Cross-Validation Index (ECVI) = 2.422
90 Percent Confidence Interval for ECVI = (2.252 ; 2.605)
ECVI for Saturated Model = 1.996
ECVI for Independence Model = 94.988

Chi-Square for Independence Model with 528 Degrees of Freedom = 53317.346

Independence AIC = 53383.346
Model AIC = 1360.913
Saturated AIC = 1122.000
Independence CAIC = 53559.344
Model CAIC = 1974.240
Saturated CAIC = 4113.970

Normed Fit Index (NFI) = .979
Non-Normed Fit Index (NNFI) = .985
Parsimony Normed Fit Index (PNFI) = .827
Comparative Fit Index (CFI) = .987
Incremental Fit Index (IFI) = .987
Relative Fit Index (RFI) = .975
Critical N (CN) = 258.620

Root Mean Square Residual (RMR) = .0278
Standardised RMR = .0660
Goodness of Fit Index (GFI) = .882
Adjusted Goodness of Fit Index (AGFI) = .851
Parsimony Goodness of Fit Index (PGFI) = .701

Table 4.82 indicates that the final model (model D) achieved a Satorra-Bentler Scaled Chi-Square value of 1130.913 with 446 degrees of freedom. The evaluation of the fit on the basis on the normed chi-square statistics χ^2 / df (1130.913 /446 = 2.54) for the structural model suggest that the model fits the data well.

The p-value associated with the Satorra-Bentler χ^2 (p = .00) indicated a significant test statistic ($p < .05$). H_{02a} was therefore rejected. This suggests that there is a significant discrepancy between the covariance matrix implied by the structural model and the observed covariance matrix, thus rejecting the exact fit hypothesis (Kelloway, 1998). The structural model was, therefore, not able to reproduce the observed covariance matrix to a degree of accuracy in the sample that can be explained in terms of sampling error only.

A RMSEA value of .0523 was obtained for the sample with a confidence interval of (.0485 - .0561). In terms of the confidence interval the obtained RMSEA value can be interpreted to suggest good model fit to reasonable model fit in the parameter. Since the 90 percent confidence interval for RMSEA (.0485; .0561) included the target value of .05, it implies that close fit in the parameter cannot be ruled out as a possible scenario. Table 4.82 confirms this by indicating that the null hypothesis of close model fit (H_{02b}: RMSEA ≤ .05) was not rejected at a 5 percent significance level ($p > .05$).

The model ECVI (2.422) was smaller than the value obtained for the independence model (94.988). The model ECVI (2.422) was however larger than the saturated model (1.996). Therefore, a model more closely resembling the saturated model seems to have a better chance of being replicated in a cross-validation sample.

The model Akaike's Information Criterion (AIC) (1360.913) achieved a value lower than the independence model (53559.34), but not the saturated model (1122.00). The consistent version of AIC (CAIC) (1974.24) on the other hand achieved a value lower than both the independence model (53559.34) and the saturated model (4113.97). The CAIC seems to suggest that a model more closely resembling the fitted model seems to have a better chance of being replicated in a cross-validation sample than the both the independence model and the saturated model. The AIC, however, suggests that a model more closely resembling the saturated model seems to have a better chance of being replicated in a cross-validation sample than the fitted model.

The model produced a Standardised Root Mean Residual (SRMR) of .0660 which is higher than the criteria of acceptable fit. The model achieved a GFI of .882 and an AGFI of .851 which are both somewhat lower than the criteria for acceptable fit.

The parsimonious normed fit index (PNFI = .882) and the parsimonious goodness-of-fit index (PGFI = .701) approach model fit from the perspective that model fit can always be improved by adding more paths to the model and estimating more parameters until perfect fit is achieved in the form of a saturated or just-identified model with no degrees of freedom (Kelloway, 1998). PNFI and PGFI range from 0 to 1, but do not have a recommendation on how high these values should be to achieve parsimonious fit. It has been suggested that neither index is likely to reach the .90 cut-off used for other fit indices. According to Kelloway (1998) and Hair, Black, Babin, Anderson, and Tatham (2006) these indices are more meaningfully used when comparing two competing theoretical models and are not very useful indicators in this CFA analysis. For this reason emphasis will not be placed on these indices to evaluate model fit in this study.

The following set of fit indices contrast how much better the given model reproduce the observed covariance matrix than a baseline model which is usually an independence or null model. The fit indices presented include the normed fit index (NFI= .979), the non-normed fit index (NNFI= .985), the comparative fit index (CFI= .987), the incremental fit index (IFI=.987) and the relative fit index (RFI =.975). All indices in this group have a range between 0 and 1 (except the NNFI that can take values greater than 1) with values close to 1 (> .90) representing good fit. All values reported above fall comfortably above the .90 cut-off, indicating good model fit.

The Critical N (CN) shows the size that a sample must reach in order to accept the data fit of a given model on a statistical basis. As a rule-of-thumb, a CN exceeding 200 is indicative that a model is an adequate representation of the data. The model in this study achieved a CN of 258.62 which is well above the threshold.

In conclusion, the results of the overall fit assessment, especially the RMSEA, SRMR, and the NFI, NNFI, CFI, IFI, and RFI, seem to suggest that good model fit was achieved. The values of the SRMR, the GFI, AGFI, PGFI, and PNFI did not, however, strictly meet the criteria for good fit.

4.8.8 Examination of the structural model residuals

The standardised residuals resulting from the covariance estimates derived from the estimated model parameters obtained for the modified comprehensive model (Model D) are shown in Table 4.83.

Table 4.83
Modified structural model standardised residuals

	SelfEff1	SelfEff2	Learn Mot1	Learn Mot2	MGO1	MGO 2	MGS1	MGS2	TeachE moSup1	TeachAc aSup1	PsychSa fFair1	Interest &Invol1	Autono my1	InspiringP rofVis1
SelfEff1	-													
SelfEff2	-	-												
LearnMot1	**3.701**	**3.370**	-											
LearnMot2	**4.169**	.805	**4.853**	-										
MasteryGO1	**3.213**	2.452	.663	**3.050**	-									
MasteryGO2	**2.942**	2.012	2.166	.660	2.193	-								
MasteryGS1	**6.117**	**4.901**	**3.227**	**2.986**	**4.522**	.224	-							
MasteryGS2	**5.152**	**4.054**	**3.459**	**4.050**	2.119	.615	-							
TeachEmoSup1	**3.959**	**3.782**	2.296	1.647	-1.121	.881	-2.240	-.961						
TeachAcaSup1	**5.528**	**4.854**	**3.788**	**3.635**	1.501	1.93	.783	.546	**9.784**					
PsychSafFair1	.583	1.222	.368	-1.769	-1.536	-.796	-1.743	-.190	-					
Interest&Invol1	2.364	2.219	**2.643**	1.327	2.395	.607	**2.589**	1.974	**-17.881**					
Autonomy1	2.098	**3.265**	2.292	.261	1.541	.113	-.077	1.034	**-**		1.165	**3.186**		
InspiringProfVis1	**2.722**	2.388	1.673	1.404	**2.843**	.325	.396	-1.947	**-6.982**	**-4.882**	-.035	**3.129**	1.962	
InspiringProfVis2	**3.289**	**2.874**	**3.997**	1.933	**3.401**	1.415	.184	-.531	**-7.990**	**-4.275**	-1.277	**3.975**	1.847	
EnhanStuSelfEff1	-.748	.488	.596	-1.666	-.933	.940	.195	.917	**7.428**	**3.942**	**-4.370**	-2.021	1.874	-.144
EnhanStuSelfEff2	-2.008	-.032	.510	-1.049	-1.233	.399	.695	.664	**7.221**	**4.161**	**-2.735**	-1.288	**3.385**	-..585
FosteringPsychSaf1	-.220	.528	-1.046	-2.561	-1.937	-.563	-2.548	-1.573	**5.778**	**2.761**	**-**	**-6.894**	**-3.112**	-1.224
FosteringPsychSaf2	-.089	.465	-1.458	**-3.259**	-1.992	-.800	**-2.912**	-1.103	**5.075**	2.422	-	**-5.158**	**-2.619**	-1.439
DemonIndivConsi1	1.222	1.140	-1.821	-1.317	-1.586	-.871	-1.269	-.642	**5.136**	**4.228**	**-10.74**	**-3.999**	-2.033	-2.209
DemonIndivConsi2	.689	1.693	-1.715	-2.018	-2.464	-1.111	-2.030	-1.073	**6.200**	**4.493**	**-**	**-9.300**	**-6.113**	**-2.827**
StimulatingInv&Int1	.357	1.825	-.862	-2.132	-2.038	-.345	-1.365	-.635	**2.917**	1.981	**-24.315**	**-5.496**	.166	-.923
StimulatingInv&Int2	.464	1.580	-.018	-.451	-1.118	-.166	.186	.978	**5.115**	**5.921**	-	-2.050	-.029	.263
ProvidingInspMot1	2.399	**3.555**	1.348	-.442	-.603	.313	-.645	.256	**5.691**	**4.636**	**-**	**-9.749**	-1.178	-1.141
ProvidingInspMot2	**3.028**	**4.231**	2.210	-.046	-.302	.860	.915	.656	**5.542**	**4.441**	**-**	**-8.506**	-1.040	1.545
ProvidingAutoSup1	-.379	1.115	-1.43	-1.325	-.246	.763	-.227	.464	1.969	1.229	**-4.75**	**-3.532**	1.549	.995
ProvidingAutoSup2	-1.175	.180	-1.358	-1.754	-.786	-.047	-1.160	-.162	**3.508**	1.398	-1.168	-2.378	2.410	.131
PromMastGoalStr1	.695	2.136	-.043	-.542	-1.816	-.258	-.059	1.339	**4.540**	**5.087**	**-17.809**	**-5.309**	-2.338	-2.095
PromMastGoalStr2	.985	**2.874**	.688	-.202	-1.213	.134	-1.093	.850	**3.953**	**4.782**	**-6.673**	**-5.485**	-1.921	**-3.10**
Res_1 (MGO1*MGS1)	2.254	**2.697**	**3.702**	**4.219**	**5.498**	**4.444**	**4.339**	1.362	.633	2.049	.525	.859	2.043	**2.928**

Res _2(MGO1*MGS2)	1.359	1.791	2.348	**3.575**	**4.134**	**3.73**	1.626	1.984	.103	.950	.513	.975	.660	1.466
Res_3 (MGO2*MGS1)	1.842	2.417	**3.825**	**2.901**	**5.273**	**3.677**	**3.855**	1.089	.008	1.616	-.578	.878	1.668	1.650
Res _4(MGO2*MGS2)	.585	.910	2.006	2.066	**3.736**	**2.734**	1.265	1.243	-1.068	.072	-1.431	-.089	-.562	.547

	Inspiring ProfVis2	**Enhanc Aca Self-Eff1**	**Enha nc Aca Self-Eff2**	**Foste Psych Saf1**	**Foste Psych Saf2**	**DemonIn divConsi1**	**DemonI ndivCon si2**	**StimInv &Int1**	**StimInv &Int1**	**Providin gInspM ot1**	**Providin gInspM ot2**	**Providin gAutoSu p1**	**Providin gAutoSu p1**	**PromM astGoal Str1**	**PromM astGoal Str2**
InspiringProfVis2															
Enhanc Aca Self-Eff1	.920														
Enhanc Aca Self-Eff2	1.596														
FosteringPsychSaf1	-1.153														
FosteringPsychSaf2	-.855														
DemonIndivConsi1	-1.857														
DemonIndivConsi2	-1.906														
StimulatingInv&Int1	-.949														
StimulatingInv&Int2	1.005														
ProvidingInspMot1	-.458														
ProvidingInspMot2	**2.888**														
ProvidingAutoSup1	.681	-.301		-1.358	.012	.562		**3.425**							
ProvidingAutoSup2	.137							.146							
PromMastGoalStr1	-1.405														
PromMastGoalStr2	-1.981														
Res_1 (MGO1*MGS1)	**3.124**	-.214	1.235	-.202	.740	1.404	.351	.404	.326	.167	.831	.724	-.600	1.155	.610
Res _2 (MGO1*MGS2)	1.847	-.874	.-228	-1.468	-.055	.132	-.175	-.146	-.561	-1.249	-1.621	.333	-.237	-.119	.055
Res_3 (MGO2*MGS1)	1.571	-.609	.173	-.695	1.425	1.394	-1.410	-.356	.287	-.077	.598	.701	-.006	.826	-.748
Res _4 (MGO2*MGS2)	1.571	-1.771	-1.57	**-3.074**	-.964	-.789	-2.090	-1.174	-1.543	-2.163	**-2.722**	-.328	-1.333	-1.114	-1.444

	RES_1	**RES_2**	**RES_3**	**RES_4**
Res_1 (MGO1*MGS1)				
Res _2 (MGO1*MGS2)	.023			
Res_3 (MGO2*MGS1)	-.003	-.028		
Res _4 (MGO2*MGS2)	.025	.009	-.011	

As can be seen from Table 4.83 there were 81 variance and covariance terms in the observed sample variance-covariance matrix (15%) that were substantially underestimated and 30 terms in the observed sample covariance matrix (6%) that were substantially overestimated. This can be seen as a somewhat unfavourable comment on the fit of the modified structural model.

The stem-and-leaf plot and is depicted in Figure 4.14. A good model would be characterised by a stem-and-leaf plot in which the residuals are distributed approximately symmetrical around zero. An excess of residuals on the positive or negative side would indicate that the observed variance and covariance terms in **S** are systematically under- or overestimated.

```
-24|3
-22|
 -20|
 -18|
 -16|98
 -14|
 -12|
 -10|7
 - 8|7350
 - 6|0971
 - 4|553294330
 - 2|531119877665543222111100000000
- 0|9999988888777666655554444444443333332222222222211111111100000999999988887+95
  0|1111111122222222233333333344444455555555555666666666667777777777777888889999+59
  2|0000000001111222233333444444456677788999999900011222334444556667777788899
  4|0000011222223344555689991111123555789
  6|1224
  8|8
```

Figure 4.14. **Modified trainer-instructor performance comprehensive model stem-and-leaf plot of standardised residuals (Model D)**

From the stem-and-leaf plot depicted in Figure 4.14, the distribution of the standardised residuals appears to be somewhat negatively skewed. The estimated model parameters therefore tended to overestimate the observed covariance terms more than they tended to underestimate them. This agrees with the CAIC results reported earlier which suggested that a model more closely resembling the fitted model seems to have a better chance of being replicated in a cross-validation sample than the both the independence model and the saturated model. The summary statistics for the standardised residuals are displayed in Table 4.84.

