#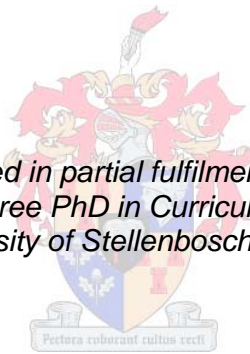 The Development and Validation of the *Growing Disciples Inventory* (GDI) as a Curriculum-aligned Self-assessment for Christian Education

by
Glynis Madeleine Bradfield

*Dissertation presented in partial fulfilment of the requirements
for the degree PhD in Curriculum Studies
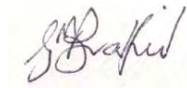at the University of Stellenbosch, South Africa*

Prof. Cornelia Roux
Department of Curriculum Studies
Faculty of Education
Stellenbosch University, South Africa

Prof. Jane Thayer
Discipleship and Religious Education Department
Seventh-day Adventist Theological Seminary
Andrews University, United States of America

March 2011

DECLARATION

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

Signature

Date: 31 January 2011

ABSTRACT

Although numerous norm-referenced measures of religiosity and spirituality exist for adults, no assessment of the holistic goals for Christian spiritual development in the context of evangelical Protestant schools, geared to adolescents, and using emerging technologies, was found. Addressing this lacuna, the purpose of this curriculum study was to develop and validate the *Growing Disciples Inventory* (GDI) as a curriculum-aligned self-assessment for Christian education.

Using a mixed methods approach, the GDI was constructed in the first phase of this educational design research. Experts in the fields of curriculum, assessment, Christian education and/or discipleship evaluated the extent to which proposed items were aligned to the Growing Disciples (GD) curriculum framework, and were appropriate to adolescent learners participating in Christian education. At least four items were included for each of 21 constructs within the four GD curriculum processes. The 100-item GDI was further refined through two development cycles of usability testing with adolescents. Using a think-aloud protocol, a proportional quota convenience sample of 16 learners completed the GDI online, reviewed their online reports, and took the exit survey. Minor refinements were made with the data from these individual interviews.

During the second phase, evidence for the validity of the GDI was evaluated with data from a purposive sample of nine educators and 595 Grade 7 through 12 students in 8 American, South African, and Australian Seventh-day Adventist schools. High reliability was found in terms of internal consistency (Cronbach's alphas of .855 to .943) and structural equation modelling (standardized correlation coefficients of .59 to .95) for the four cyclical and lifelong Christian spiritual development processes of *Connecting, Understanding, Ministering*, and *Equipping*. Confirmatory factor analysis through structural equation modelling provided evidence of construct validity with an adequate model fit. Moderate inter-factor correlations compared to higher correlations within factors indicated discriminant validity. Learner responses to 7 GDI exit survey items further supported the GDI's design and ease-of-use online. Answers to 3 open-ended GDI exit survey questions supplied rich qualitative data that corroborated quantitative responses, and added perceptions of the utility and relevance of the GDI as a formative self-assessment tool to facilitate exploration of strengths and growth points through reflection

and metacognition. The majority of educator interviews indicated favourable perceptions of the GDI's utility and relevance within their sphere of the global Seventh-day Adventist education system.

Structural equation model fit evaluation and correlations demonstrated that the GDI is a consistent self-assessment across gender and grade level. Although a weak correlation between country and learner scores was found, qualitative data supports the relevance of the GDI in each country. Further validation studies are recommended with larger samples international samples to adequately demonstrate generalizability within the context of evangelical Protestant education.   Analysis of emerging themes in learner responses corroborated quantitative findings, triangulating evidence for learner engagement and the positive potential for the GDI's use to facilitate Christian spiritual development. Each study of reliability and validity undertaken in this mixed methods curriculum research added moderate to strong evidence in support of the GDI as a curriculum-aligned self-assessment for adolescents participating in Christian education.

OPSOMMING

Daar bestaan talle norm-gebaseerde meetinstrumente vir die meting van vlakke van religieusiteit en spiritualiteit vir volwassenes. Geen assessering instrument van die holistiese doelstellings van Christelike spirituele ontwikkeling in die konteks van Protestant skole, toegespits op adolessente, wat van opkomende tegnologieë gebruik maak, kon gevind word nie. Om hierdie leemte aan te spreek, was die doelwit van hierdie navorsingstudie en kurrikulumontwikkeling om die "Growing Disciples Inventory" (GDI) te ontwikkel en om die geldigheid van dié instrument te bepaal as 'n kurrikulumgerigte selfassessering instrument vir Christelike onderwys.

Deur gebruik te maak van 'n gemengde navorsingsmetode-benadering is die GDI in die eerste fase van hierdie opvoedkundige navorsingsontwerp opgestel. Deskundiges op die gebiede van kurrikulum, assessering, Christelike onderwys en/of "dissipelskap" het die toepaslikheid van voorgestelde items vir die "Growing Disciples" (GD) kurrikulum-raamwerk, asook die geskiktheid vir adolessente-leerders in Christelike onderwys geëvalueer. Ten minste vier items is vir elk van 21 konstrukte binne die vier GD kurriku-lumprosesse ingesluit. Die 100-item GDI is verder verfyn deur twee ontwikkeling-siklusse van loods- of bruikbaarheidstoetsings met adolessente. Deur gebruik te maak van 'n "hardop-dink" protokol het 'n proporsionele kwota gerieflikheidsteekproef van 16 leerders die GDI aanlyn voltooi. Die deelnemers se onmiddellike kits-aanlyn verslae is hersien, en die 10-item finale opname is gedoen. Geringe verfynings is ontwerp met data wat verkry is van hierdie individuele onderhoude.

In die tweede fase is bewyse vir die geldigheid van die GDI geëvalueer met data wat versamel is van 'n doelgerigte steekproef van nege opvoeders en 595 graad 7 tot 12 leerders uit 8 Sewende-dag-Adventiste skole in Amerika, Suid-Afrika, en Australië. Hoë betroubaarheid is gevind in terme van interne konsekwentheid (Cronbach se alfas tussen .855 tot .943) en strukturele vergelykings-modellering (gestandaardiseerde korrelasie koëffisiënte tussen .59 tot .95) vir die vier sikliese en lewenslange Christelike spirituele ontwikkelingsprosesse: *Verbinding, Begrip, Bediening*, en *Toerusting*. Bevestigende faktorontleding deur middel van strukturele vergelykings-modellering het bewyse gelewer van konstrukgeldigheid met voldoende model paslikheid. Matige interfaktor-korrelasies in

vergeleke met hoër korrelasies binne die faktore, het voorlopige bewyse van diskriminante geldigheid gelewer. Leerders se response op 7 GD finale opname items het die GDI se ontwerp en aanlyn gebruikersvriendelikheid verder ondersteun. Response op drie oop-einde vrae van die GDI se finale opname het baie goeie kwalitatiewe data opgelewer wat kwantitatiewe response staaf. Daarmee het persepsies oor die bruikbaarheid en toepaslikheid van die GDI as 'n vormende self-assesserings-instrument aansienlik gegroei. Die GDI bevorder die verdure ondersoek van die ontwikkeling van Christelike spiritualiteit en groeipunte deur middel van refleksie, besinning en metakognisie. Die meeste van die opvoeders se finale onderhoudsresponse het gunstige persepsies van die GDI se bruikbaarheid en toepaslikheid in die globale Sevende-dag Adventiste onderwys-stelsel aangedui.