Table 4.84

Summary statistics for standardised residuals (Model D)

Smallest Standardised Residual	24.315
Median Standardised Residual	.000
Largest Standardised Residual	9.764
Largest Negative Standardised Residuals	
Residual for LCIntIn1 and LCTeEmo1	-17.881
Residual for InsProf1 and LCTeEmo1	-6982
Residual for InsProf1 and LCTeAca1	-4.882
Residual for InsProf2 and LCTeEmo1	-7.990
Residual for InsProf2 and LCTeAca1	-4.275
Residual for EnSASE1 and LCPsySa1	-4.370
Residual for EnSASE2 and LCPsySa1	-2.735
Residual for FosPsy1 and LCIntIn1	-6.894
Residual for FosPsy1 and LCAuto1	-3.012
Residual for FosPsy2 and LearnM2	-3.259
Residual for FosPsy2 and MastGS1	-2.912
Residual for FosPsy2 and LCIntIn1	-5.158
Residual for FosPsy2 and LCAuto1	-2.619
Residual for DeInCo1 and LCPsySa1	-10.741
Residual for DeInCo1 and LCIntIn1	-3.999
Residual for DeInCo2 and LCIntIn1	-9.300
Residual for DeInCo2 and LCAuto1	-6.113
Residual for DeInCo2 and InsProf1	-2.827
Residual for StimInv1 and LCPsySa1	-24.315
Residual for StimInv1 and LCIntIn1	-5.496
Residual for ProInMo1 and LCIntIn1	-9.749
Residual for ProInMo2 and LCIntIn1	-8.506
Residual for ProAut1 and LCPsySa1	-4.275
Residual for ProAut1 and LCIntIn1	-3.532
Residual for ProMGS1 and LCPsySa1	-17.809
Residual for ProMGS1 and LCIntIn1	-5.309
Residual for ProMGS2 and LCPsySa1	-6.673
Residual for ProMGS2 and LCIntIn1	-5.485
Residual for ProMGS2 and InsProf1	-3.101
Residual for RES_4 and FosPsy1	-3.074
Residual for RES_4 and ProInMo2	-2.722
Largest Positive Standardised Residuals	
Residual for LearnM1 and SelfEff1	3.701
Residual for LearnM1 and SelfEff2	3.370
Residual for LearnM2 and SelfEff1	4.169
Residual for LearnM2 and LearnM1	4.853
Residual for MastGO1 and SelfEff1	3.231
Residual for MastGO1 and LearnM2	3.050
Residual for MastGO2 and SelfEff1	2.942
Residual for MastGS1 and SelfEff1	6.117
Residual for MastGS1 and SelfEff2	4.901
Residual for MastGS1 and LearnM1	3.227

Residual for MastGS1 and LearnM2	2.986
Residual for MastGS1 and MastGO1	4.522
Residual for MastGS2 and SelfEff1	5.152
Residual for MastGS2 and SelfEff2	4.054
Residual for MastGS2 and LearnM1	3.459
Residual for MastGS2 and LearnM2	4.050
Residual for LCTeEmo1 and SelfEff1	3.959
Residual for LCTeEmo1 and SelfEff2	3.782
Residual for LCTeAca1 and SelfEff1	5.552
Residual for LCTeAca1 and SelfEff2	4.884
Residual for LCTeAca1 and LearnM1	3.788
Residual for LCTeAca1 and LearnM2	3.635
Residual for LCTeAca1 and LCTeEmo1	9.784
Residual for LCIntIn1 and LearnM1	2.643
Residual for LCIntIn1 and MastGS1	2.589
Residual for LCAuto1 and SelfEff2	3.265
Residual for LCAuto1 and LCIntIn1	3.186
Residual for InsProf1 and SelfEff1	2.722
Residual for InsProf1 and MastGO1	2.843
Residual for InsProf1 and LCIntIn1	3.129
Residual for InsProf2 and SelfEff1	3.289
Residual for InsProf2 and SelfEff2	2.874
Residual for InsProf2 and LearnM1	3.997
Residual for InsProf2 and MastGO1	3.401
Residual for InsProf2 and LCIntIn1	3.975
Residual for EnSASE1 and LCTeEmo1	7.428
Residual for EnSASE1 and LCTeAca1	3.942
Residual for EnSASE2 and LCTeEmo1	7.221
Residual for EnSASE2 and LCTeAca1	4.161
Residual for EnSASE2 and LCAuto1	3.385
Residual for FosPsy1 and LCTeEmo1	5.778
Residual for FosPsy1 and LCTeAca1	2.761
Residual for FosPsy2 and LCTeEmo1	5.075
Residual for DeInCo1 and LCTeEmo1	5.163
Residual for DeInCo1 and LCTeAca1	4.228
Residual for DeInCo2 and LCTeEmo1	7.200
Residual for DeInCo2 and LCTeAca1	4.493
Residual for StimInv1 and LCTeEmo1	2.917
Residual for StimInv2 and LCTeEmo1	5.115
Residual for StimInv2 and LCTeAca1	5.921
Residual for ProInMo1 and SelfEff2	3.555
Residual for ProInMo1 and LCTeEmo1	5.691
Residual for ProInMo1 and LCTeAca1	4.636
Residual for ProInMo2 and SelfEff1	3.028
Residual for ProInMo2 and SelfEff2	4.321
Residual for ProInMo2 and LCTeEmo1	5.542
Residual for ProInMo2 and LCTeAca1	4.421
Residual for ProInMo2 and InsProf2	2.888
Residual for ProAut1 and StimInv1	3.425
Residual for ProAut2 and LCTeEmo1	3.508
Residual for ProMGS1 and LCTeEmo1	4.540
Residual for ProMGS1 and LCTeAca1	5.087
Residual for ProMGS2 and SelfEff2	2.874
Residual for ProMGS2 and LCTeEmo1	3.953
Residual for ProMGS2 and LCTeAca1	4.782
Residual for RES_1 and SelfEff2	2.697
Residual for RES_1 and LearnM1	3.702

Residual for RES_1 and LearnM2	4.219
Residual for RES_1 and MastGO1	5.498
Residual for RES_1 and MastGO2	4.444
Residual for RES_1 and MastGS1	4.339
Residual for RES_1 and InsProf1	2.928
Residual for RES_1 and InsProf2	3.124
Residual for RES_2 and LearnM2	3.575
Residual for RES_2 and MastGO1	4.134
Residual for RES_2 and MastGO2	3.730
Residual for RES_3 and LearnM1	3.825
Residual for RES_3 and LearnM2	2.901
Residual for RES_3 and MastGO1	5.273
Residual for RES_3 and MastGO2	3.677
Residual for RES_3 and MastGS1	3.855
Residual for RES_4 and MastGO1	3736
Residual for RES_4 and MastGO2	2.735

The Q-plot is depicted in Figure 4.15. Figure 4.15 indicates that the data deviates somewhat from the 45- degree reference line which is a negative comment on the fit of the model. The data points swivel away from the 45-degree reference line at the upper end in a positive direction as well as in the lower end in a negative direction. In conclusion, the model residuals results seem to suggest that only satisfactory model fit was achieved.

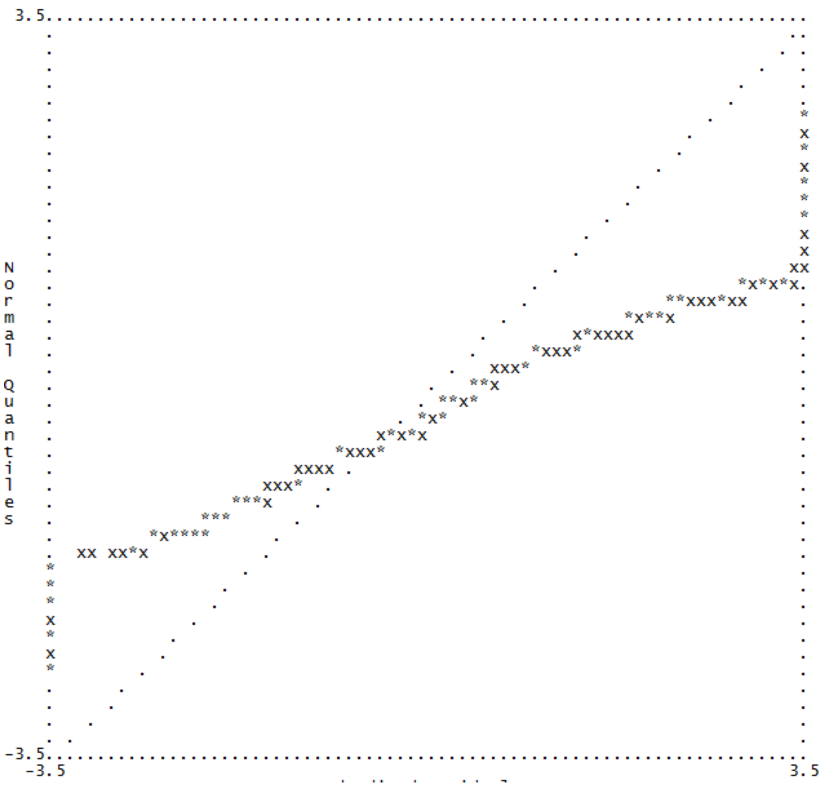

Figure 4.15. **Modified trainer-instructor performance comprehensive model Q-plot of standardised residuals (Model D)**

4.8.9 Further assessment of the structural model

The structural model has shown good fit to the data as judged by the overall goodness of fit statistics and acceptable fit as indicated by the standardised residuals. As such, the structural model was evaluated further.

The purpose of further evaluating the structural model was to determine whether each of the hypothesised theoretical relationships was supported by the data. To establish this, the causal linkages between the exogenous and endogenous latent variables were considered as well as the structural linkages between the endogenous latent variables. In evaluating these linkages, four factors are taken into consideration: a) the signs of the parameters representing the paths between the latent variables that will indicate whether the direction of the hypothesised relationships is as predicted; b) the statistical significance of the estimated path coefficient that will indicate whether the estimate can be generalised to the parameter; c) the magnitude of the estimated parameters that will provide information on the strength of the hypothesised relationships; and d) the squared multiple correlations for the structural equations that will indicate the amount of variance in each endogenous latent variable that is accounted for by the latent variables that are expected to impact upon it (Diamantopoulos & Siguaw, 2000).

The unstandardised parameters for the beta and gamma matrices, including their standard error and z-values, provide a means to evaluate the linkages between the exogenous and endogenous variables.[33] The beta matrix describes the slope of the relationships between the endogenous variables. The unstandardised beta matrix is depicted in Table 4.84. The beta estimates can be interpreted as partial regression slopes.[34] The unstandardised estimate for β_{ij} therefore indicates the average change in η_i, expressed in the (unknown) metric of the latent variable, associated with 1 unit increase in η_j (when holding the other latent effects in the structural equation constant). These parameters are statistically significant ($p < .05$) if z >

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[33] It must be emphasised once again that a significant beta or gamma path coefficient estimate does not mean proof of a causal effect. Ex post facto research designs preclude the drawing of causal inferences from significant path coefficients (Theron, 2010).

[34] The hypotheses being tested by evaluating the statistical significance of the beta estimates shown in Table 4.49 (and the gamma estimates shown in Table 4.50) are not exactly the same hypotheses formulated in Chapter 3. All the path specific substantive research hypotheses implicitly hypothesised a specific causal linkage between two latent variables when that relationship forms part of a specific structural model containing specific other structural relations.

1.6449 (Diamantopoulos & Siguaw, 2000). The results depicted in Table 4.85 indicate that all the path coefficient estimates are statistically significant ($p < .05$), except for the path between *inspiring professional vision* and *learning motivation* that was also found insignificant in the previous round of analysis (i.e. Model C).

Table 4.85
Unstandardised beta matrix (Model D)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC						
LEARN MOTIV	.373 (.044) 8.552		.584 (.055) 10.699		.296 (.049) 1.942	.060 (.044) 1.347
MGO	.343 (.051) 6.746			.449 (.052) 8.601		
MGS					**.617** **(.090)** **6.853**	
CLIMATE						**.249** **(.037)** **6.716**
PROF VISION				**.294** **(.061)** **4.833**		

Table 4.85 shows that all the z-values were greater than 1.6449 and all were positive (except for the path between *inspiring professional vision* and *learning motivation)*, which is in-line with the nature of the hypothesised effects. More specifically Table 4.84 indicates that *learning motivation* was found to be positively determined by extent to which a student believes that they can successfully execute the actions needed to produce a desired academic outcome. Hypothesis 4, *academic self-efficacy* positively influences *learning motivation,* is thus corroborated. *Learning motivation* was found to be positively determined the extent to which the student aims to engage in task learning, skill improvement, and competence development. As such, Hypothesis 12, *mastery goal orientation* positively influences *learning motivation,* is supported.

Support for h*ypothesis 11, inspiring professional vision* positively influences *learning motivation,* was not gained and the path was removed from the train-instructor competency model in favour of an indirect effect on leaning motivation via learning climate. I*nspiring* *professional vision* was thus found to positively influence *learning climate.* The results show that *learning motivation* was also found to be positively determined by extent to which students perceive a classroom environment as supportive, safe and fair, interesting and involving, and supportive of autonomy. As such, h*ypothesis 5, learning climate* positively influences *learning motivation,* was corroborated.

Academic self-efficacy had a statistically significant effect on *mastery goal-orientation,* thereby providing support for the casual relationship hypothesised by hypothesis 13 between *academic self-efficacy* and *mastery goal-orientation*. Furthermore, *mastery goal structure* had a statistically significant effect on *mastery goal orientation,* thereby providing support for the relationship as hypothesised by hypothesis 14 in the structural model.

Table 4.85 also indicates that the included path from *learning climate* to *mastery goal structure* (as suggested by the modification indices) was significant. Similarly, the path included (as indicated by the modification indices) from *mastery goal structure* to *inspiring professional vision* was also found significant.

The unstandardised gamma matrix is depicted in Table 4.86 and describes the slope of the relationships between the exogenous variables and the endogenous variables. The unstandardised estimate for γ_{ijj} therefore indicates the average change in η_i, expressed in the (unknown) metric of the endogenous latent variable, associated with 1 unit increase in $\xi_{j.}$ These parameters are also significant ($p < .05$) if $z > 1.6449$ (Diamantopoulos& Siguaw, 2000).

As is evident from Table 4.86, only one of the z-values is smaller than 1.6449 and only one of the signs of the statistically significant γ_{ij} estimates are negative. More specifically, Table 4.85 indicates that *enhancing academic self-efficacy* had a statistically significant effect on *academic self-efficacy.* Hypothesis 3*, enhancing student self-efficacy* positively influences *academic self-efficacy,* is thus corroborated. Table 4.86 indicates that *individualised consideration* had a statistically significant effect on *learning climate.* As such, support is gained in favour of hypothesis 6, *individualised consideration* positively influences *learning climate.* Similarly, *fostering psychological safety and fairness* had been shown to have a statistically significant effect on *learning climate* thereby corroborating h*ypothesis 7, fostering psychological safety and fairness* positively influences *learning climate.* Furthermore, Table 4.86 indicates that *stimulating involvement and interest* had a statistically significant effect on *learning climate.* Support is thus found for hypothesis 8*, stimulating involvement and interest* positively influences *learning climate.* Table 4.85 shows that *providing autonomy support* had a statistically significant effect on *learning climate.* Hypothesis 9, *providing autonomy support* positively influences *learning climate,* is thus corroborated. All the trainer-instructor competencies hypothesised to influence learning climate were thus found to be positive and significant.

Table 4.86
Unstandardised gamma matrix (model D)

	ENHANCE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOTIV	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC	.487 (.049) 9.952							
LEARN MOTIV								**-.048** **(.040)** **-1.205**
MGO								
MGS							-.180 (.080) -2.236	
CLIMATE		.221 (.073) 3.038	.209 (.074) 2.825	.226 (.076) 2.978		.128 (.064) 2.012		
PROF VISION					.256 (.047) 5.397			

Providing inspirational motivation was also found to have a statistically significant effect on *inspiring professional vision.* Evidence is thus gained in favour of hypothesis 10, *providing inspirational motivation* positively influences *inspiring professional vision.* Lastly, and somewhat unexpectedly, *promoting mastery classroom goal structure* was found to have a statistically significant *negative* influence on *mastery goal structure.* This relationship became negative due to the inclusion of the path from *learning climate* to *mastery goal structure.* Hypothesis 15, *promoting mastery classroom goal structure* positively influences *mastery goal structure,* is thus not corroborated. It, however, needs to be reiterated that strictly speaking the hypothesis that was tested in Model D was that *promoting mastery classroom* *goal structure* explains unique variance in *mastery goal structure* that is not explained by *learning climate*.

Lastly, the moderating effect of *mastery classroom goal structure* on the relationship between *mastery goal orientation* and *learning motivation* was found to be statistically insignificant. No support was thus gained for hypothesis 16, *mastery classroom goal structure* moderates the effect of *mastery goal orientation* on *learning motivation.* This result was rather disappointing given the sound theoretical argument underlying the structural path. During theorising a strong theoretical argument was provided that when students with a mastery goal orientation are placed in a classroom with a mastery goal structure, the desirable relationship between personal mastery goal orientation and learning motivation should be strengthened. These students will regard the classroom environment as reinforcing and satisfying as the features of the classroom resemble their own personal goal preference. Holland (1997) stated that when there is person-environment fit, it should result in stable behaviour as individuals would receive a substantial amount of selective reinforcement. Given this strong substantive argument, it was decided to retain this structural path. A further deciding factor effecting the decision to retain the path is the limited studies in literature that have assessed the moderating effect of mastery goal structure on the relationship between mastery goal orientation and achievement outcomes. There appears to be a need in the literature to clarify the interaction between mastery goal structure and mastery goal orientation. Consequently, it could be argued that the removal of a path with a strong theoretical based on the insignificant result of one study, is a rather stringent criterion. Future studies should retest this hypothesis to obtain more definitive evidence whether the path should be rejected or not.

Additional insights can be obtained by considering the completely standardised parameter estimates provided by LISREL (Diamantopoulos & Siguaw, 2000). The completely standardised parameter estimates are not affected by differences in the unit of measurement of the latent variables and can thus be compared across structural equations. The completely standardised parameter estimates reflect the average change, expressed in standard deviation units, in the endogenous latent variables, directly resulting from a one standard deviation change in an endogenous or exogenous latent variable to which it has been linked, holding the effect of all other variables constant (Diamantopoulos & Siguaw, 2000). The completely standardised parameter estimates for **B** and Γ are depicted in Tables 4.87 and 4.88.

Table 4.87
Completely standardised beta matrix (Model D)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC						
LEARN MOTIV	.373		**.584**		.096	.060
MGO	.343			**.449**		
MGS					**.617**	
CLIMATE						.248
PROF VISION				.294		

Table 4.88
Completely standardised gamma matrix (Model D)

	ENHAN CE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOTIV	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC	.487							
LEARN MOTIV								-.048
MGO								
MGS							-.180	
CLIMATE		.221	.209	.226		.128		
PROF VISION					.256			

Table 4.87 and Table 4.88 indicate that of the all significant effects obtained, the effect of *learning climate on mastery goal structure* was the most pronounced, followed by the effect of *mastery goal orientation* on *learning motivation* and *mastery goal structure* on *mastery goal orientation.* It is interesting to note that the relationship between *mastery goal structure* and *learning climate* was not originally hypothesised but was added later after running the analysis and investigating the modification indices.

The inter-latent variable correlation matrix shown in Table 4.89 for the revised model (Model D) does suggest that a number of latent variables included in this model, are quite strongly related. The strongest correlations were obtained between *stimulating involvement and interest* and *promoting a mastery goal structure;* between *providing autonomy support* and *promoting a mastery goal structure;* between *providing inspirational motivation* and *promoting a mastery goal structure;* and between *fostering psychological safety and fairness* and *individualised consideration.*

Table 4.89
Inter-latent variable correlation matrix (Model D)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION	ENHANCE ASE
ACA SELF-EFFIC	1.000						
LEARN MOTIV	.645	1.000					
MGO	.403	.782	1.000				
MGS	.135	.418	.492	1.000			
CLIMATE	.335	.455	.357	.540	1.000		
PROF VISION	.134	.312	.263	.483	.527	1.000	
ENHANCE ASE	.487	.426	.291	.277	.686	.276	1.000
FOSTER PSYCH	.387	.390	.276	.318	.743	.293	.794
IND CONS	.393	.390	.274	.312	.746	.288	.806
STIM INVOL	.385	.381	.270	.306	.751	.294	.791
PROV INSP MOTIVAT	.370	.364	.250	.275	.691	.337	.759
PROV AUT SUP	.364	.356	.249	.276	.692	.270	.747
PROM MGS	.397	.377	.255	.266	.722	.294	.814
MGO*MGS	.086	.029	.052	.050	.124	.048	.177

	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOTIVAT	PROV AUT SUP	PROM MGS	MGO* MGS
FOSTER PSYCH	1.000						
IND CONS	**.839**	1.000					
STIM INVOL	.803	**.821**	1.000				
PROV INSP MOTIVAT	.778	.768	.798	1.000			
PROV AUT SUP	.725	.740	**.808**	.738	1.000		
PROM MGS	.777	**.826**	**.874**	**.841**	**.843**	1.000	
MGO*MGS	.080	.119	.211	.131	.166	.144	1.000

Table 4.90 indicates the R^2 values for the six endogenous latent variables. The squared multiple correlations signify the proportion of the variance in the endogenous latent variable that was accounted for by the trainer-instructor performance structural model. Table 4.90 indicates that the structural model successfully accounted for the variance in *learning motivation* and *learning climate.* However, the trainer-instructor performance structural model was less successful in explaining variance in *mastery goal structure, mastery goal climate,* and especially *inspiring professional vision* and *academic self-efficacy.* The model's inability to account for the variance in these latent variables is somewhat disappointing. The results of the latter can, however, in part be attributed to the fact that various other cognitive and non-cognitive learning potential competency variables and trainer competencies (that were included in the elaborated model) were excluded from the current structural model.

Table 4.90
R^2 values for the endogenous latent variables (Model D)

ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
.238	.759	.360	.317	.722	.263

4.8.10 Structural model modification indices

The close fit null hypothesis for the revised model (Model D) was not rejected whereas it was rejected for the original model (Model A) and the first two revisions of the model. The structural model parameter estimates obtained for third revision (Model D) of the originally proposed model were therefore interpreted. Although the close fit hypothesis was not rejected and the parameter estimates were interpreted, Model D should nonetheless still be viewed as overarching hypothesis on the psychological mechanism that shapes learning motivation that is to some degree shaped by feedback from the current data. The revised model, Model D, depicted in Figure 4.16 should therefore be confronted with new data from another sample from the same target population to corroborate the findings made with regards to Model D.

Although Model D fitted the data the question should still be considered whether the model should be revised further through the addition of further meaningful paths. In accordance with the suggestion by Jöreskog and Sörbom (1993) that parameters with the highest modification index values should be examined first, the highest modification index value was sought and found in the beta matrix. Table 4.91 provides the results of the modification indices calculated for the beta matrix.

Table 4.91
Modification indices for beta matrix (Model D)

	ACA SELF-EFFIC	LEARN MOTIV	MGO	MGS	CLIMATE	PROF VISION
ACA SELF-EFFIC		17.646	**38.597**	**44.195**	**31.730**	15.083
LEARN MOTIV				1.193		
MGO					.465	3.737
MGS	29.759	16.399	7.858			
CLIMATE	20.640	19.990	11.663	**58.593**		
PROF VISION	2.634	4.759	7.542		1.764	

Table 4.91 suggests the addition of a path from *mastery goal structure* to *learning climate*. After the first round of analysis of structural model, the modification indices suggested the inclusion of a path from learning climate to mastery goal structure. This path was included as the theoretical argument that a classroom 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 goal structure made theoretical sense. The inclusion of the path from *mastery 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 support, and interest and involvement. This bi-directional path suggests a feedback loop in which a classroom with a positive *learning climate* will positively influence *mastery goal structure* while a *mastery goal structure* will at the same time positively influence *learning climate.*

Although the above argument makes conceptual sense, a stronger theoretical argument exists for the path between *learning climate* to *mastery goal structure* than for the path between *mastery goal structure* and *learning climate*. Admittedly, this bidirectional path presents the typical dilemma involved with correlational research; the issue of cause and effect. It does seem more likely, however, that a learning climate characterised by teacher emotional and academic support, psychological safety and fairness, autonomy support, and interest and involvement will result in a mastery goal structure characterised by the view that learning is important for growth and development, than *vice versa*. That being said, it does seem plausible that once a mastery goal structure is in place, it will lead to increases in a learning climate and/or "demand" a learning climate in order to sustain the mastery goal structure. Given this argument, it was decided not to include the path between *mastery goal structure* and *learning climate.* It is suggested that future elaboration and replication studies determine whether this feedback loop result resurfaces as a persuasive argument.

After rejecting the suggestion of adding a path between *mastery goal structure* and *learning climate,* the parameter with the second largest modification index was considered for modification. The parameter with the second highest modification index value is also found in the beta matrix (refer to Table 4.91). The index suggests the inclusion of a path from *mastery goal structure* to *self-efficacy*. This suggests that a classroom characterised by the perception that learning is important for personal growth and development would positively influence the *belief that a person can successfully execute the actions needed to produce a desired academic outcome*. This appears to be a plausible path. It makes substantive sense that an environment where effort is important for improvement, where trying hard is very important, and where understanding the learning material is the main goal would result in higher academic self-efficacy. As discussed in Chapter 2, Bandura proposed that four sources are used in the development of self-efficacy: enactive mastery (personal attainments), vicarious experience (modelling), verbal persuasion, and physiological arousal (e.g. anxiety). An environment characterised by a mastery goal structure is likely to provide more instances of verbal persuasion and modelling that would likely persuade a student that they can successfully execute academic tasks. As such, it is likely to result in an enhanced belief that the student can successfully execute a task. The size of the modification index value and expected change in beta seems to support this view. Although a compelling argument, one becomes increasingly reluctant and hesitant to modify the model at this stage due to the fact that excessive model modification raises the concern that one is allowing statistical data to inform hypotheses rather than theory – for the sake of improving model fit. Furthermore, all the path specific substantive research hypotheses implicitly hypothesise a specific causal linkage between two latent variables when that relationship forms part of a specific structural model containing specific other structural relations. The inclusion of too many paths can significantly alter the larger structural model/hypothesis. The suggested path from *mastery goal structure* to *self-efficacy* was therefore not included in the structural model. Future studies should investigate the potential inclusion of this path in the trainer-instructor model.

Table 4.92
Modification indices for gamma matrix (Model D)

	ENHANCE ASE	FOSTER PSYCH	IND CONS	STIM INVOL	PROV INSP MOT	PROV AUT SUP	PROM MGS	MGO* MGS
ACA SELF-EFFIC		1.018	8.122	9.114	**32.342**	.018	19.162	10.124
LEARN MOTIV	.218	4.817	5.685	2.668	.295	6.136	.177	
MGO	1.080	4.258	6.273	3.022	1.701	.753	3.410	35.505
MGS	.002	15.269	9.270	1.317	.039	1.214		27.491
CLIMATE	9.369				.114		.871	1.691
PROF VISION	.856	.814	5.134	.116		.057	7.281	2.364

The next largest modification index value was found in the gamma matrix (refer to Table 4.92) and suggested the inclusion of the path from *providing inspirational motivation* to *academic self-efficacy*. *Providing inspirational motivation* is similar to the trainer-instructor competency e*nhancing student academic self-efficacy* as both involve expressing a positive belief in students and the provision of positive feedback. *Providing inspirational motivation* focused on the future potential of the students whereas *enhancing student academic self-efficacy* focuses on the tasks at hand. Due to this common positive feedback theme involved in both competencies it does make sense that *providing inspirational motivation* may have an positive influence on *academic self-efficacy.* Although a relationship between these constructs make sense, the future-oriented feedback is likely to have a "diluted" effect on the more immediate, task-focused academic self-efficacy. The completely standardised change value for the parameter (.492) does, however, suggest that the addition of the path could be justified. Future studies should investigate the theoretical foundation of this argument.

The next highest value found in the modification indices of the beta matrix suggests that a path should be included from *learning climate to academic self-efficacy.* This suggests that a classroom characterised by a respectful and caring trainer-instructor, by student interest and involvement, by autonomy support, and by psychological safety and fairness positively influences a student's belief that they can successfully execute the learning tasks to achieve the desired academic outcomes. The inclusion of this path makes sense to some extent, as a positive learning climate creates opportunities for increasing academic self-efficacy. The completely standardised change for this parameter (.337) is substantial enough to justify the addition of this path. Future studies should investigate the theoretical foundation of this argument.

Although several other parameters with large modification index values (>6.6349) were calculated for the beta and gamma matrices (Table 4.91 and 4.92), either no substantive theoretical argument could be found to support the addition of the paths or the completely standardised change did not to support the addition of the paths. Therefore no further paths were added to the revised structural model (Model D) at this stage of the analysis.

4.9 Summary

The purpose of this chapter was to report on the results obtained from this study. The following chapter discuss the general conclusions drawn from the research in greater detail. The practical implications of the study and limitations of the study are also discussed. Finally, recommendations for future research are presented.