Evaluering van strukturele vergelyksmodellering se paslikheid, asook korrelasie-ontleding lewer bewyse dat die GDI 'n bestendige self-assesseringsinstrument is oor geslag en graad vlak. 'n Swak korrelasie is tussen land van herkoms en leerdertellings gevind; maar kwalitatiewe data ondersteun die toepaslikheid van die GDI in elke land. Verdere geldig-heidstoetsing word aanbeveel, met groter steekproewe. Ontleding van opkomende temas in die geldigheidsteekproef se leerder-response, het kwantitatiewe bevindings ondersteun. Bewyse van leerderbetrokkenheid en die positiewe potensiaal van die GDI se gebruik om Christelike spirituele ontwikkeling te bevorder, is getrianguleer. Die betroubaarheid en geldigheid van die gemengde navorsingsmetodes het matige tot sterk bewyse gelewer ter ondersteuning van die geldigheid van die GDI as 'n kurrikulumgerigte self-assesseringsintrument vir adolessente in Christelike onderwys.

ACKNOWLEDGEMENTS

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 CHAPTER 1
RESEARCH OVERVIEW

1.1 INTRODUCTION

The purpose of Christian education is broader than the transmission of knowledge, or achievement evaluated against national or local curricula priorities; rather, it seeks "the whole-person equipping" of learners for "knowledgeable and competent discipleship in a hurting world" (Van Dyk, 2000, p. 88). The teaching and learning process in Christian schools is grounded in a Christian worldview which impacts all aspects of educational leadership, curriculum and assessment.

Academic assessments provide information to improve teaching and learning. Psychological assessments such as inventories of personality (e.g. the Sixteen Personality Factor Questionnaire) and interest, abilities and values (e.g. Career Ability Placement Survey) inform decisions regarding career direction, high school course selection and college program applications. Measures of physical fitness such as the FitnessGram (Welk & Meredith, 2008) build self-awareness and facilitate the setting of realistic individual goals for physical education. Increased emphasis on formative and summative assessment in all facets of education raises expectations of evaluation of the core spiritual development goals of Christian education.

"Where questions about educational mission and values are skipped over, assessment threatens to be an exercise in measuring what's easy, rather than a process of improving what we really care about" (Astin et al., 1996, p. 1). Schools committed to integrating faith and values thus assess moral, religious and spiritual education goals as well as academic outcomes (Helm, 2002). Yet, no self-assessments of adolescent Christian spiritual development utilizing online technology for formative assessment were discovered in a thorough review of relevant literature. It is hoped that the curriculum-aligned self-assessment tool developed through this study will help fill this gap.

This chapter provides an introductory overview of the rationale for this study, its problem statement and purposes. A summary of the research design, questions and the context within which the research takes place sets the course. Lastly, key terms used throughout the dissertation are defined.

1.2 RATIONALE

Formal Christian education takes place in schools operated by Christian denominations or interdenominational groups. In most world regions, these faith-based schools are accountable to national or regional educational systems. Evidence of learner achievement and implementation of system-wide standards is required. Established in the 1870s (Greenleaf, 2005), the Seventh-day Adventist (Adventist) church school system coordinates a network of over 80,800 educators serving 1.5 million learners in 7,600 schools, colleges and universities in 145 countries (General Conference, 2009). The philosophy of Adventist education is foundational to each school's purpose: "to prepare students for useful and joy-filled life, fostering friendship with God, whole-person development, Bible-based values, and selfless service" (*Philosophy of Education*, 2003). This holistic, lifelong learning view encompasses more than academic success, and calls for measures of spiritual outcomes in addition to national/regional academic content standards shared with public and secular private education systems.

AdvancEd (2007), serving public and private schools in 65 countries worldwide, helps its clients with school improvement and learner achievement using seven accreditation standards, each with multiple indicators. As the largest international consortium of accrediting bodies for primary and secondary education, this service is used by Adventist schools in some regions. The following AdvancEd indicators, for example, could better be addressed in Christian schools by including validated assessments of Christian spiritual development goals, threaded through every aspect of the school's identity:

- Establishes performance measures for student learning that yield information that is reliable, valid, and bias free.
- Develops and implements a comprehensive assessment system for assessing progress toward meeting the expectations for student learning.
- Uses learner assessment data for making decisions for continuous improvement of teaching and learning processes.

- Demonstrates verifiable growth in student performance.
- Ensures that each learner has access to guidance services that include, but are not limited to, counselling, appraisal, mentoring, staff consulting, referral, and educational and career planning

In the past fifty years, three large empirical studies have assessed aspects of Adventist education. Each study has focused on exploring, describing and evaluating this system of faith-based education in North America, rather than assisting the individual participant or learner grow spiritually. The first study developed and evaluated a series of five religious achievement tests, administered in North American Adventist schools in grades 4, 6, 8, 10, and 12, during 1989 to 1992. These tests measured cognitive objectives of a specific religion curriculum (J. D. Thayer, 1992). Test results confirmed both areas of overall objective-aligned learning and specific areas needing improvement.

Through several surveys in a ten-year longitudinal study, Dudley (1978, 1986, 2000, 2007) explored Adventist youth values and retention in USA Adventist churches, indirectly addressing the effectiveness of Adventist church schools as participants commented on the impact of both. The 1989 *ValueGenesis I* study surveyed over 12,000 grade 6-12 Adventist learners, and 2,600 parents, pastors, principals, and teachers in North America. Over 400 questions investigated the influence of family, church, and school on the faith, values, and commitment of Adventist youth (Benson & Donahue, 1990; Dudley & Gillespie, 1992; G. Rice & Gillespie, 1992). In a second wave ten years later, called *ValueGenesis 2*, 15,000 Adventist youth were asked many of the same questions regarding faith maturity and denominational loyalty (Gillespie, Donahue, Boyatt, & Gane, 2003). Publications such as Gillespie, Larson & Larson's (1992) *Teaching Values*, suggest strategies for teaching and informal assessment of specific aspects of faith-based learning. The *Journal of Adventist Education* disseminated descriptive and exploratory results with recommended improvements to the church's formal Christian education system. Subsequent replications of the study in Australia (*ValueGenesis: Study 1 core report*, 1993) and Europe ("Valuegenesis Europe," 2006-2008) provide additional global perspectives that inform decisions about improving Christian education in home, church and school settings. Ultimately this research does impact the learner; however, the focus was on system evaluation. All three studies inform but do not provide self-assessment tools to facilitate individual lifelong learning in the realm of Christian spiritual development.

Currently, a four-year study is "assessing the achievement level in Adventist schools compared to [USA] national norms, and the learner, parent, teacher, or school factors associated with academic performance of elementary and secondary students in Adventist schools across the North American Division" (North American Division Education Department, 2009).   Assessment of the goals for Christian spiritual growth unique to Christian education is part of a broader assessment plan (J.D. Thayer, personal communication, November 2007), further motivating the study.   Referring to spiritual assessment in Adventist schools, Gillespie (1998) noted that "what was done intuitively before needs to be more purposeful if we want to find out whether it happened or not" (p.7).