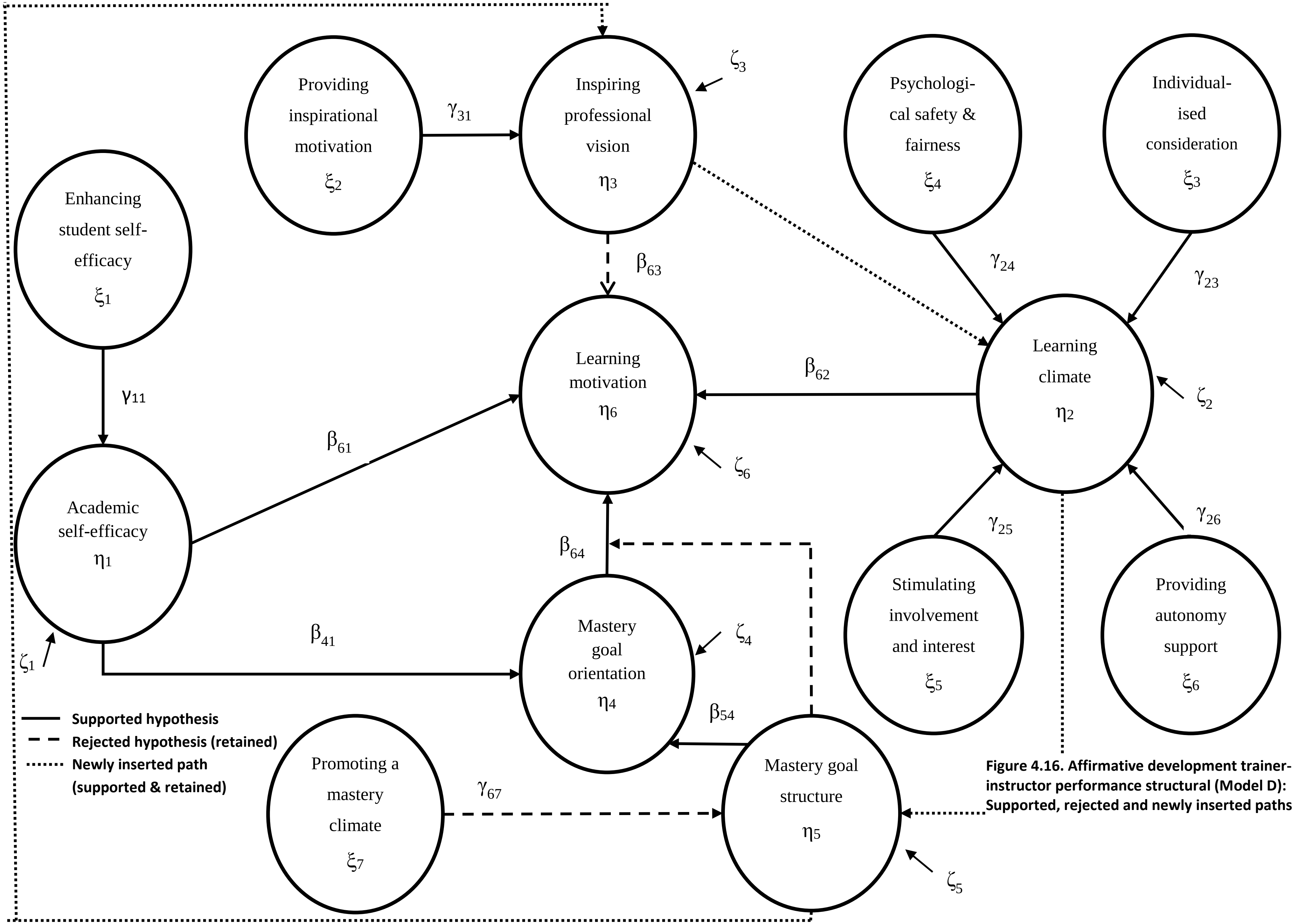

Figure 4.16. Affirmative development trainer-instructor performance structural (Model D): Supported, rejected and newly inserted paths

CHAPTER 5: CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 Introduction

South Africa is faced with severe social and economic problems. Chapter one discussed in detail the levels of unemployment and inequality the country is faced with. The nature and extent of these problems are much higher than they should be given the country's level of resources, and they contribute negatively to almost every index of comparison with other countries (NPC, 2011; Turok, 2008). The various social and economic problems South Africa is faced with, are not only the result of global economic trends, but are largely due the distortions in the economy and society that occurred under Apartheid. Under Apartheid, Black individuals were not allowed the same access to skills development and educational opportunities afforded to White South Africans. They were not given the opportunity to gain the skills, knowledge and abilities to enter the labour market and offer themselves to organisations as employable resources. This has resulted in situation where knowledge, skills and abilities are not uniformly distributed across all races.

Today, South Africa attempts to compete with other countries on the basis of an under-developed socio-economic infrastructure. The socio-economic problems caused by the country's under-developed human capital are having an increasing impact on organisations. It was argued earlier that one way in which South Africa can overcome the socio-economic challenges it is faced with, is through skills development, or more specifically, affirmative action skills development. Affirmative action skills development involves providing individuals from the designated groups with access to skills development and educational opportunities in order to equip them with the currently deficit skills, knowledge, and abilities.

It appears, however, that the private sector has have not been effective in adopting a useful approach to human capital development, nor a sound basis for engagement with the South African government on this matter. It was argued earlier that the private sector should not only address South Africa's issue of under-developed human capital to ensure long-term economic sustainability, but also address the issue because it the right thing to do from a moral perspective.

As an organisational function, Human Resource Management is considered to be the champion of human capital development. The Industrial Psychology fraternity was therefore called upon to assist organisations in identifying individuals who would gain maximum benefit from such affirmative action skills development opportunities. In response to this, various studies were conducted to address the factors that determine whether or not a student would be successful if entered into an affirmative action skills development programme (De Goede, 2007; Burger, 2013; Van Heerden, 2013). These learning potential competency models have made significant progress in determining the cognitive and non-cognitive factors required by students to benefit from such opportunities. The models have provided organisations with predictors to include in their selection process to identify high potential candidates that have high expected performance on the learning performance criterion.

The learning potential research can also add value to the growth and development of the selected high potential candidates. Once admitted into the learning opportunity, variance in learning performance can be explained in terms of malleable and non-malleable person characteristics as well as situational characteristics. The person characteristics include cognitive and non-cognitive factors required to perform well in affirmative development programmes. The challenge for the HR function is to design, develop and implement interventions aimed at optimising the malleable person characteristics and situational characteristics that affect the level of learning performance of those admitted to affirmative development programmes. This study specifically focused on the malleable person characteristics that previous learning potential research (De Goede, 2007; Burger, 2013; Van Heerden, 2013) have identified as factors that can be further developed during (or prior to) the training programme. More specifically, the role of the trainer-instructor in enhancing the malleable learning competency potential and situational latent variables that were shown to influence learning performance in previous learning potential structural models (De Goede, 2007; Burger, 2013; Van Heerden, 2013), or that was hypothesised to do so in the current study, were investigated. Various trainer-instructor competencies and situational variables were included in the model to determine how these malleable learning competency potential latent variables identified by earlier studies (De Goede, 2007; Burger, 2013; Van Heerden, 2013) as determinants of learning performance could be enhanced. Three student learning competency potential variables, two situational variables, and nine trainer-instructor competencies were added to the trainer-instructor competency model. Due to the size of the model, the model was reduced to allow for empirical testing. The results of the analysis are discussed below.

5.2 Results

5.2.1 Evaluation of the measurement model

The fit of the trainer-instructor competency measurement model was evaluated to determine to what extent the indicator variables successfully operationalise the latent variables contained in the model. The overall goodness-of-fit of the measurement model was tested through structural equation modelling (SEM). Various indices were interpreted to assess the goodness-of-fit of the measurement model and it was found that the measurement model fit the data well.

All the item parcels loaded statistically significantly on the latent variables they were designed to reflect. The values of the squared multiple correlations for the indicators were generally quite high, except for MGO2, Res_2 and Res_4 which possessed validities lower than .50. MGO2, Res_2 and Res_4 were again flagged as problematic indicators of their respective latent variables due to the fact that more variance was explained by measurement error than was explained by the latent variable these indicators were meant to reflect. In general, the basket of evidence supported the use of the proposed operationalisation of the latent variables to empirically test the trainer-instructor structural model. MGO2, Res_2 and Res_4 were the only three exceptions.

As the measurement model showed good fit and the indicator variables generally reflected their designated latent variables well, the structural relationships between latent variables hypothesised by the proposed model depicted in Figure 2.7 were tested via SEM.

5.2.2 Evaluation of structural model

Although the reduced trainer-instructor structural model initially showed reasonable fit the close fit hypothesis was nonetheless rejected. Modification to the model was therefore considered.

To improve model fit, the modification indices for the beta matrix were evaluated to determine whether additional paths should be added to the model. The matrix indicated that an additional path should be added between *learning climate* and *mastery goal structure* and the analysis was rerun. In other words, in a classroom where students experience emotional and academic support from their teacher, have higher levels of autonomy, have higher levels of interest and involvement, and experience mutual respect and trust are more likely to perceive an atmosphere where effort is important for improvement, where all students are valued, where trying hard is important, and where all students can be successful if they work hard. It does make substantive theoretical sense that a classroom that is more supportive and safe (i.e. conducive to learning) will result in the perception that effort and improvement is valued. This relationship made substantive sense and was therefore added to the structural model.

Furthermore, analysis of the gamma matrix indicated that the path representing the moderating effect of *mastery goal structure* on the relationship between *mastery goal orientation* and *learning motivation* was insignificant, therefore indicating that no support was found for the hypothesis that *mastery goal structure* moderated the strength of the relationship between *mastery goal orientation* and *learning motivation.* Given the sound theoretical argument underlying this hypothesis and the other insignificant path coefficients, it was decided not to remove this insignificant path from the model, or any of the other insignificant paths.

The comprehensive model was rerun after the addition of the path between *learning climate* and *mastery goal structure*. Once again, reasonable model fit was obtained but the close fit null hypothesis (RMSEA ≤ .05) still had to be rejected. Analyses of the gamma and beta matrix of the modified model indicated that no further paths needed to be removed. Still no support was found for the hypothesis that *mastery goal structure* moderated the strength of the relationship between *mastery goal orientation* and *learning motivation*.

The newly inserted path from *learning climate* to *mastery goal structure* was statistically significant. However, the gamma matrix indicated that the previously positive path between *promoting a mastery climate* and *mastery goal structure* has become negative with the inclusion of the path from *learning climate* to *mastery goal structure*. This should be interpreted in the light that this hypothesis is, in fact, not the original simple hypothesis that *promoting a mastery climate* explains variance in *mastery goal structure*. Rather, it is the hypothesis that the unique part of *promoting a mastery climate* explains unique variance in *mastery goal structure* that is not explained by *learning climate*. The plausible theoretical proffered for the negative partial regression coefficient describing the slope of the relationship between *promoting a mastery climate* and *mastery goal structure* in the structural equation also containing *learning climate* was that instructor behaviour that (over)emphasises the need/importance of behaviour that has already been accepted/embraced by the class under the influence of the *learning climate* in the class may evoke resistance and rebellion against the mastery goal orientation ideal.

The modification indices suggested the addition of a path between *inspiring professional vision* and *learning climate.* This relationship made substantive sense as an individual who has a positive professional vision will be more likely to contribute, be open to, and experience a learning climate as they would be motivated to learn.

After adding the additional path between *inspiring professional vision* and *learning climate,* the comprehensive model was subsequently re-run and the output analysed. In the analysis of the model after the second modification, the beta matrix indicated that the newly inserted path from *inspiring professional vision* to *learning climate* was statistically significant. The matrix also indicated that the path between *inspiring professional vision* to *learning motivation* was insignificant. Given the sound theoretical argument underlying the hypothesis, it was decided to retain the path in the model. Examination of the modification indices of the beta matrix suggested the inclusion of a path between *mastery goal structure* and *inspiring professional vision.* This suggests that an individual who experiences the classroom as having a mastery goal structure will be more likely to hold an inspiring professional vision due to the value they see in learning for the sake of growth and development.

With the addition of the path from *mastery goal structure* to *inspiring professional vision* the comprehensive model was fitted again. The results after the third modification indicated that all paths, except the interaction effect and the path between *inspiring professional vision and learning motivation*, were significant. Both insignificant paths were retained in the model due to the sound substantive arguments underlying these structural paths. After an examination of the modification indices, the decision was made to not add any additional paths to the structural model. A full analysis of this final trainer-instructor structural model was therefore undertaken.

Evaluation of the overall goodness of fit statistics indicated that the revised comprehensive model fits the data well and the standardised residuals suggested that acceptable fit was achieved. Overall, it was concluded that good model fit was achieved. Therefore, although the initial model showed only reasonable fit, good model fit was obtained through three modifications as suggested by the modification indices. A discussion of all the hypothesised relationships and additional included paths follow.

Academic self-efficacy was found to positively influence *learning motivation.* A strong belief in one’s academic capabilities increases the desire to learn the learning material. Support for this relationship was found by the learning potential research conducted by Burger (2012) and Van Heerden (2013). It is also in line with various other studies finding support for the positive effect on self-efficacy on academic performance and motivation (Bandura 1995, 1997; Deci & Ryan, 1985; Pajares, 1996; Bandura & Locke, 2003; Hammond & Feinstin, 2005). Bandura (1995, 1997), Deci and Ryan (1985), and Wigfield and Eccles, (2002), suggest that self-perceptions of competence can affect motivation in an activity.

Mastery goal orientation was found to positively influence *learning motivation.* This suggests that students that focus on task learning, improving skills, and competence development will be have a higher desire to learn the learning material. This is likely due to the fact that these students believe (1) intelligence and performance can be improved by increased effort; (2) setbacks and failures are challenges to be mastered through effort; and (3) performance is assessed according to the extent they have mastered new skills or tasks. According to Meece and colleagues (1988) mastery goals allow a sense of accomplishment to be derived from the inherent qualities of the task which are likely to motivate students. In her learning potential study, Van Heerden (2013) also found support for the path between *learning goal orientation* and *learning motivation*.

Academic self-efficacy was found to positively influence *mastery goal orientation.* Although Van Heerden (2013) made a compelling theoretical argument for this relationship in her study, she found no support for it. It is, consequently, rather encouraging that empirical support for the hypothesis was found in the current study. Support for the hypothesis indicates that a strong belief in one's academic capabilities increases an individual's orientation to develop competence by acquiring new skills and mastering novel situations. According to Schunk (1990), students with higher *self-efficacy* tend to participate more readily, work harder, pursue challenging goals and spend much effort toward fulfilling identified goals. Numerous studies have found a positive relationship (Greene & Miller,1996; Greene, Miller, Crowson, Duke and Akey, 2004; Kozlowski et al., 2001; Rastegar et al. 2010; Schmidt & Ford, 2003) and a causal relationship (Ames & Archer, 1988; Phan, 2010; Sedaghat et al., 2011) between *self-efficacy* and *mastery goal orientation.*

Learning climate was found to positively influence *learning motivation*. This is encouraging as the multi-dimensional learning climate construct was specifically developed based on the innate psychological needs as identified in self-determination theory and Maslow's hierachy of needs. Various researchers have found that students' perceptions of the classroom social environment are associated consistently with adaptive motivational beliefs and achievement behaviours (e.g., Ryan & Patrick, 2001; Goh, Young, & Fraser, 1995). Positive classrooms climates make students feel comfortable, promote self-efficacy and adaptive engagement patterns, fostering feelings of belonginess, and increase student motivation, enjoyment, interest and performance (Curby et al., 2009; Woolley, Kol, & Bowen, 2009; Newberry & Davis, 2008; Davis, 2003; Patrick, Turner, Meyer, & Midgley, 2003; Marks, 2000).

Although not initially hypothesised during theorising, examination of the modification indices after an initial analysis of the model indicated a relationship between *learning climate* and *mastery goal structure*. In other words, a climate characterised by teacher emotional and academic support, psychological safety and fairness, autonomy support, and interest and involvement will contribute to a goal structure characterised by the view that learning is important for growth and development. This made conceptual sense as it suggests that positive social climate dimensions are likely to positively impact the perception that learning is important for growth and personal development. In essence, this finding seems to suggest that in order for students to believe learning is important, all students are valued, trying hard is important, and all students can be successful if they work hard, students should perceive their environment as one in which they are (1) emotionally and academically supported by their trainer-instructor, (2) supported to be autonomous, (3) interested and involved, and (4) that it is psychologically safe to express themselves in the classroom. This finding is in accordance with Maslow's hierarchy of needs where lower order needs (e.g. safety, belonging and esteem needs as encapsulated in *learning climate*), need to be fulfilled before higher order needs (e.g. self-esteem and self-actualisation as encapsulated in *mastery goal structure*) can be strongly desired.

No support was gained for the hypothesis that *inspiring professional vision* directly positively influences *learning motivation.* This was somewhat surprising due to the sound theoretical argument presented to support this relationship. It was firstly argued that both cognitive and expectancy theory present motivational mechanism through which the trainer instructor can effect student motivation. More specifically, by focussing on the attainment value of learning to students the trainer-instructor can affect the relevance of learning and learning activities to an individual's actual or ideal self-concept. Students would engage in these activities and develop competencies that are consistent with their real and desired concept of themselves.

Secondly, it was argued that humanstic (e.g. Maslow's hierachy of needs) seems to imply that the instructor can stimulate the student's need for self-actualisation. The need for self-actualisation speaks directly to the developmental tasks faced by adults in their early and midcareer and life stages. Adult students' need for competence, their need to develop an occupational identity, their need to become self-reliant and autonomous, and their need to fulfil their goals and aspirations can all be linked to the need for self-actualisation. Given the need for self-actualisation and the salience of establishing a career to the fulfilment of the developmental tasks, instructors should be able to stimulate this need by creating a professional vision for their students.

Lastly, organisational and leadership theories was utilised to motivate this substantive path as it is the strategic function of the leader to enhance the psychological state of followers which then results in motivation to perform (House & Dessler, 1974). House (1977) stated that leaders stimulate change by articulating a clear vision and creating a strong bond with followers that lead to the acceptance of the vision. Leaders are also adept raising follower self-esteem, collective identity, and the intrinsic value of work (Shamir et al., 1993).

Given the sound theory underlying this hypothesis, it was decided to retain the path in the model. Successful trainer-instructors establish a clear vision of what they want to accomplish, what they want their students to accomplish, and what their students can accomplish. The trainer-instructor should create a professional vision for their students to increase their learning motivation. Future studies should re-test this hypothesis to obtain more definitive evidence whether the hypothesis should be rejected or not.

Although not initially hypothesised, a path between *inspiring professional vision* and *learning climate* was included as suggested by modification indices. Support was found for the newly inserted path. This relationship suggests that a *positive professional vision* is likely to enhance students' perceptions of a positive learning climate. If students think and feel that they will become competent and contributing employees in society, they will be more likely to perceive the environment as one that is safe and supportive for learning. This positive vision may lead to attitude which results in students being more receptive to support and interaction, thereby creating the perception that the learning climate is safe and supportive.

The inclusion of the path from *inspiring professional vision* to *learning climate* also suggests that *inspiring professional vision* has an indirect effect on *leaning motivation* via *learning climate* rather than a direct effect. This indirect relationship ultimately suggests that students' positive professional vision of their future will only increase their learning motivation via a positive learning climate. As discussed in Chapter 3, a positive professional vision will increase the utility value of learning task as students will be able to see the usefulness of learning activities to achieve goals that is not immediately related to the task itself - provided that they can pursue the vision in a positive learning climate.

Mastery goal structure was found to positively influence *mastery goal orientation.* This suggests that a classroom characterised by mastery goal orientation instructional practices are likely to positively influence individual goal orientations. Thus, students who viewed the instructional practices in their classroom as more mastery structured, tended to report a greater mastery orientation. This is in line with previous research that supports the hypothesis that climate has a shaping effect on goal-orientation (Cury et al., 1996; Gano-Overway &Ewing, 2004; Wolters, 2004; Murayama & Elliot, 2009).

No support was gained for the moderating effect of *mastery goal structure* on the relationship between *mastery goal orientation* and *learning motivation*. If support was obtained for this hypothesis, it would suggests that when students with mastery goal orientations are placed in a classroom with a mastery goal structure, the desirable relation between personal mastery goal orientation and learning motivation would be strengthened. These students will regard the classroom environment as reinforcing and satisfying as the features of the classroom resemble their own personal goal preference. Although this remains a compelling argument, neither this study, nor Lau and Nie (2008), nor Linnenbrink (2005) found support for this hypothesis.

The results seem to favour a mediated model in which the relationship between *mastery goal structure* and *learning motivation* is mediated by *mastery goal orientation*. This hypothesis is supported by previous research. Murayama and Elliot (2009) and Halvari and colleagues (2011) found support for the mediating effect of goal orientation on classroom goal structure and achievement-outcomes. *Mastery classroom goal structure* thus impacts positively on the students' level of personal mastery goal orientation, which, in turn, contributes to higher levels of learning motivation. Personal goal orientation thus appears to be the mechanism through which *classroom goal structure* influences *learning motivation.*

Although not initially hypothesised during theorising, examination of the modification indices after an initial analysis of the model indicated a relationship between *mastery goal structure* and *inspiring professional vision.* In other words, if the class places value on learning for the sake of growth and development, students will have more positive views on the importance of learning to their careers and to society. They will have stronger beliefs about wanting to be or being competent employees contributing to society. According to Patrick and colleagues (2007), students' perceptions of the learning environment influence their beliefs about themselves and their work which, in turn, influence the nature and extent of their engagement in learning tasks.

All the trainer-instructor competencies were found to influence the situational or student competency potential latent variables they were meant to influence. This is a gratifying but also a vital and noteworthy finding. It provides support for the fundamental position underpinning the current study that the trainer-instructor is a critical factor indirectly determining the success learners achieve in affirmative development programmes. More specifically, *enhancing student self-efficacy* was found to positively influence *academic self-efficacy.* By demonstrating various feedback, modelling, goal-setting, and reward instructional strategies the trainer-instructor increases students' belief that they can successfully execute the actions needed to produce a desired academic outcome. Instructors can design instructional presentations and interactions that capitalise on the influence of sources students use to judge their capability to complete future tasks (Margolis & McCabe, 2006; Schunk, 1989a). This finding is in line with the multitude of studies that have found that modifying instructional techniques increases self-efficacy (Meece et al., 1988; Wood & Locke, 1987; Schunk & Hanson, 1985; Bandura & Schunk, 1981; Dweck, 1975).

The trainer-instructor competency, *providing inspirational motivation,* was found to positively influence *inspiring professional vision.* This suggests trainer-instructors positively impact on the professional vision that students have of their future by voicing an idealised picture of students' future as professionals; by communicating positive and encouraging messages about their future, and expressing statements that build motivation and confidence. By creating a sense of purpose, the higher-order needs of affirmative development trainees can be activated. Powerful visions indicate a long-term perspective which offer a view of a clearly better future (Kantabutra & Avery, 2010). According to Parikh and Neubauer (1993) this creates a spark of excitement and nurtures a more pleasant working environment. This is in line in line with the findings of this study which suggests that *providing inspirational motivation* has a positive impact on *learning climate* mediated by *inspiring professional vision.*

As the leader in the classroom, the trainer-instructor is continuously observed by and interacting with trainees. As discussed earlier, the behaviours and practices leaders engage in transmit signals to followers about what is expected and valued (Guzzo & Noonan, 1994). Repeated and consistent engagement in these practices over time (i.e. a pattern of behaviour) direct followers' attention to the leaders preferred expectations, resulting in the formation of individual climate perceptions that reflect these expectations. Additionally, leaders continuously interact with followers to shape their psychological climate. Two climate variables were included in this study: *learning climate* and *mastery goal structure*. Four trainer-instructor competencies had an effect on *learning climate* and one trainer-instructor competency had an effect on *mastery goal structure*.

Fostering psychological safety and fairness was found to positively influence *learning climate.* In other words, when trainer-instructors display behaviours that promote mutual respect, foster feelings of safety and security, and demonstrate a sense of fairness and justice it impacts positively on the *learning climate*. Psychological safety should be enhanced when trainer-instructors regularly display a personal interest and listen carefully as they signal to their learners that there is low personal risk in honest communication (Bass & Riggio, 2006; Edmondson, 2003). Edmondson (2004) found that psychological safety facilitates learning behaviours such as speaking up about mistakes and testing work assumptions. This is due to the fact that a psychologically safe climate allows individuals to voice their mistakes and to believe that they will be regarded as people who have (through such behaviour) contributed to the improvement of a system.

Individualised consideration was found to positively influence *learning climate.* When trainer-instructors show care for students' concerns and developmental needs it impacts positively on *learning climate*. When classrooms meet students' need for relatedness, students will be more engaged (VanDeWeghe, 2006). This is likely to occur in classrooms where teachers (and peers) create a caring and supportive environment. Individual consideration thus creates a sense of belonging which stems from positive teacher-student relationships. Caring behaviour displayed by the instructor is likely to result in perceptions of teacher support - a crucial dimension of a *learning climate*.

Providing autonomy support was found to positively influence *learning climate.* That is, by demonstrating instructional behaviour that nurtures students' inner motivational resources by providing students with organisational, procedural and cognitive latitude the trainer-instructor positively contributes to a *learning climate*. This will create a climate of autonomy which encourages students to develop self-reliance and independent thinking. Students will be able to choose alternative ways to approach tasks; they will experience more ownership for learning, and have a more direct impact on their own learning outcomes, stimulating their willingness to take responsibility. According to Reeve et al. (2002) autonomy supportive behaviours create situations for students where they find content relevant to their interest and report more interest and enjoyment for the activity.

Stimulating involvement and interest was found to positively influence *learning climate.* Through the display of behaviour that inspires excitement or interest in the learning material and get students involved in class and learning activities, the trainer-instructor can positively impact the *learning climate.* According to social systems theory, a group leader controls the interaction among group members or between group members and the surrounding environment (Morrison, 1979). The trainer-instructor thus increases student motivation by cultivating a feeling of interest and curiosity. The atmosphere of interest and curiosity then results in increased partipation in learning activities.

Contrary to the initial positive relationship hypothesis, p*romoting a mastery climate* was found to have a negative influence on *mastery goal structure.* The positive effect became negative with the inclusion of the path from *learning climate* to *mastery goal structure.* The key to the understanding of the negative relationship between *promoting a mastery climate* and *mastery goal structure* lies in conceptualising the unique variance left in *promoting a mastery climate* and *mastery goal structure* when the effect of *learning climate* has been controlled for in *promoting a mastery climate* and *mastery goal structure*. A learning climate provides informational cues as to what behaviour will be more likely be appreciated and rewarded in the classroom. Dragoni's (2005) found that students tend to align their state goal orientation with the achievement focus inherent in the classroom climate in order to maintain harmony with their environment. Students therefore will align their state goal orientation with the classroom goal structure in order to achieve and maintain homeostatic balance with their environment. However, instructor behaviour that (over)emphasises the importance of mastery goal behaviour that has already been accepted by the class under the influence of the *learning climate* in the class may evoke resistance against the ideal.

5.3 Practical implications

Previous research focused on the identification of competency potential variables that determine learning potential of affirmative action candidates. This study represents a promising first step towards determining how some of the malleable identified competency potential latent variables in the learning potential model can be developed/influenced through the actions of the trainer-instructor to capitalise on identified potential. The research focused solely on malleable learning competency potential latent variables and malleable situational latent variables that are subject to the influence of a trainer-instructor. The fundamental premise is that these variables can be manipulated and enhanced through the actions of the training-instructor to increase student learning performance. Burger (2012) discussed various means and methods through which the trainer-instructor can enhance student learning potential. More specifically, she discussed how students' *motivation, academic self-efficacy* and *time cognitively engaged* could be enhanced by the trainer-instructor. This study provides empirical evidence supporting the use of various trainer-competencies to enhance student *learning motivation, academic self-efficacy, mastery goal orientation* and the newly included student competency potential variable, *inspiring professional vision.*

It was argued earlier, given the fact that the trainer-instructor is usually considered as the most important single experience in any learning process, that it is possible that at least some portion of the high drop-out rates of participants, at least some portion of the poor performance of training participants, and at least some portion of the complaints of poor quality affirmative development training is due to incompetent and poor performing trainers. It is not the direct objective of the current study to describe the extent to which affirmative development programmes and learnership programmes fail to achieve their objectives. Neither is it the direct objective of the current study to diagnose the causes of the failure of affirmative development programmes and learnership programmes to achieve their objectives. The concern nonetheless exists (stated differently, the diagnostic hypothesis is put forward) that the goal of affirmative development programmes to empower employees with the job competency potential and job competencies required to produce the outputs for which a specific job exists, is often not achieved due to the a lack of competence of the trainer-instructor on key competencies. This does not, however, deny the fact that affirmative development programmes can fail to empower employees with the job competency potential and job competencies required to produce the outputs for which a specific job exists due to problems related to the content of the training curriculum and/or the selection of applicants into the training programme.

If training providers and organisations conducting in-house training programmes want to achieve the highest return on investment for their training, the results generated in this study can be used in a number of ways.