The *Council for American Private Education* (CAPE), "a coalition of national organizations and state affiliates serving private elementary and secondary schools", reported that 80 percent of the six million students enrolled in 34,000 private schools (over 25% of all USA preschool, elementary and secondary schools) attend religiously-affiliated schools (Council for American Private Education, 2009). A review of religious and secular private education systems in North America found only one validated instrument assessing Christian spiritual development. The *Assessment of Catechesis Religious Education* (ACRE) was designed for use by Catholic schools and parish-based religious education programs (George, 1977).   The ACRE is a three-level test administered to learners in grades 5, 8 and 11. The ACRE's integrated approach to religious education assessment, including sections for the cognitive, affective, and behavioural domains (National Catholic Educational Association, 2001), was of significant interest to this study. Glasnapp and Pedulla (2001) state that the ACRE's primary purpose is "to serve as a tool in assisting local schools and parishes to review and evaluate their catechesis/religious education program's teaching and learning" (p.52). Although individual reports are generated for review with learners and their parents, the primary purpose of the ACRE appears to be summative assessment for improvement of the Catholic education system (Dudoit Raiche, 2000; Palmer & Dudoit Raiche, 1998).

The Lutheran-affiliated *Search Institute* has been researching positive child and adolescent development to strengthen and deepen the scientific foundations of the *Developmental Assets* framework (Search Institute, 2009). Although their research methods and findings are valuable to Christian educators, the developmental assets

framework focuses on positive development which is broader than the specific Christian spiritual development assessment this study develops. No validity reports are available for a noted Baptist adult-oriented discipleship tool ("Spiritual growth assessment," 2007). While criterion- rather than norm-referenced, the criteria are assumed to be known, rather than clearly stated in a curriculum of any form. The *Association of Christian Schools International* (ACSI) include an optional *Bible Assessment* subtest to its *Stanford 10 Achievement Test Series (Association of Christian Schools International, 2009).* This norm-referenced subtest assesses biblical knowledge, understanding and application of Scripture to aid teachers in discovering the strengths of commonly taught Bible programs. So once again the focus is on summative assessment for improving teaching in future years, rather than formative assessment for learning. ACSI also provides a short assessment suitable to middle and high school learners ("Spiritual values assessment," 2009), which is practical, and presumably aligned to the ACSI's core values (not found on the website). Many Christian higher education institutions (Council for Christian Colleges & Universities, 2006) assess young adult (not adolescent) Christian spiritual development, but these are norm-referenced (e.g. psychological scales) rather than criterion-referenced (e.g. education curriculum specific to Christian secondary education).

Each assessment found had comparative value, but none fit as a self-assessment aligned to a curriculum framing holistic lifelong cycles of Christian spiritual development as referenced in this educational design research. The primary purpose then of this doctoral study was the development and validation of the *Growing Disciples Inventory* (GDI), aligned to the *Growing Disciples* (GD) curriculum framework (cf. Table 2.1 and Section 2.5.2.2). The GDI was designed as a formative self-assessment for adolescents engaged in Christian spiritual development in evangelical Protestant Christian education settings.

In the broader field of all research on spirituality in childhood and adolescence, a number of studies (Benson, Williams, Eklin, & Schuller, 1990; Donahue & Benson, 1995; Dudley, 1978, 2000; Schwadel & Smith, 2005; C. Smith, 2003; C. Smith & Denton, 2005; C. Smith & Faris, 2002, 2002b) analyze brief questions included in national surveys for exploratory or descriptive research purposes other than religiosity and spirituality (cf. 2.3.3.2). Noting the dearth of research on adolescent spirituality, Shapiro (1999) assessed Jewish adolescent perceptions on their spiritual journey, and recommended further study in this field. Gorsuch (1990) recommended greater emphasis be placed on research aimed at

facilitating change (i.e. formative assessment, cf. 2.3). Nearly two decades later, validated assessments aimed at facilitating self-directed lifelong Christian spiritual development, suitable to adolescents engaged in Christian education, were still not found in precedent literature on assessment from a Christian approach to the psychology of religion.

 "[A] central concern of the Christian faith, if not also Islam, Judaism, Hinduism, and Buddhism, is to enhance the spiritual well-being of people" (Moberg, 1984, p. 351). Through the industrial-modern age which emphasized the rationale-scientific and stage theories of human development, research in spiritual development was limited and academic publications regarding research within specific faith traditions rare. With postmodernism's inclusive approach increasing recognition of spiritual development as central to positive human development (Benson & Roehlkepartain, 2008; Benson, Roehlkepartain, & Rude, 2003; Currie, 1995), previously biased research agendas have been critiqued, as evident in Yust, Johnson, Sasso, and Roehlkepartain's (2006) assertion:

> The wisdom of a specific religious community is generally relegated to perpetuating that tradition among the children of the faithful; it is not often explored by scholars for its interpretative usefulness as we talk about the shape of human societies, the challenges of creating just and caring relationships, and solving the global … crises and the world's future (p. 4).

Thus this educational design research seeks to (a) fill a noted lacuna in available assessments (see reviews in 2.3.3.1 and 2.3.3.2) for the area of Christian spiritual development within a specific global faith-based education system, while (b) adding to the pool of research in the wider context of spiritual development across religious communities. Validating a self-assessment aligned to a Christian spiritual development curriculum will provide Christian educators with a researched tool that could improve the quality of teaching and learning within similar contexts, as well as adding to the broader field of curriculum studies research related to self-directed lifelong learning curriculum and assessment tools.

1.3 PURPOSE

Through twenty years of teaching experience in four countries in Africa and North America, the researcher observed discrepancies between what was planned, taught, and assessed regarding Christian spiritual development as specified by the goals and

objectives of Christian schools. Where goals match those of secular and/or public education, there are national/state and classroom assessment methods that provide evidence of learning. Assessment of Christian spiritual development processes outlined in goals and objectives is incomplete or inconsistent. This gap impacts the quality of teaching and learning, and thus the achievement of each school's mission and aims.

Wiggins (1998) identifies another aspect of this problem: "[s]tudents are entitled to tests that they can see as having value and resonance in relation to their prior work and future aspirations" (p.345). Measures that evaluate the effectiveness of school systems are designed to improve curriculum, teaching and learning, and school administration. But such assessments do not facilitate learner involvement in planning and owning their educational experience.

The GD curriculum framework will not impact teaching or the attainment of desired outcomes, no matter how well grounded it is in theology and educational theory, without additional components. However, a validated self-assessment could facilitate GD curriculum-aligned teaching tailored to learner's self-assessed spiritual development needs, utilizing teaching methods and materials appropriate to local contexts. No assessment tool building on a backward curriculum design model (cf. 2.2.3.1) and a holistic Christian spiritual development framework (cf. 2.5.2.2) has been found, suitable for this purpose.

Thus this educational design research develops and validates an assessment tool, aligned to the GD curriculum framework, for the following purposes:

- to increase self-awareness of spiritual growth in adolescents experiencing Christian education through Adventist churches or schools through formative assessment, and
- to accumulate data useful to the development of teaching materials and strategies for the GD curriculum, and
- to facilitate summative assessment of adolescent perceptions of their spiritual growth in order to improve Christian curriculum, teaching and learning, locally and globally.

Recognizing the need for assessment tools to assist adolescents in developing an awareness of where they are in their personal Christian spiritual development journey and which options available through Christian education may best facilitate or nurture spiritual growth, this study designs, develops and investigates the validity of a self-assessment inventory for this need. Although assessment reports are envisioned as part of the larger curriculum design project to assist teachers planning lessons, principals planning school climate improvement, or administrators preparing accreditation reports, the purpose of this dissertation research is to create a curriculum-aligned assessment tool with the learner as the unit of study.