Firstly, organisations can use the identified competencies in the recruitment and selection process of trainer-instructors. For example, recruitment or job advertisements for many organisations now include competencies (Rodrigues, Patel, Bright, Gregory, & Gowing, 2002). The advertisements could ask applicants to specifically assess their own suitability by evaluating themselves in terms of the competencies or by answering a number of specific competency-based questions. Furthermore, the competencies can be applied in the selection process through a variety of candidate assessment techniques. The identified trainer-instructor competencies can be utilised as the predictor constructs that are assessed in structured competency-based interviews, work sample assessments, competency-based reference checks, and competency-based simulations.

Secondly, the trainer-instructor competency model can form the foundation of training and development activities. These competencies provide the basis of any training and development trainer-instructors may require. As these competencies are critical to the job success of trainer-instructors and the learning performance of students, specific courses and modules can be created to address and further enhance performance on these competencies. Training trainer-instructors on the identified competencies can play a pivotal role in the job success of trainer-instructors and, consequently, their students. Furthermore, transfer of training evaluations (e.g. 360 surveys) can be based on the competency model.

Thirdly, and linking to the previous suggestion, the evaluation of the performance of trainer-instructor can be based on the competency model by structuring the appraisal instrument around the identified competencies (Posthuma & Campion, 2008). By basing the performance management process on these competencies, trainer-instructors will not only be able to receive feedback on “what” they have accomplished (i.e., performance goals), but also on “how” the work was performed. By assessing competencies as a part of performance management, trainer-instructors can be assisted in understanding performance expectations and enhancing competencies. By obtaining multi-source feedback (e.g. peer, self, superior, and student feedback), but especially student feedback, trainer-instructors can obtain valuable feedback on how have they performed their work, and to what extent this is impacting student learning performance. Student evaluation of trainer-instructor performance can easily be obtained by including the competency evaluations, and the corresponding student competency potential latent variables it effects, into the mid-term and final module evaluations.

Lastly, trainer-instructors should create and structure content, activities and situations specifically with the aim of enhancing the more malleable student competency potential latent variables that are subject to their influence. For example, by creating activities that can develop and support student autonomy, trainer-instructors can display the necessary behaviours to create an environment that supports student autonomy. Similarly, by creating exercises, for example, that require students to visualise or "act" in their role as future employees, trainer-instructors can display the behaviours required to create a positive, inspiring professional vision. As such, lessons, modules, activities, and content could be carefully developed to address the student competency potential variables and student competencies required to perform successfully in training (and, ultimately, on the job)

Once developed, competency models can be applied to facilitate the accomplishment of organisational objectives (Rodrigues et al., 2002). In this case, the trainer-instructor competency model can be utilised to achieve the organisation's EE objectives and to contribute to the development of South Africa's currently under-developed human capital. It was argued in Chapter one that the essence of classroom learning is to transfer the knowledge and skills acquired during training and development intervention to novel problems the affirmative development employee will be confronted with on the job. This implies action-learning takes place the workplace. Affirmative development programmes are likely to transpire via a longer term education/training programme followed by the employee's introduction into the workplace. Alternatively, the programme could be conducted in the format of a modular programme where "blocks" of training are alternated with "blocks" of work. Either way, the purpose of the programme is apply the learnings gained in class to the work place. In the case of a modular programme format, it is likely that the requirement will be to apply the classroom learnings in the workplace in the form of a project or task. In both cases, the workplace essentially substitutes the classroom as learning environment and the line manager substitutes the trainer-instructor as teacher. This seems to suggest that the line manager plays an integral role in action learning of the student. As such, the line manager has a crucial role to play in supporting the learning of the student. By displaying the same competencies as the trainer-instructor in the classroom, the line manager can positively impact student *learning motivation, self-efficacy, mastery goal orientation, inspiring professional vision,* and, ultimately, learning performance (and/or job performance).

5.4 Limitations

Various limitations or shortcomings in the research methodology have already been discussed throughout the study. Nevertheless, some of the important limitations are highlighted again.

An *ex post facto* research design was utilised to test the hypotheses. According to Kerlinger and Lee (2000), *ex post facto* research designs preclude the experimental manipulation of the relevant latent exogenous and endogenous variables. As such, one cannot say with certainty that obtaining good model fit and support for path-specific hypotheses imply causality. Good model fit and significant path coefficients constitute insufficient evidence to conclude that the path-specific causal hypotheses derived via the literature study have been confirmed.

Scientific research essentially is the process where a scientific hypothesis is created based on a sound theoretical argument and whose validity needs to be supported by empirical confirmation. Thus, a hypothesis should, ideally, be based on theorising and then supported by the data and not based on the data and then supported by theory. The final empirically test model, Model D, contained three paths (see Figure 4.16) that were not initially included in the model. Although the results strongly suggested the inclusion of these paths and convincing logical arguments were proffered in support of these hypotheses, future studies should determine whether these (and the other) hypotheses included in the model are replicable and sound.

The trainer-instructor structural model was tested on a non-probability, convenience sample of tertiary education students from a non-probability sample of one Further Education and Training institute under the Department of Higher Education and Training. Due to the fact that a non-probability sampling procedure was utilised to select the sample, it cannot be claimed that the sample is representative of the target population. It must be mentioned, however, that previous learning potential studies were limited by the fact that the selected samples did not mainly consist of participants from the designated group. Ninety-eight percent of the sample selected for this study consisted of affirmative development candidates.

Lastly, as mentioned in chapter four, some of the measurement instruments utilised in the study were (in retrospect) flawed. Many of the scales that were employed could be described as unbalanced and unequal-interval scales. Using these types of scales can lead to distorted results which may bias the research. The use of these scales may thus have had a negative impact on the scales' effectiveness in discriminating among individuals of varying ability. The majority of the scales (as displayed by the IRT scale information functions) were effective in discriminating between individuals two standard deviations below the mean and the mean on the latent trait. Ideally, for the purpose of this research, the scales should be able to discriminate among individuals of varying ability along the full extent of latent trait (i.e. between high scorers, average scores, and low scores).

5.5 Recommendations for future research

The nomological network of variables that explain trainer-instructor performance and student learning potential consists of a multitude of causally related variables. The literature study identified numerous latent variables that could be added to the structural model and that may determine the job performance of trainer-instructors. Despite identifying a large number of variables contained in this nomological network, only a reduced form of the model could be tested due to logistical, resource, and sample constraints.

Before identifying additional variables that could be added to the trainer-instructor structural model, the newly inserted paths (i.e. paths that were not specifically put forward in chapter 2, but inserted as indicated by the modification indices) could be tested. As these were not hypothesised upfront, it is critical to, firstly, elaborate on the theoretical argument proposed to substantiate the inclusion of the paths. Secondly, it is critical to replicate the findings to gain more definitive support for the hypotheses. Furthermore, there were two hypotheses that did not gain support in this study despite the sound theoretical argument supporting their inclusion. As such, future studies should include these hypotheses to obtain more definitive evidence to support their inclusion or exclusion in the trainer instructor performance competency model. Replication of result is a basic requirement for scientific integrity as its builds confidence that the finding is probable (or holds "true") under different circumstances.

Lastly, those wishing to elaborate on the current model could also consider testing the variables that have been identified in the current study, but could not be empirically tested. A brief overview is provided of the variables identified, but not tested in this study:

5.5.1 Accurate role perception

According to Shuell (1986) learning is an active, constructive, cumulative and goal oriented process. The active component refers to the fact that the student is required to do certain things while processing incoming information in order to learn the material in a meaningful manner. In order for students to take an active role in the teaching-learning situation, they need to have a accurate perception of their role in the learning process.

Expectancy theory views performance as a function of motivation (valence, instrumentality, and expectancy), ability, and role perceptions (Porter & Lawler, 1968). They defined 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" (p. 24). According to Porter and Lawler, the evaluation of these behaviours by the supervisor, however, is dependent upon the supervisor's role perceptions for the job. This implies that it is the accuracy of role perceptions rather than the individual's role perceptions per se that is of the greatest importance. Role perceptions thus appear to moderate the effect of ability on performance. Given the salience of role perception in determining performance, it is likely that the student's perception of their role in the learning process will have a marked influence on their learning performance in the classroom and during evaluation.

Accurate role perception was defined as *having clear and accurate beliefs of the activities, behaviours and responsibilities required by them in the learning process to learn successfully.* Various hypotheses were made with regard to this variable. Please refer to section 2.6.4 for a detailed discussion.

5.5.2 Clarifying learning conceptions and requirements

The concern exists that students conceptualise learning as the accumulation and memorisation of facts and procedures and that they expect to receive at least some of this knowledge from their teachers. Once obtained, it will be stored in memory, but only after it has been provided to them. Biggs (1999) found that students' conceptions of learning affect their approaches to learning which, in turn, affect their learning outcomes (Trigwell & Prosser, 1996). According to Devlin (2002) instructors need to change the way some students learn, and not to regard it as an impediment to teaching them. Targetting student conceptions of learning presents a valuable means to assist such change.

Students thus need to possess an accurate qualitative definition of learning, one which requires them to actively engage with the learning material in such a manner that their knowledge and skills can be applied to novel learning problems. Not only is an accurate perception of learning important; of equal importance is an accurate perception of their role in the learning process. Students' interpretation/understanding of learning will, consequently, affect the manner in which they approach their learning material.

As such, the trainer-instructor competency variable, *clarifying learning conceptions and requirements,* was created to include behaviours that can address student's misconceptions of their role in the learning process. This competency was defined as *behaviours promoting accurate conceptions of learning, accurate role perceptions, and clarity with regard to objectives, assignments, and requirements.* Please refer to section 2.7.8 for a detailed discussion of this competency.

5.5.3 Structure in the learning material

Learning involves an active process of creating meaningful structure. Learning essentially involves students having a deep understanding of the learning material (Zirbel, 2006). Although teaching ultimately aims to facilitate student learning, students are required to create their own structure of the learning material constituting a whole and its constituent parts.

The role of the trainer-instructors is to facilitate student learning. Trainer-instructors should facilitate transfer by presenting the learning material in a format that makes it easier to find meaningful structure in the material. The manner in which the material is presented and articulated by the trainer-instructor either facilitates or inhibits learning. The student should experience the feeling that something makes sense. The student should be able to combine information with existing knowledge structure; that is, they should be able to make sense of the learning material and be able to make meaningful associations. Even though the trainer-instructor cannot be held responsible for what happens in the minds of their students, they are responsible for effectively facilitating the process of learning.

The student learning potential competency variable, *structure in the learning material,* was thus added to the model. The variable was constitutively defined as *a meaningful structure within which the constituent parts of the learning material are presented as a meaningful integrated whole.*

5.5.4 Facilitating clarity and understanding

Chesebro (2003) stated that the ability to teach clearly so that students can understand course material is fundamental to teaching. In order to facilitate student learning, the instructor has to create a meaningful structure within which the learning material can be understood by the student. Rosenshine and Furst (1971) found that instructional clarity is the most effective variable for increasing student achievement.

To enhance the student competency latent variable, *structure in the learning material*, the trainer-instructor competency variable, f*acilitating clarity and understanding,* was included. *Facilitating clarity and understanding* was defined as *instructional behaviour that makes lectures easy to outline, cases being well organised, and learning material being explained clearly.*

Various other variables not included in the proposed trainer-instructor structural model were uncovered in the literature review process. Due to the size and complexity of the trainer-instructor performance nomological network, however, it is virtually impossible for one researcher to gain a complete and accurate understanding of this nomological network. In order to discover the comprehensive trainer-instructor nomological network, a multipronged approach involving various researchers and research studies is required. The research problem should ideally be viewed from various vantage points and stakeholders should discover, develop, and empirically test a trainer-instructor performance model that closely approximates reality. Collaborated effort and a shared investment of resources from various researchers who build upon each other's research results are required. The following variables and/or adaptations should be considered for inclusion in future research:

5.5.5 The inclusion of mastery goal structure as a dimension of learning climate

A climate is defined a "set of perceptions that reflect how work environments… are cognitively appraised and represented in terms of their meaning to and significance for individuals' (James et al., 1988, p. 129). Both *mastery goal structure* and *learning climate* qualify as climate variables. *Mastery goal structure* is often used synonymously with *mastery goal climate* in the literature.

In this study, the dimensions of *learning climate* were carefully selected by assessing various conceptualisations of the construct, extracting the most common dimensions used in the literature, and linking these identified dimensions to prominent motivational theories. The decision to separate *mastery goal structure*/*climate* from *learning climate* was one based on popular practice. Some studies have, however, included *goal structure* as a dimension of *learning climate* (e.g. Miller & Murdoch, 2007).

Although this study included a path from learning climate to mastery goal structure (and supported this relationship with a sound theoretical argument), it may prove useful to investigate the inclusion of mastery goal structure into learning climate in future studies. This would not only simplify an already complex model, but also serve to integrate the concept of (learning) climate into one variable. It is thereby, however, not denied that learning climate is a multidimensional construct, that the structural relations exist between these dimensions, and that it would be valuable to examine the learning climate construct and the internal structural relations existing between its latent dimensions at a more detailed level. When considering the larger trainer-instructor nomological network and how *learning climate* structurally integrates with the nomological network of learner competency potential latent variables and learner competencies it appears to make conceptual sense to consolidate mastery goal structure and learning climate into a single (multidimensional) latent variable.

5.5.6 Performance-mastery goal structure

Mastery goal orientation is the only goal orientation that has been consistently related to adaptive patterns of behaviour (Alkharusi, 2010). However, the achievement goal research has often neglected to investigate how performance and mastery goals can combine to influence student outcomes (Alkharusi, 2010). Many studies have found either no correlation or a weak correlation between mastery and performance goals (Midgley et al., 1998), suggesting that students may at times hold mastery and performance goals simultaneously and to varying degrees. As a consequence, some theorists have suggested the multiple goal perspective postulating that holding both mastery and performance goals are most adaptive (Barron & Harackiewicz, 2001). The results of Linnenbrink's (2005) research suggest that a mastery-performance-approach goal structure is most beneficial.

As such, it may be beneficial to investigate the possibility of including the effects of both the mastery goal and the performance-approach orientation and as well as the effects of the mastery goal and performance-approach classroom structure. Although the dynamics underlying the mastery-performance goal structure is yet to be uncovered, it may prove useful to investigate its effects on student learning performance. A classroom that signals to students the importance of demonstrating high ability and doing better than others as well as emphasising learning for the sake of personal growth and development may yield the most predictive results.

5.5.7 Polynomial Regression

This study incorporated two hypotheses related to the interaction between *mastery goal orientation* and *classroom mastery goal structure*. Support was found for the hypothesis that *mastery goal orientation* mediated the relationship between *mastery goal structure* and *learning orientation*. No support was found for the hypothesis that *mastery goal structure* moderated the strength of the relationship between *mastery goal orientation* and *learning motivation*. This result was disappointing given the sound theoretical argument that supported this hypothesis.

The orthogonalised product terms method (i.e., the residuals) proposed by Little and colleagues (2006) was used to test this moderating effect. This method involved creating orthogonalised indicators for a latent interaction construct by forming each possible product term from the set of indicators for the two latent variables (mastery goal structure and mastery goal orientation) involved in the interaction effect. The resultant uncensored product terms were then individually regressed onto the first-order effect indicators of the constructs. The residuals obtained for the regression models were saved and used as indicators of the interaction construct.

As discussed earlier in Chapter 2, Lau and Nie (2008) postulated a match and mismatch hypothesis with regard to goal orientation and classroom goal structure. They further differentiated between the two possible effects of a matching hypothesis: a reinforcing interaction and an exacerbating interaction. The former refers to instance where classroom goal structures strengthen a desirable relation at the individual level and the latter refers to a reinforcing interaction in which the classroom goal structures strengthen an undesirable relation at the individual level.

It was also mentioned earlier that a mismatch hypothesis is not simply the reverse of the proposed match hypothesis and the different mismatches between goal structures and personal goals have different implications (Murayama & Elliot, 2009). Once again, the mismatch hypothesis can be further differentiated into three possible effects: a vitiation effect, mitigation effect, and exacerbation effect. The first refers to an effect in which the beneficial influence of personal goals is reduced and the second refers an effect in which the adverse influence of personal goals is reduced (Murayama & Elliot, 2009). The third refers to an effect in which the adverse influence of personal goals is increased.

The above thus ultimately refers to person environment (P-E) fit. Person–environment fit is defined as the compatibility that occurs when individual and work environment characteristics are well matched (Kristof-Brown, Zimmerman, & Johnson, 2005). According to Muchinsky and Monahan (1987) there are two traditions of research with regard to person-organisation (P-O) fit. The first, complimentary fit, refers to an occasion when the person's strengths provides what the organisation needs, or vice versa. The second, supplementary fit, focuses on when a person and an organisation possess characteristics which are similar or matching. Research on supplementary fit is generally concerned with the measurement of the similarity between fundamental characteristics of people and organisations. This refers either to a situation of congruence or incongruence. In retrospect, a more fruitful manner to investigate the interaction between goal orientation and classroom goal structure would have been to determine to what extent congruence exists between the individual's goal orientation and the classroom goal structure.

Van Deventer (2015) states that existing fit studies evaluate person-environment fit in one of three different ways. The first, perceived fit, is evaluated when an individual is asked to directly judge the compatibility between himself/herself and the organisation (Kristof-Brown et al., 2005). The second, objective fit, is evaluated indirectly through the comparison of a person and an organisation as reported by different sources (Kristof-Brown et al., 2005). Thirdly, subjective fit, is evaluated indirectly through the comparison of a person and an organisation as reported by the same person. According to Endler and Magnusson (1976), individual perceptions of a situation are more important and more closely related to attitudes and behaviours than an actual/objective situation. Similarly, Cable and Edwards (2004) noted that subjective evaluation may be more suitable as individuals can only respond to fit/misfit when they are aware that fit/misfit exists. Subjective fit may, consequently, be the most apt way to assess person-environment fit.

Congruence and/or incongruence have traditionally been assessed by means of difference scores. According to Van Deventer (2014) it involves measuring congruence as a single latent variable by a difference score. The effect of congruence on an outcome variable is then examined by studying the relationship between *congruence* and the outcome variable. This usually involves simple linear regression analysis as the method of data analysis to determine the amount of variance explained in the outcome variable by the *congruence* variable (operationalised in terms of a difference score). The difference score method is, however, associated with various substantive and methodological problems (Edwards & Parry, 1993).

One particularly promising method of assessing congruence/incongruence that overcomes some of the problems associated with difference scores is polynomial regression with response surface analysis. Polynomial regression with response surface analysis is a sophisticated statistical approach that allows researchers to examine the extent to which combinations of two predictor variables (e.g. goal orientation and goal structure) relate to an outcome variable (e.g. learning motivation) (Shanock, Baran, Gentry, Pattison, & Heggestad, 2010). Van Deventer (2014) reports that when studying the effect of congruence between two predictor latent variables from the same domain, the response of an outcome variable to a representative sample of combinations of levels of two latent predictor variables is described via a response surface (rather than a single congruence latent variable). The effect of congruence and incongruence on an outcome variable is then studied by examining the nature of the response surface in specific regions of the three-dimensional space.

Various advantages are associated with polynomial regression. Not only is it likely to be a more reliable technique than difference scores, it also considers c*ongruence* and *incongruence* to be two separate latent variables with separate and possibly differential effects on the outcome variable (Theron, 2013). Whereas difference scores assume that congruence and incongruence lie along a single continuum, polynomial regression assumes two continua (a continuum from ++ congruence to -- congruence and a second continuum from +- incongruence to -+ incongruence). This implies that the nature of the congruence that exists between two variables can have a differential effect on the outcome variable (i.e. the effect of ++ is not necessarily the same as --). This is related to the match hypothesis which can either have a reinforcing interaction and an exacerbating interaction. The other implication is that the nature of the incongruence that exists between the two variables can have a differential effect on the outcome variable (i.e. the effect of +- is not necessarily the same as -+). This relates to the mismatch hypothesis which can either have a vitiation effect, mitigation, and exacerbation effect.

Future studies should investigate the use of latent variable polynomial regression analysis with response surface analysis (i.e. SEM with response surface analysis) to examine the extent to which the combinations of mastery (and performance) goal structure and mastery (and performance) goal orientation relate to learning motivation. Thus, two separate predictor latent variables (*goal orientation* and *perceived classroom goal structure)* are hypothesised to influence an outcome variable (*learning motivation*).

5.6 Concluding remarks

South Africa is currently faced with a large number of interrelated socio-economic challenge challenges: skills shortages, unemployment, poverty, income inequality, and inequality in the workplace. Many of these challenges are the result of Apartheid. Apartheid not only deprived

Black South Africans from material resources, but also deprived them from self-sufficiency tools. If South Africa wishes to overcome this history of disadvantagement, it has to remove barriers to self-sufficiency. Although removal of such barriers can take various forms, one solution advocated in this study was the enablement and empowerment of disadvantaged individuals through affirmative development programs in order to develop the tools and resources needed for their own self-sufficiency.

The previous learning potential studies have made major strides in offering organisations practical and scientifically supported solutions to select individuals which will have the highest likelihood of benefiting from affirmative development initiative. This study builds on that research by providing organisations and learning institutions with practical and scientifically supported solutions to recruit, select, develop, and assess affirmative development trainer-instructors which will directly impact on affirmative students'/employees' success in these initiatives.

Further research should be undertaken to build upon this study and also other relevant themes. More importantly, however, the results of these studies must be communicated to the public and private sector for their practical use. Industrial Organisational Psychology research in and by itself will and can do very little to contribute towards solving the challenges facing South Africa. As such, a mutual responsibility exists with regard to research endeavours. It the responsibility of Industrial Organisational researchers/academics to impart the knowledge gained from research to industry in a useful manner which can be practically applied. Equally so, it is the responsibility of industrial organisational practitioners to practically apply and implement the research produced by academia. As such, both should and can operate as scientist practitioners to address the challenges facing the Industrial Psychology fraternity, private business, government and South Africa in the most effective, ethical, and resourceful manner.

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APPENDIX A: TEACHING-LEARNING QUESTIONNAIRE

Teaching-Learning Questionnaire-SV

Purpose of the questionnaire

This questionnaire is part of a research initiative that aims to investigate how trainer-instructors influence student learning performance.

What you have to do

- Read and sign the participant information leaflet and consent form
- This questionnaire consists of 13 sections – **please complete all 13 sections.**
- The entire questionnaire will take about 30-40 minutes to complete
- It is very important that you read the instructions carefully and complete the questionnaire honestly.

Identification

Your response to this questionnaire is completely anonymous and confidential and will not be seen by anyone except the researcher. The following information is, however, required:

GENDER	Male	Female			
AGE					
RACE	Black	Coloured	Indian	White	Other
HIGHEST LEVEL OF EDUCATION (e.g. grade 10/diploma/certificate)					
HOME LANGUAGE					
NAME OF COURSE					
GROUP NUMBER					
NAME OF COURSE INSTRUCTOR					

Thank you for completing this questionnaire. Your participation is appreciated!

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT	The development and empirical evaluation of a partial competency model of affirmative development trainer-instructor performance
NAME & CONTACT DETAILS OF RESEARCHER	Lindie van der Westhuizen vdwesthuizen.lindie@gmail.com 0825802315
NAME & CONTACT DETAILS OF STUDY SUPERVISOR	Prof Callie Theron ccth@sun.ac.za 0218083009
ADDRESS	Department of Industrial Psychology, University of Stellenbosch
WHAT IS THE PURPOSE OF THE RESEARCH?	To investigate the performance of affirmative development trainer-instructor by examining the effect of trainer-instructor behaviour on student learning performance.
WHY HAVE YOU BEEN INVITED TO PARTICIPATE IN THE RESEARCH?	The nature of the study requires the participants to be students currently enrolled in a training programme or at a tertiary learning institution. The answers you provide will provide valuable information on how you experience learning, the learning environment and your trainer-instructor. You have been invited to participate in this study as you are currently a college student enrolled at a tertiary learning institution and therefore meet the requirements to participate in the study.
WHO IS CONDUCTING THE RESEARCH?	Lindie van der Westhuizen is conducting the research as part of the requirements to obtain a MComm (Psych) degree from the University of Stellenbosch.
WHAT WILL HAPPEN TO YOU IN THIS STUDY?	You will be asked to complete a questionnaire that will take about 30-40 minutes to complete. The questionnaire will be handed out during class. You will be asked to complete the questionnaire during class. Once you have completed the questionnaire, please hand it back to the researcher. This is the full extent of your participation in the study.
ARE THERE NEGATIVE CONSEQUENCES?	The ratings you provide on the questionnaire might make you think about the performance of your instructor. Your ratings will be completely confidential and anonymous. No information will be shared with any management person in the organisation. The data will only the utilised for research purposes and will not in any way inform any performance management decisions related to the instructor. Any further concerns regarding the instructor’s performance should be addressed through the formal communication channels available at your institution.
ARE THERE POSITIVE CONSEQUENCES?	If you volunteer to participate in the study and hand in your completed questionnaire, you can enter a lucky draw. By participating in the study you stand a chance to win a prize. Furthermore, the overall results that will be obtained from this study will potentially be of benefit in learning institutions and organisations in facilitating skills development.
WILL YOU REMAIN ANONYMOUS?	The information gathered in this study cannot be directly linked to you and all information will be kept strictly confidential. Your questionnaire has been assigned a specific number. The number cannot be directly linked to you. Only the researcher and the study supervisor will have access to the information.

	The results of the study will be reported by means of an unrestricted electronic thesis and by means of an article published in an accredited scientific journal. A summary of the research findings will be presented to college personnel. In none of these instances will the identity of any research participant be revealed. Only aggregated statistics will be reported. The identity of the college will not be revealed in any of the publications. A copy of my research results will be made available to your college.
WHAT IF YOU HAVE CONCERNS OR QUESTIONS?	If you have any questions or concerns regarding participation in this study please contact the researcher or study supervisor.
WHAT IF YOU DO NOT WANT TO PARTICIPATE?	Participation is voluntary. If you agree to take part, you still reserve the right to withdraw participation at any stage during the research process. There will be no negative consequences for refusing to participate or withdrawing from the study. 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, Stellenbosch University.
HOW WILL THE LUCKY DRAW WORK?	Your questionnaire has been assigned a specific number. When you hand in your completed questionnaire, you can decide whether you would like to enter the lucky draw. Please keep the slip attached to your research questionnaire. The lucky winning number will be announced via your institution's media channels. If you are the winner, you can collect your prize at the specified time. Bring your slip as proof when you collect your prize.
DO YOU UNDERSTAND THIS RESEARCH STUDY AND ARE YOU WILLING TO TAKE PART IN IT?	YES NO
HAS THE RESEARCHER ANSWERED ALL YOUR QUESTIONS?	YES NO
DO YOU UNDERSTAND THAT YOU CAN WITHDRAW PARTICIPATION FROM THE STUDY AT ANY TIME?	YES NO
SIGNATURE	
DATE	

Instructions

The following pages contain sets of statements about the past semester in this <u>specific</u> course. Please react to each statement as **honestly and truthfully** as possible. **There is no right or wrong answer**.

Indicate the extent to which you agree or disagree with the following statements by crossing the number (from 1 to 5) that best describes your behaviours in the past semester in this <u>specific</u> course.

For example:

If you were given the below statement, and you strongly agree with the statement, cross the box with the number 5.