1.4 DESIGN

Design and development research (Richey, 2005; Richey & Klein, 2007; Richey, Klein, & Wayne, 2004) also known as *educational design research* (A. Collins, Joseph, & Bielaczyc, 2004; Edelson, 2002; A. E. Kelly, 2004; McKenney, Nieveen, & Van den Akker, 2006; T. C. Reeves, 2005; T. C. Reeves, Herrington, & Oliver, 2005; Van den Akker, 1999; Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006) is the research design that best matches the research problem and questions investigated in this curriculum study. Richey, Klein & Nelson (2004) state that "sub-studies may be conducted to analyze and define the instructional problem, to specify the content, or to determine instrument reliability and validity" (p.1104). This research creates an assessment tool or product as part of the larger *Growing Fruitful Disciples* curriculum project (see http://growingfruitfuldisciples.com/). The study is grounded in curriculum theory, educational and psychological research, and Christian education practice. A mixed methods research approach is used through both development and validation phases, featuring iterative cycles of design, development, piloting and testing to validate the GDI.

The research design (cf. Chapter 3) may be described as *applied and descriptive* because the self-assessment will provide information that can be reported formatively for individual learners and (in later cycles beyond this study) summatively for teachers and system-wide decision making regarding nurturing Christian spiritual development.   The research may further be described as *intervention-oriented* and *evaluative* as this study evaluates the extent to which qualitative and quantitative data provide evidence for the validity, reliability and trustworthiness of the GDI (Mertler & Charles, 2005).

1.4.1 QUESTIONS

This dissertation focuses on designing, developing, and evaluating a curriculum-aligned assessment tool. As a design experiment or educational design research, the primary research question is: *What validity evidence supports the use of the* GDI *as an assessment of Christian spiritual development for adolescents participating in Christian education?* Four more specific questions, two within the development phase, and two within the validation phase, more fully investigate the primary research question:

1.4.1.1 Phase 1: Design & Development Research Questions

1. To what extent is the GDI aligned to the GD curriculum framework?
2. To what extent is the GDI design appropriate as an adolescent self-assessment?

1.4.1.2 Phase 2: Validation Research Questions

3. To what extent is the GDI a reliable and valid self-assessment of adolescent Christian spiritual growth as outlined in the GD curriculum framework?
4. To what extent is the GDI appropriate for international use in Christian education?

In Chapter 3 (cf. 3.2.3), more specific elements of each question are discussed as the research design is fully described, and the methodology selected to research them outlined in detail.

1.4.2 METHODS

The participatory, interventionist nature of educational design research (cf. 3.2.1), along with the broad purpose of this study (cf. 1.3), guided the selection of mixed methods research (Greene, 2006; Onwuegbuzie & Leech, 2005; Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2006), as the best approach (cf. 3.2.2). Using both quantitative and qualitative methods best answers the questions raised by the research problem which frames the purpose of this study (Newman & Benz, 1998; Newman, Ridenour, Newman, & DeMarco, 2003; Tashakkori & Teddlie, 1998). As a research design, educational design research is well suited to solving practical teaching and learning problems, which are always multifaceted and thus best researched using multiple methods.

The development phase utilizes quantitative (inventory design, expert reviews, factor analysis, pilot testing) and qualitative methods (think-aloud learner reflections and dialogue with expert reviewers) to develop, pilot and refine the GDI. The validation phase includes both quantitative (inventory use/testing, statistical analysis) and qualitative methods (learner exit surveys, and teacher exit interviews) (Babbie, 2001; Buzzetto-More & Alade, 2006; B. Johnson & Christensen, 2008; Maxwell, 2005). The sequence and specific methods briefly introduced here are fully discussed in Chapter 3, Section 3.3.

Swezey (1981) provides a model outlining the criterion-referenced test construction process, as used in comparable doctoral research constructing and validating tests or assessments (Beile, 2005; Hall & Edwards, 2002; Muse-Burke, 2004; Stensland, 1991; Terry, 1983; O. J. Thayer, 1996, 2004). This methodology frames the quantitative aspects of the GDI educational design research.

The GD framework (cf. 2.5.2) was the curriculum referenced in determining what to assess in the GDI. The GD curriculum is constructed around four processes, each with five goals. Each commitment (goal) is further defined by more specific exemplars. The first phase began with designing a pool of representative items aligned to these twenty-one more specific exemplars or objectives (Babbie, 2001). Subjected to statistical analysis, the items that survived the review by content experts were included in the preliminary version for pilot testing (US Department of Health & Human Services, n.d.; Williams, Hricko, & Howell, 2006; Witte, Amoroso, & Howard, 2000). The qualitative and quantitative data collected in the first phase were analyzed to answer research questions one and two. The early cycles of development and data analysis guided the further refinement of the GDI for full-scale online validity testing.

In the second phase, a purposive sample of adolescents attending Adventist schools in three regions on three continents completed the GDI online and a short exit survey providing qualitative feedback on their reflections of perceived accuracy of the viewed individual report and perceived value of this experience to help them plan steps to further Christian spiritual development. Teachers who coordinated learner participation answered ten exit interview questions, most open-ended, providing their perceptions of learner engagement in this self-assessment, and the utility of this curriculum tool in their practical setting. Data collected electronically were analyzed using statistical analysis software

(SPSS and AMOS 18) to answer the third and fourth research questions as further described in Chapter 3, Section 3.2.2.

1.5 CONTEXT

A thorough review of precedent literature built an understanding of the theoretical field of curriculum studies which increasingly embraces internationalization (P. Jackson, 1980; Null, 2008; Pinar, 2008, 2009, 2003), curriculum alignment (L. W. Anderson, 2002; Glatthorn, 1999; Houghton, 2004; R. McDonald & Van der Horst, 2007; Roach, Niebling, & Kurz, 2008; Webb, 2007), self-assessment (Andrade & Valtcheva, 2009; Donovan, Bransford, & Pellegrino, 1999; Fancourt, 2005; B. McDonald & Boud, 2003; Taras, 2008; Tuck, 1997), and self-directed learning (Costa & Kallick, 2004; Knowles, 1975; Wolters, Pintrich, & Karabenick, 2005). This review prompted further investigation into the more specific field of assessment in religious education. The review of existing assessments (see Sections 1.2 and 2.3.3) in this field, along with feedback from Adventist educators in various regions, experience teaching and leading international interdenominational Christian education, and curriculum development experience, provide evidence that a validated assessment of Christian spiritual development would be useful globally.

As participant age was not correlated with the level of faith maturity in the ValueGenesis studies (Kijai, 1993), it is hypothesized that the GDI will not be closely tied to age or grade level, making it plausible to validate one inventory for adolescents in Grades 6-12. Although research on how the concept of salvation develops in Adventist children has identified differences among the hypothesized development age groups (6-7, 8-12, 13-17 years), some aspects of the concept of salvation appeared to be environment- or teaching-related rather than age-related (Habenicht, Korniejczuk, Booth, & Brown, 2003). These findings regarding Adventist learners are supported by secular studies of child and adolescent spirituality (Benson, Scales, Sesma, & Roehlkepartain, 2005; Coles, 1990; Hart, 2005; Scarlett, 2005; Tamminen, 1994; Yust, et al., 2006). So the context for this study focuses on exploring the validity of one self-assessment cross-nationally and across the adolescent age span.

As the overarching goal of equipping learners "for knowledgeable and competent discipleship" (Van Dyk, 2000, p. 88) is shared by Adventist and other evangelical

Protestant Christian schools, the GD curriculum framework has common ground with other Protestant Christian education settings. Hence this study may be of value to the broader spectrum of Christian spiritual nurture across evangelical Christian church and school learning environments. The wider interest in assessment of Christian education towards religious and spiritual development, focused on concerns about religious literacy among graduates from evangelical Christian and Jewish schools and colleges in America (Benson & Eklin, 1990; Benson & Roehlkepartain, 2008; Benson, et al., 1990; A. W. Collins, 1991; Drexler, 2000), and in public secondary education in Europe (Wright, 1993, 2001a, 2001b) further supports the broader context for which it is hoped this study will provide additional insights.

The context is further clarified by examining the target audience, delimitations selected, assumptions and key terms foundational to reading the rest of this dissertation.

1.5.1 TARGET

For this research, the target groups included adolescents in Grades 7 to 12 (aged 12 to 19) and their Christian school teachers. A purposive sample (cf. 3.3.1) of Adventist schools was used in the piloting study in the first phase (cf. 3.3.2) and validation in the second phase (cf. 3.3.3) of this research. A snowballing sample of expert reviewers drew on professionals with experience in curriculum development, religious education of youth, adolescent development and spirituality, as well as adolescent religion class teachers, regional education leaders in the Adventist education system, and Christian theologians of discipleship. Exploring the validity of such a self-assessment across continents called for multi-national samples of experts, teachers and learners. This was made possible within the global network of Adventist elementary and secondary schools thanks to the support of most of the regional educational administrators contacted.

1.5.2 DELIMITATIONS

Feasibility limited this educational design research to a sample of the population of Grade/Year 7-12 scholars attending Adventist schools in Michigan in the United States of America, in the Western Cape, South Africa, and in New South Wales, Australia. Schools included met three criteria:

1. the school was interested in the *Growing Disciples* curriculum, and the potential of using the GDI once researched;
2. the participating educators and learners had access to computers to complete the GDI online during school hours; and
3. the educators were willing to participate with their learners, and available during the research timeline.

Educational design research is often conducted over a number of years, with researchers working closely with practitioners in a cyclical refinement of the intervention towards evolving development goals and processes. This study may be considered as one full cycle within the broader vision of the *Growing Fruitful Disciples* curriculum project (see http://growingfruitfuldisciples.com/).

1.5.3 ASSUMPTIONS

Two assumptions are foundational to this study. Firstly, the frame of reference for this study is the researcher's Christian worldview, within the context of the Seventh-day Adventist denominational education system. Boa (2001) describes *worldview* as "one's primary orientation to the world, including one's view of the nature of ultimate reality and of human origin, purpose, and destiny" (p. 517). Every educator's worldview shapes who they are and the choices they make professionally and personally, which in turn impacts their students or learners. To the extent worldview interweaves what is described elsewhere (cf. 1.6, 2.4.2) as religiosity and/or spirituality, all education is inherently religious or spiritual. The broad spectrum of pertinent literature from transcendent and naturalistic perspectives (see Figure 2.5) was professionally reviewed and informs this study as critiqued through Chapter 2, recognizing the influence of the researcher's Christian worldview in constructing the theoretical framework guiding this research.

Secondly, this study builds on the assumption Gorsuch (1990) makes regarding the measurement of religiosity, that "everything that anyone can communicate to another in any form can be quantitatively analyzed" (p.88). Recognizing "an inescapable reductionism complicates all spirituality measurements" (Moberg, 2002, p. 48) and the deficiencies in scales intended to be universal, Moberg considered spirituality as

amenable to empirical research as psychological constructs such as attitudes, beliefs, and self-conceptions researched in established social and behavioural sciences.

1.6 KEY TERMS

The following brief quotes and notes define and delimit key terms as they will be used in this dissertation. Further discussion is included in Chapter 2 as each term is used in the context of the theoretical and conceptual frameworks constructed through literature review.

1.6.1 CHRISTIAN SPIRITUALITY

"Christian spirituality is the lived experience of Christian belief," (McGinn & Meyendorff, 1997, p. xv), "a conscious relationship with God, in Jesus Christ, through the indwelling of the Spirit and in the context of community of believers" (Sheldrake, 2000, p. 40). Recent research and popular usage are increasingly polarizing the term *religiosity*, limited to affiliation with an extrinsic or institutional religion, and *spirituality* (cf. 2.4.2), referring to "personal experience of the sacred or transcendent" (Farias & Hense, 2008, p. 164), or search for ultimate reality (Pargament & Hill, 2003). Even though this split may appear heuristically useful to researchers, several dangers may be overlooked:

- Such polarization ignores the fact that spiritual expression occurs in a social context and that virtually all organized faith traditions are concerned with personal spiritual growth (Pargament & Hill, 2003, p. 64);
- Most people report experiencing spirituality within an organized religious context, with no clear distinction between the two terms (Pargament & Hill, 2003, p. 65; Zinnbauer et al., 1997);
- Considering *spirituality* as good or positive and *religion* as bad or negative "severely limits psychological inquiry and may reflect simple prejudice rather than informed analysis" (Zinnbauer & Pargament, 2005, p. 28; Zinnbauer, et al., 1997), and
- Choice of words can misconstrue meanings, e.g. *religion* (as an institutional phenomenon) is incorrectly contrasted with *spirituality* (as a sacred human activity), instead of comparing *religiousness* (individual belief or practice) and *spirituality* (Zinnbauer & Pargament, 2005, p. 28)

In this study then, the term *Christian spirituality* will be used to include Christian religiousness and spirituality (cf. 2.4.4). This definition supports a pluralistic perspective, considering spirituality as lived experience situated within and outside of other religious traditions.

1.6.2 CHRISTIAN SPIRITUAL DEVELOPMENT

From a Christian perspective, Helminiak (1987) states that "spiritual development is not one more focus of study added to a list (physical, emotional, intellectual, and more technical cognitive, moral, ego and faith development). Rather, spiritual development embraces the whole" (p. 95). *Christian spiritual development* is holistic growth toward maturity in beliefs, attitudes, and relational practices of *Christian spirituality* (Cloud & Townsend, 2001). Such development is cyclical or web-like (cf. 2.4.1.3), as Fischer's (Fischer, Yan, & Stewart, 2003) dynamic skill theory and developmental web metaphor suggests, rather than sequential or ladder-like as proposed by stage theories (cf. 2.4.1.2) of developmental psychology (Miller, 2002). Overlapping terms such as *Christian spiritual growth, faith maturity* and *spiritual formation*, are discussed within the literature review (cf. 2.4.4), but the term *Christian spiritual development* will be used throughout to refer to *Christian religious and spiritual development*.

1.6.3 DISCIPLESHIP, DISCIPLE, DISCIPLING

"Theologies and ideologies of religious faith have names and symbols which help to capture the essence of these images of the mature. In the Christian faith, for example, *disciple* and *saint* are two traditional key terms. In Jewish faith, *the righteous one* (tsedek) would be central." (Dykstra, 1986a, p. 252). The terms *disciple* and *discipleship*, familiar in some Protestant Christian education settings, were used to capture the Christian perspective on lifelong spiritual development in the *Growing Disciples* curriculum, to which the *Growing Disciples Inventory* developed and validated in this study, is aligned. The definition of *discipleship* as the ongoing process of "becoming a complete and competent follower of Jesus Christ" (Barna, 2001, p. 17) will be used in this study. "A disciple of Jesus is one who has come to Jesus for eternal life, has claimed Jesus as Saviour and God, and has embarked upon the life of following Jesus" (Wilkins, 1992, p. 40). Thus a *growing disciple* is a Christian engaged in the process of lifelong *Christian spiritual development*, in turn mentoring or *discipling* other Christ-followers.