	Statement	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
1	I enjoy completing questionnaires	1	2	3	4	✖

<u>Read each statement carefully and choose only ONE answer!</u>

<u>Please respond to ALL questions</u>

COURSE CHARACTERISTICS						
1	Compared to other modules I've had this year, this module was…	Very easy	Easy	Medium	Difficult	Very Difficult
2	Compared to other modules I've had this year, this module's workload was…	Very low	Low	Medium	High	Very High
3	The pace in this module was…	Very slow	Slow	Medium	Fast	Very Fast
4	Outside of class, I spent … hours per week on this module.	1-2	3-4	5-6	7-8	8+

A	SELF-EFFICACY Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1.	I believe I will receive an excellent final mark in this course.	1	2	3	4	5
2.	I'm certain I can understand the most difficult material presented in the course.	1	2	3	4	5
3.	I'm confident I can learn the basic concepts taught in this course.	1	2	3	4	5
4.	I'm confident I can understand the most difficult material presented by the instructor in this course.	1	2	3	4	5
5.	I'm confident I can do an excellent job on the assignments and tests in this course.	1	2	3	4	5
6.	I expect to do well in this course.	1	2	3	4	5
7.	I'm certain I can learn the skills being taught in this course.	1	2	3	4	5
8.	If I think about the difficulty of this course, the instructor, and my skills, I think I will do well in this course.	1	2	3	4	5

B	LEARNING MOTIVATION Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1.	I intended to increase my knowledge during this course.	1	2	3	4	5
2.	When I didn't understand some part of this course I tried harder by, for example, asking questions.	1	2	3	4	5
3.	I was willing to work very hard to increase my knowledge and understanding during this course.	1	2	3	4	5
4.	I wanted to learn as much as I could during this course.	1	2	3	4	5
5.	I was motivated to learn the work covered in this course.	1	2	3	4	5
6.	I intended to do my best in this course.	1	2	3	4	5

C	LEARNING GOAL ORIENTATION Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1.	It's important to me that I learn a lot of new concepts in this course.	1	2	3	4	5
2.	One of my goals in this course is to learn as much as I can.	1	2	3	4	5

3.	One of my goals is to master a lot of new skills this semester.	1	2	3	4	5
4.	It's important to me that I thoroughly understand my class work.	1	2	3	4	5
5.	It's important to me that I improve my skills this year	1	2	3	4	5
6.	It's important to me that other students in my class think I am good at my class work.	1	2	3	4	5
7.	One of my goals is to show others that I'm good at my class work.	1	2	3	4	5
8.	One of my goals is to show others that class work is easy for me.	1	2	3	4	5
9.	One of my goals is to look smart in comparison to the other students in my class.	1	2	3	4	5
10.	It's important to me that I look smart compared to others in my class.	1	2	3	4	5
11.	It's important to me that I don't look stupid in class.	1	2	3	4	5
12.	One of my goals is to keep others from thinking that I'm not smart in class.	1	2	3	4	5
13.	It's important to me that my lecturer doesn't think that I know less than others in class.	1	2	3	4	5
14.	One of my goals in class is to avoid looking like I have trouble doing the work.	1	2	3	4	5

D	**MASTERY GOAL STRUCTURE** **Statement**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
1.	In our class, trying hard is very important.	1	2	3	4	5
2.	In our class, how much you improve is really important.	1	2	3	4	5
3.	In our class, really understanding the material is the main goal.	1	2	3	4	5
4.	In our class, it's important to understand the work, not just to memorize it.	1	2	3	4	5
5.	In our class, learning new ideas and concepts is very important.	1	2	3	4	5
6.	In our class, it's OK to make mistakes as long as you are learning.	1	2	3	4	5
7.	In our class, getting good marks is the main goal.	1	2	3	4	5
8.	In our class, getting right answers is very important.	1	2	3	4	5

9.	In our class, it's important to get high marks in tests.	1	2	3	4	5
10.	In our class, showing others that you are not bad at class work is really important.	1	2	3	4	5
11.	In our class, it's important that you don't make mistakes in front of everyone.	1	2	3	4	5
12.	In our class, it's important not to do worse than other students.	1	2	3	4	5
13.	In our class, it's very important not to look dumb.	1	2	3	4	5
14.	In our class, one of the main goals is to avoid looking like you can't do the work.	1	2	3	4	5

E	**CLASSROOM LEARNING CLIMATE** **Statement**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
1.	In our class, the instructor respects students' opinions.	1	2	3	4	5
2.	In our class, the instructor understands how students' feel about things.	1	2	3	4	5
3.	In our class, the instructor tries to help students when they are sad or upset.	1	2	3	4	5
4.	In our class, students can rely on the instructor for help when they need it.	1	2	3	4	5
5.	In our class, the instructor enjoys to see students working.	1	2	3	4	5
6.	In our class, the instructor cares about how well students learn.	1	2	3	4	5
7.	In our class, the instructor wants students to do their best.	1	2	3	4	5
8.	In our class, the instructor likes to help students learn.	1	2	3	4	5
9.	In our class, students feel respected.	1	2	3	4	5
10.	In our class, students are treated fairly and equally.	1	2	3	4	5
11.	In our class, students respect each other's opinions.	1	2	3	4	5
12.	In our class, students do not make fun of each other's ideas.	1	2	3	4	5
13.	In our class, students feel comfortable to discuss their ideas.	1	2	3	4	5
14.	In our class, students are not scared to answer questions, even if they might be wrong.	1	2	3	4	5

15.	In our class, students value one another and the contributions we make.	1	2	3	4	5
16.	In our class, students are considerate of each other's feelings.	1	2	3	4	5
17.	In our class, students feel free to disagree with the instructor and to ask questions.	1	2	3	4	5
18.	In our class, students discuss ideas and work.	1	2	3	4	5
19.	In our class, students give their opinions during class discussions.	1	2	3	4	5
20.	In our class, students are encouraged to answer questions.	1	2	3	4	5
21.	In our class, students are encouraged to ask questions.	1	2	3	4	5
22.	In our class, students show interest in the work and activities.	1	2	3	4	5
23.	In our class, students want to learn, understand and explore the work.	1	2	3	4	5
24.	In our class, students discuss possible solutions to problems with each other.	1	2	3	4	5
25.	In our class, students share ideas with one another.	1	2	3	4	5
26.	In our class, students put a lot of energy in class work and activities.	1	2	3	4	5
27.	In our class, students try to explain to or to teach one another.	1	2	3	4	5
28.	In our class, students have opportunities to take responsibility for due dates for assignments.	1	2	3	4	5
29.	In our class, students have opportunities to create and implement classroom rules.	1	2	3	4	5
30.	In our class, students have opportunities to choose group members.	1	2	3	4	5
31.	In our class, students have opportunities to talk about their needs.	1	2	3	4	5
32.	In our class, students have opportunities to decide how to complete assignments/projects.	1	2	3	4	5
33.	In our class, students have opportunities to discuss many ways and strategies to approach the work.	1	2	3	4	5
34.	In our class, students have opportunities to find many different ways of solving problems.	1	2	3	4	5
35.	In our class, students have opportunities to be independent problem solvers.	1	2	3	4	5
36.	In our class, students have opportunities to use mistakes as learning experiences.	1	2	3	4	5

37.	In our class, students have opportunities to say why the solutions they found are so good so that everyone can learn.	1	2	3	4	5

F	INSPIRING PROFESSIONAL VISION Statement	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1.	In our class, students are positive about their careers.	1	2	3	4	5
2.	In our class, students can picture themselves as competent employees/professionals.	1	2	3	4	5
3.	In our class, students believe they can add value to society as professionals/ employees.	1	2	3	4	5
4.	In our class, students believe they will have successful careers.	1	2	3	4	5
5.	In our class, students have a clear idea of where they want to be in 5 years.	1	2	3	4	5
6.	In our class, students see the relevance of the learning activities to their careers.	1	2	3	4	5
7.	In our class, students see the value of learning to their careers.	1	2	3	4	5
8.	In our class, students see how their knowledge and skills can add value to society.	1	2	3	4	5

G	ENHANCING STUDENT ACADEMIC SELF-EFFICACY Statement	Never	Almost Never	Rarely	Some-times	Often
1.	The instructor provides clear and constructive feedback.	1	2	3	4	5
2.	The instructor praises students for their specific skills.	1	2	3	4	5
3.	The instructor shows that he/she believes in student's abilities.	1	2	3	4	5
4.	The instructor emphasises student's ability when they get difficult tasks right.	1	2	3	4	5
5.	The instructor encourages students to try harder.	1	2	3	4	5
6.	The instructor emphasises student growth and progress.	1	2	3	4	5
7.	The instructor wants students to believe that if they fail it is because they have not tried hard enough and encourage them to try harder.	1	2	3	4	5
8.	The instructor encourages students to help and guide each other through difficult tasks.	1	2	3	4	5

9.	The instructor demonstrates ways/strategies to accomplish tasks.	1	2	3	4	5
10.	The instructor uses students to show other students how to do the work right.	1	2	3	4	5
11.	The instructor uses other students that are doing the task correctly as examples to remind us that we can also do it.	1	2	3	4	5
12.	The instructor sets goals for the class that are difficult but which the class can still achieve.	1	2	3	4	5
13.	The instructor helps students to break up larger goals into smaller ones that are easy to achieve.	1	2	3	4	5
14.	The instructor makes sure that our goals are clear so that we can tell when we've reached them	1	2	3	4	5
15.	The instructor reminds students of past successes to remind us that we can achieve future challenges.	1	2	3	4	5
16.	The instructor links new work to past successes.	1	2	3	4	5
17.	The instructor helps students to identify and create their own goals.	1	2	3	4	5
18.	The instructor gives rewards/recognition when students get closer to or achieve their goals.	1	2	3	4	5
19.	The instructor encourages us to react to mistakes as normal and useful parts of the learning and not to think of them as failing.	1	2	3	4	5
20.	The instructor rewards and/or recognises students' personal improvements and progress.	1	2	3	4	5

H	**FOSTERING PSYCHOLOGICAL SAFETY AND FAIRNESS** **Statement**	**Never**	**Almost Never**	**Rarely**	**Some-times**	**Often**
1.	The instructor emphasises respectful, supportive relationships among class members.	1	2	3	4	5
2.	The instructor encourages students to avoid negative attitudes.	1	2	3	4	5
3.	The instructor expects students to treat each other with respect.	1	2	3	4	5
4.	The instructor creates the kind of class where students can relax and be themselves.	1	2	3	4	5
5.	The instructor maintains a friendly, comfortable classroom atmosphere.	1	2	3	4	5
6.	The instructor gives us the chance to share our feelings and ideas in a way that makes us feel safe.	1	2	3	4	5
7.	The instructor gives us opportunities to share our different views with each other as long as we are respectful.	1	2	3	4	5

8.	The instructor shows respect and positive regard for others and wants us to do the same.	1	2	3	4	5
9.	The instructor treats all students fairly and justly.	1	2	3	4	5
10.	The instructor shows honesty and integrity when dealing with students.	1	2	3	4	5

I	DEMONSTRATING INDIVIDUAL CONSIDERATION Statement	Never	Almost Never	Rarely	Some-times	Often
1.	The instructor is friendly towards individual students.	1	2	3	4	5
2.	The instructor makes students feel welcome when they ask for help/advice in or outside of class.	1	2	3	4	5
3.	The instructor has a genuine interest in individual students.	1	2	3	4	5
4.	The instructor makes sure he/she is available when students need him/her after class or during office hours.	1	2	3	4	5
5.	Instructor is aware and considers the individual student's needs, abilities, and interests.	1	2	3	4	5
6.	The instructor treats students with respect.	1	2	3	4	5
7.	The instructor builds good relationships with students in the classroom.	1	2	3	4	5
8.	The instructor makes an effort to know students as individuals.	1	2	3	4	5
9.	The instructor shows concern for students.	1	2	3	4	5
10.	The instructor encourages students to see him/her if they are having problems.	1	2	3	4	5
11.	The instructor is patient when helping students with their problems.	1	2	3	4	5
12.	The instructor views students as individuals with particular needs and special personalities.	1	2	3	4	5
13.	The instructor provides students with individual feedback.	1	2	3	4	5

J	STIMULATING INVOLVEMENT AND INTEREST Statement	Never	Almost Never	Rarely	Some-times	Often
1.	The instructor encourages students to take part in class discussions and activities.	1	2	3	4	5
2.	The instructor gives the students time for class discussion and questions.	1	2	3	4	5
3.	The instructor invites students to disagree with him/her and is happy when they do.	1	2	3	4	5
4.	The Instructor shows interest in student's viewpoint.	1	2	3	4	5

5.	The instructor encourages intelligent, creative and independent thought by students.	1	2	3	4	5
6.	The instructor challenges students' beliefs.	1	2	3	4	5
7.	The instructor stimulates student thinking and learning.	1	2	3	4	5
8.	The instructor asks questions and delivers presentations that make students think deeply.	1	2	3	4	5
9.	The instructor encourages students to interact and share ideas with each other during a session.	1	2	3	4	5
10.	The instructor gives students the chance to explain their ideas and to assess and refine them.	1	2	3	4	5
11.	The instructor provides learners with the opportunity to give and receive help.	1	2	3	4	5
12.	The instructor makes students feel excited or interested in the class material.	1	2	3	4	5

K	PROVIDING INSPIRATIONAL MOTIVATION Statement	Never	Almost Never	Rarel y	Some-times	Often
1.	The instructor believes in students' ability to become what they want to become.	1	2	3	4	5
2.	The instructor talks positively about students' future.	1	2	3	4	5
3.	The instructor expresses a positive vision (view) of students as successful employees/ professionals.	1	2	3	4	5
4.	The instructor helps students to create a positive vision (view) of their career.	1	2	3	4	5
5.	The instructor encourages students to see future challenges as learning opportunities.	1	2	3	4	5
6.	The instructor provides guidance to students on how to reach their work dream/vision.	1	2	3	4	5
7.	The instructor instills hope in students to pursue and achieve their vision / professional dream.	1	2	3	4	5
8.	The instructor believes that students will be able to meaningfully contribute to society as successful professionals/employees.	1	2	3	4	5
9.	The instructor helps students to believe that they will be able to meaningfully contribute to society as successful professionals/employees.	1	2	3	4	5
10.	The instructor is confident that students will be competent employees/professionals.	1	2	3	4	5

L	PROVIDING AUTONOMY SUPPORT Statement	Never	Almost Never	Rarely	Some-times	Often
1.	The instructor encourages students to take personal responsibility for their learning.	1	2	3	4	5

2.	The instructor allows students, within limits, to follow their own interests.	1	2	3	4	5
3.	The instructor encourages students to test their ideas for themselves.	1	2	3	4	5
4.	The instructor encourages students to work independently.	1	2	3	4	5
5.	The instructor gives students opportunity to choose group members.	1	2	3	4	5
6.	The instructor involves students in creating and implementing classroom rules.	1	2	3	4	5
7.	The instructor gives students the options to choose the material to use in class assignments.	1	2	3	4	5
8.	The instructor encourages students to find multiple solutions to problems.	1	2	3	4	5
9.	The instructor wants students to defend their solutions so everyone can learn from that student.	1	2	3	4	5
10.	The instructor provides students with enough time for decision-making.	1	2	3	4	5
11.	The instructor encourages students to be independent thinkers and problem solvers.	1	2	3	4	5
12.	The instructor encourages students to debate ideas freely.	1	2	3	4	5
13.	The instructor provides students with choices and options.	1	2	3	4	5
14.	The instructor tries to understand how students see things before the instructor gives any advice on how to handle a problem.	1	2	3	4	5

M	**PROMOTING A MASTERY GOAL STRUCTURE** **Statement**	**Never**	**Almost Never**	**Rarely**	**Some-times**	**Often**
1.	The instructor provides important and engaging learning opportunities.	1	2	3	4	5
2.	The instructor emphasises becoming skilled at tasks and learning (rather than getting good marks or competing with top others).	1	2	3	4	5
3.	The instructor explains the use and purpose of tasks and assignments.	1	2	3	4	5
4.	The instructor emphasises effort rather than giving the right answers.	1	2	3	4	5
5.	The instructor guides students when they are having problems with classwork.	1	2	3	4	5
6.	The instructor gives struggling students hope by helping them see how they are making progress.	1	2	3	4	5
7.	The instructor adjusts learning activities to match student skills.	1	2	3	4	5

8.	The instructor helps students see that learning is interesting, relevant, and important (by, for example, connecting learning activities to students' lives and interests).	1	2	3	4	5
9.	The instructor encourages the discussion of ideas and 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).	1	2	3	4	5
10.	The instructor makes special effort to recognise progress.	1	2	3	4	5