1.6.4 RELIGIOUS EDUCATION

Literature on the religious, moral and spiritual dimensions in education (Bastide, 2007; Blaylock, 2000; de Souza, 2008; de Souza, Durka, Engelbretson, Jackson, & McGrady, 2006; Huebner, 1987; Kameniar, 2007; Leicester, Modgil, & Modgil, 2000; Roux, 2005; Ziebertz, 2003) in the present postmodern and pluralistic world confounds definition of the term *religious education*. In Western democracies, *religious education* in public school systems commonly refers to learning *about and from* world religions (Fancourt, 2005; R. Jackson, 2004; J. M. Lee, 1988), albeit variously defined and approached within each cultural context. In this study the term *religious education* will be used as defined by the *United Nations Commission on Human Rights:*

> Religious education is the transmission of knowledge and values pertaining to all religious trends, in an inclusive way, so that individuals realize their being part of the same community and learn to create their own identity in harmony with identities different from their own. (Amor, 2001).

1.6.5 CHRISTIAN EDUCATION

This study is situated in the context of Protestant Christian secondary education. In church-operated private schools and to some extent public schooling in countries with a state religion, *religious education* goes beyond teaching world religions to integrating the state/private school's religious worldview in the planned, taught, assessed, extra-curricular and hidden curriculum. In this study, the term *Christian education* reflects this holistic approach where education is viewed as value-embedded, faith-based, and connected with real-life experienced in and beyond the school setting. Such an education is faith-integrated while facilitating and respecting personal choice of lived spirituality. Note that the term *Christian education* in American research literature (e.g.Benson & Eklin, 1990; Roehlkepartain, King, Wagener, & Benson, 2005) most often refers to learning within a specific church's *informal* education settings, but can also refer to *formal* schooling from a Christian worldview as used in this study and in literature regarding religious education in European countries and their former colonies (for example, see de Souza, et al., 2006).

1.6.6 ADVENTIST EDUCATION

The term *Adventist education* is used in this study to denote *Christian education* shaped by the beliefs and practices of the Seventh-day Adventist church, a Protestant evangelical denomination (http://adventist.org/). As with *Christian education*, *Adventist education*

occurs informally within the Adventist home, church and community, as well as formally within the *Adventist education* or parochial school system globally. These settings complement each other in the broad perspective of lifelong holistic *Christian spiritual development*. As this dissertation is validating the GDI in formal education settings, the term *Adventist education* will be used within the context of formal education in Seventh-day Adventist schools, unless otherwise specified.

1.7 SUMMARY

Chapter 1 introduced the scope of this dissertation research, providing an overview of its rationale and purpose, which determine the research questions and research design, considering the research context, limitations and assumptions. Chapter 2 reviews precedent literature which forms the theoretical and conceptual framework for this study, drawing from the areas of curriculum studies, teaching and learning models, self-assessment and self-directed learning, adolescent development, religious and spiritual development, and Adventist Christian education. The research design is presented in Chapter 3, which includes a review of educational design research as the design selected for this study, mixed methods research, the four research questions and validation methods used. Data collection procedures are described including the population, sampling, research protocols for both phases, and a review of assessments informing this study. Data analysis and reporting on both the development and validation phases is the focus of Chapter 4. A summary of findings frames the discussion of results, implications for implementation, and suggestions for further research in Chapter 5.

2 CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

A review of precedent literature frames this interdisciplinary educational design research within the fields of curriculum studies and educational assessment, developmental psychology and positive youth development, religious and spiritual development in childhood and adolescence, and the Christian theology of discipleship. As theory, practice and research interact dynamically, this chapter relates research findings, theoretical models and conceptual frameworks to the practical settings for which the *Growing Disciples Inventory* (GDI) is designed.

Within the field of curriculum studies, literature on understanding curriculum, assessment and self-directed learning provides the conceptual basis for the assessment type, structure, and administration. Literature on religious and spiritual development through the adolescent years and its implications for assessment of Christian spiritual development informs decisions about the appropriate level for the selection and wording of items to include in the assessment. Lastly, a brief overview of the educational philosophy of Seventh-day Adventist (Adventist) education and the theological foundations of the *Growing Disciples* (GD) curriculum framework, to which the GDI is aligned, describes the context for this educational design research.

The focus of this chapter is on reviewing research, theory and practice foundational to the development phase of this curriculum study. The literature base relating to the validation phase is primarily addressed in Chapter 3. Additional findings are referenced as appropriate in support of the analysis and discussion of results, in Chapters 4 and 5.

2.2 CURRICULUM

In the industrial age spanning the 18th to 20th century, society's production orientation reshaped education to focus on specific content delivered by teachers in level/age-specific

classes in a fixed amount of time, relying on norm-referenced testing to differentiate those who made the grade on time from those who did not (Reigeluth, 1994, pp. 4-6). Learners who did not fit the mould went on without mastering required content, or were sorted for alternate tracks, deprived of the opportunity to learn at their own rate and in their own way.

With the transition to the computer or information age beginning with the space exploration era in the mid-20th century, globalization and internationalization have implications for curriculum theory and the science and art of teaching and learning (Null, 2008; Pinar, 2008, 2009). Systems of education are changing as the larger socio-economic and political super-systems surrounding them change (B. L. Jones & Maloy, 1996; Reigeluth, 1996). Consequently, education paradigm shifts are necessary in a world where:

- Cooperative relationships and team organization are replacing adversarial relationships and bureaucratic organization.
- Shared leadership with distributed control and accountability is replacing autocratic leadership and centralized control.
- Networking and integration of tasks are replacing one-way communication and division of labour.

Describing the features of an educational system appropriate for the conditions and new demands of the information-networked 21st century, Reigeluth (2006) prompts educators to think about school systems for the technology-driven world today as learner-centred systems with the following features:

- Continuous progress based on personal learning contracts focusing on active learning and interdisciplinary tasks is emphasized rather than standard subject content coverage at specific grade levels in age-streamed classes.
- Individualized testing and performance-based assessment are promoted over norm-referenced, non-authentic testing.
- Students access information using advanced technologies, cooperative learning networks and learning centres, rather than rely on isolated reading and writing limited to textbooks that quickly become outdated and the constraints of local classrooms.
- Teachers focus on facilitating learning rather than transmitting knowledge.
- "All aspects of human development are fostered" (Reigeluth, 2006, p. 54).

With increasing awareness of the need for self-assessment (cf. 2.3.1) in collaborative and self-directed learning (cf. 2.3.2), new curriculum tools are necessary in education in general, and in Christian education in particular. The design and development of the GDI is intended to help fill this gap. Toward this purpose, this chapter begins with an overview of curriculum approaches, and models of curriculum and instructional design which informed the development phase of this educational design research.

2.2.1 CURRICULUM APPROACHES

Originating from the Latin word *currere*, meaning "to run the course" (Pinar, 2008, p. 498), as racing chariots did in ancient Greece (Mednick, 2006), the word *curriculum* has been variously understood and theorized about in the field of education.   Four different approaches to curriculum theory and practice are key to understanding curriculum since the field of curriculum studies began with Bobbitt's 1918 publication of *The Curriculum* (Pinar, Reynolds, Slattery, & Taubman, 2008/1995).

In the agrarian age, curriculum was the passing of information from one generation to the next, in the form of organized knowledge, which was often the mastery of a collection of books by the elite of society (Wiles, 2005). This view of *curriculum-as-subject-matter* is reflected in the educational philosophy of early curriculum theorists who believed curriculum "should consist of permanent studies in the rules of grammar, reading, rhetoric, logic, mathematics", and the greatest books of the Western world (pp. 4-6, 26-29). When content is emphasized, the choice of textbook or other information source is key.

As the industrial era brought education to the general population, the definition of curriculum shifted from subject content to intention. Bobbit defined curriculum as "a series of things that children and youth must do and experience" (Wiles, 2005, pp. 4-6, 26-29). This view of *curriculum-as-plan* is reflected in Taba's (1962) definition of curriculum as a plan for learning, and Tyler's (1949) definition of curriculum as all that is prepared and directed by schools to achieve their educational purposes. The influence of Taba and Tyler is still felt where curriculum development is considered producing a carefully planned product to guide teaching and learning. However, when curriculum-as-product is emphasized, attention is focused on teaching, or how information is delivered, with the

learner generally left out of the picture, a thing to be acted upon, rather than a meaning-making individual ("Curriculum theory and practice," n.d.).

As financial constraints in the late 20th century dictated efficiency in curriculum planning for regional/national educational systems, and political and economic pressure to compete globally prompted international math and science testing comparisons (Anderson-Levitt, 2008; Baker & LeTendre, 2005), a new curriculum approach integrated components of curriculum as plan, product and process. Idealistically seeking to integrate competencies from informal (life skill training) and formal (academic) education, *curriculum-as-desired-outcom*es focused on what all learners should know or be able to do by a specific level of education. Behaviourism and political interests in education promoted identifying outcomes in advance so that "curriculum planners could work backwards to set the conditions necessary to achieve their goals" (Wiles, 2005, pp. 4-6, 26-29). Although beginning-with-the-end-in-mind can help teachers articulate the purpose of engaging the learner from the start, outcomes-based education researched in Canada, USA, Britain, and Australia found the complexity of terminology led to lofty goal rewriting and little change, with time constraints in schools mitigating against individual learner mastery of the broad outcomes or competencies that are by nature integrative and interdisciplinary (Jansen & Christie, 1999; Spady, 2008).

As understanding of learner differences increased, through theories of multiple intelligences (Gardner, 1983, 1993, 2006) and learning styles (Kolb, 1984), curriculum focus shifted from tightly specifying objectives and methods in advance to examining what was experienced by learners, seeing *curriculum-as-process* rather than as a product or as a plan. As the 'pedagogical superiority' of multi-grading is recognized, and the lines between formal and informal education increasingly blurred (Farrell, 2008), process-oriented strategies such as active or experiential learning, problem- and project-based learning, outdoor education, and hands-on learning are called for (Hlebowitsh, 2006). The interaction between teachers and learner in the *curriculum-as-process* approach focuses on the individual learning experience, utilizing methods such as differentiated and self-directed learning. This contrasts with the focus of curriculum-as-plan on teaching as a one-size-fits-all information-transmission form of education. However, a weakness of the curriculum-as-process approach is that the process can become the product, potentially overlooking essential learnings every learner needs to know or be able to do (Mednick,

2006). Further, the importance of the quality of teachers to guide and inspire learners in differentiated or self-directed learning is both the strength and a potential weakness of the *curriculum-as-process* view ("Curriculum theory and practice," n.d.).

Backward design (Wiggins & McTighe, 1999) and the systems approach to instructional design (Dick, Carey, & Carey, 2004), referenced in this study (cf. 2.2.3), incorporate aspects of the *curriculum-as-plan* and *curriculum-as-process* approaches, where the educator structures the learning environment to differing degrees. In treating learners as subjects who are constructing meaning through active learning experiences, rather than passive objects to whom content is transmitted, process-oriented models allow for a high degree of variety in content covered through individualized, locally-situated learning (Stenhouse, 1975). In such contexts, assessments are formative learning opportunities rather than comprehensive measures of content transferred or detailed objectives achieved. The *curriculum-as-process* approach best matches the approach selected for this curriculum study, including aspects of the *curriculum-as-praxis* and *curriculum-as-context* approaches briefly reviewed hereafter.

Where the *curriculum-as-process* model emphasizes judgment and meaning making about engagement in a particular sphere of learning, it may do so without reference to collective human well-being, increasingly emphasized in today's relational society. "The praxis model of curriculum theory and practice brings these to the centre of the process and makes an explicit commitment to emancipation [of the human spirit]. Thus action is not simply informed, it is also committed. It is praxis." ("Curriculum theory and practice," n.d.). Freire (2006/1992) proposed critical pedagogy as "a process which takes the experience of both the learner and the teacher and, through dialogue and negotiation, recognizes them both as problematic" (Grundy, 1987, p. 103). Together, "students and teachers confront the real problems of their existence and relationships" (ibid). Groome's (1980; Shared Christian praxis learning process," n.d.) religious education model is an application of Freire's problem-posing education model, which emphasizes experiential learning together on the lifelong journey of Christian spiritual development. The purpose of the GDI is to provide a tool to increase open dialogue between learners and Christian educators, increasing awareness of individual strengths and growth points, as a springboard for commitment and accountability in Christian spiritual development.

From another perspective, Mednick (2006) argued that curriculum is contextually shaped, a reality that the four curriculum approaches reviewed - product, plan, process, and praxis - overlook. Curriculum cannot be substantially changed without understanding and respecting its context or setting. The nature of teacher-learner relationships, class organization, school climate, and other elements often called the *hidden curriculum*, impact what and how a learner learns. Whole-person development, the aim of Christian education, recognizes the impact of planned teaching and learning, as well as the significance of Christian spiritual development which as often occurs in fruitful moments – unplanned but crucial, considered hidden curriculum. Kohlberg (A. F. Holmes, 1991) proposed that the hidden curriculum was where moral education took place. Research on positive, religious and spiritual development in childhood and adolescence discussed further in this chapter (cf. 2.4) supports a *curriculum-in-context* approach.

Considering the reality of the hidden curriculum, where all of life is an education, Whitson (2007) uses a venn diagram (Figure 2.1) to demonstrate the intersection between directed and undirected curriculum within formal schooling.
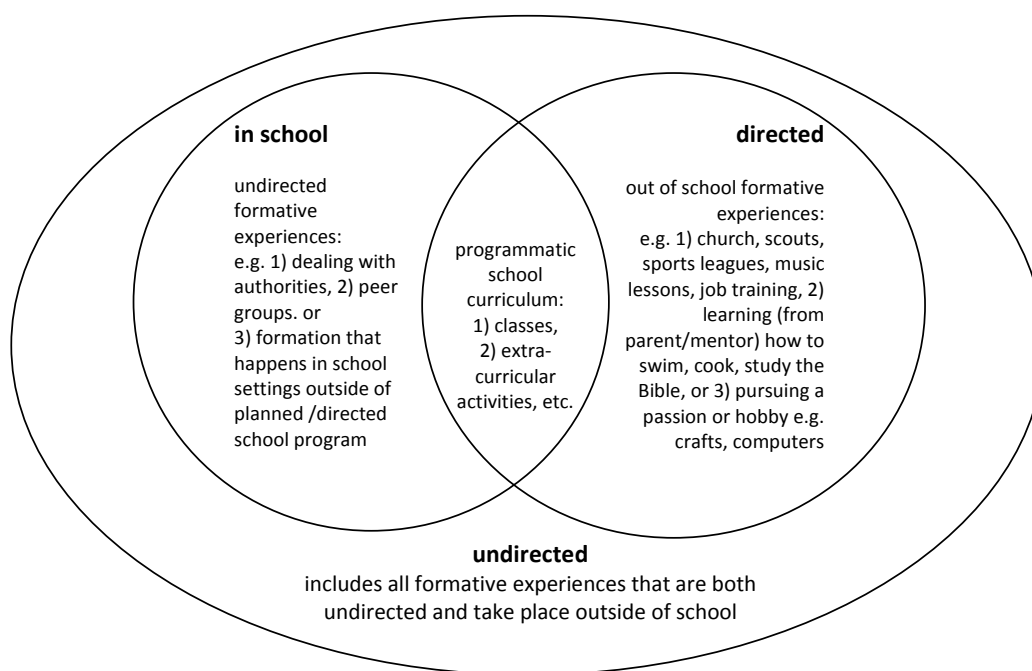
Figure 2.1 Curriculum: The Course of (Trans-)formative Life Experience
(adapted from Whitson, J.A, (2007). What is curriculum? Retrieved from http://wp.me/p1V0H-q)

Undirected curriculum, Whitson proposes, includes all formative learning experiences that are both undirected (or self-directed learning) and occur outside of formal school settings, as well as the undirected formative experiences that occur in school outside of planned/school-directed programming. Directed curriculum includes the formal curriculum that is planned and taught within schools settings and formative experiences that are to some extent planned in socio-cultural contexts including church activities, sports, music, crafts and hobbies and parent/relative/friend mentoring. Whitson (2007) notes that originally the latin term c*urriculum vitae* meant *the curriculum of (a) life*, which is more than just those threads of life experience that are planned and happen as part of programs within schools.

From a Christian worldview, Christian spiritual development will likely be nurtured in a religious and spiritual education class in school, through a church youth programme, or spiritual nurture within the family. Thus it is not limited to planned events or experiences. Assessing Christian spiritual development will thus include aspects of lived experience outside of religious education classes, recognizing the web of lifelong learning.

At the beginning of the 21st century, one new frontier to curriculum practice is distributed and asynchronous learning often connected through the internet. Although this approach incorporates elements of any of the other approaches, it is not limited by time or setting. This makes possible paradigm shifts in thinking about teaching and learning. For example, fifth- and sixth-grade learners and their teachers in Catholic schools in Port Coquitlam, British Columbia, Canada, and Shoreview, Minnesota, USA (K. A. Johnson, 2001) collaborated in a three-month computer-mediated project using networked technology (internet, email, fax) to dialogue and share in five religious topic groups. Learners found tasks authentic, challenging, and integrated; teachers became facilitators, and the project fostered ongoing assessment by learners. The GDI utilizes internet technology to be available anytime, anywhere globally, with individual reports instantly created for learners. The focus is on providing learners with reports that that can help them make informed personal choices about spiritual growth, with the ability to tap into electronic resources including other learners and mentors not in the same physical location.

Thus this educational design research draws on several curriculum approaches, and utilizes current technology. This approach opens up new possibilities for using the self-assessment as a formative and transformative tool in diverse settings or contexts, demonstrating one aspect of the globalization or internationalization of curriculum.

2.2.2 CURRICULUM THEORY

Curriculum theory followed the initial formulation of curriculum as educational progressives found practical ways to plan quality education. "Curriculum theory is a set of propositions, observations, facts, beliefs, policies, or procedures proposed or followed as a basis for curriculum action" (Hewitt, 2006, p. 133). Curriculum models are "representations of objectives, setting, or processes" (p. 138). Keeping the curriculum approaches (product, plan, process, praxis, context) which describe ways of looking at or organizing curriculum practice in mind, this section reviews several curriculum theories and models which form part of the theoretical framework for this curriculum study.

With each era of curriculum advance, curriculum theories and models have emerged. A very brief overview of selected well-known models and underlying theories demonstrates the complex web that shapes current curriculum development, including this research. Each model clarifies a different aspect of curriculum work, complementing rather than competing with or fully replacing previous models.

The publication of Franklin Bobbitt's book, *The Curriculum,* in 1918 is suggested as the formal beginning of the field of curriculum studies (Pinar, et al., 2008/1995). Focusing on curriculum for formal schooling, Bobbitt recommended the systematic scientific study of society to determine what schools should teach to ameliorate the social problems no other institution was sufficiently addressing (Hewitt, 2006, p. 140). His second book, *How to Make a Curriculum*, written during the years of post-World War I social reform, outlined two steps: (a) local needs assessment to create and/or refine curriculum objectives, and (b) the creation of learning experiences addressing these real-world objectives.

As a member of the American *Eight-Year Study* in the 1930s, Ralph Tyler (1949) developed a process for thinking about purposes for schools and how to develop curriculum. His famous post-World War II syllabus for a University of Chicago course

illustrated the elements of the process which became a pervasive curriculum design model. With widespread influence on training graduate students who became curriculum directors or professors in the USA (Hewitt, 2006, pp. 140-142), Tyler's (1949) four-question rationale, expanded by Taba (1962) to seven steps of curriculum design, have been extensively used in the development of curriculum as a product. Through answering four key questions, the objectives model stressed assessment and evaluation as a way of validating curriculum work.

Since the mid-20th century curriculum development era, Bloom's taxonomy of educational objectives (L. W. Anderson & Krathwohl, 2001; Bloom, 1956) has been the standard in the writing of performance objectives. Krathwohl, Bloom and Masia (1964) developed affective objectives to complement Bloom's cognitive objectives. However, neither the cognitive nor the affective taxonomies addressed the domain of behavioural outcomes; both failed to fully reflect the practice of real classroom learning, understandably so, as Bloom originally developed the taxonomy to aid professors from different universities collaboratively create banks of test items for annual comprehensive examinations (Krathwohl, 2002). Eisner (1985) proposed expressive objectives as "the outcome of an encounter or learning activity which has been planned to provide the student with an opportunity to personalize learning" (p.69). Eisner noted the difficulty in describing objectives in advance when working from the viewpoint of expressive objectives as experiential learning encounters, particularly in the area of arts education. Expressive objectives incorporated holistic descriptions of complex, irreducible educational encounters.

Recognizing the shortcomings of various objectives models, including assessment challenges, Stenhouse (1975) proposed a *process model*, giving credence to the concept of *fruitful moments* in teaching, which result in unpredictable yet significant learning outcomes. Those promoting curriculum in harmony with the learner's personal interests, needs and learning styles, at their level of development, were concerned with the natural order of development, and the processes through which learning took place, more than emphasizing end products or the transmission of a set body of knowledge ("Curriculum theory and practice," n.d.). The GD curriculum framework (cf. 2.5.2) reflects a curriculum-as-process approach as it builds around four cyclical processes of a holistic Christian

spiritual development framework, where each process represents an intertwined spiral or strand of ever-deepening lifelong learning in cognitive, affective and behavioural domains.

A new taxonomy of objectives (R. J. Marzano & Kendall, 2007) builds on Bloom's (Bloom, 1956) taxonomy of cognitive objectives, but explicitly addresses cognitive, affective, and psychomotor aspects of learning. The new taxonomy is based on three domains of knowledge (information, mental procedures, and psychomotor procedures); and six levels of mental processing, the first four combining those of Bloom's (retrieval, comprehension, analysis, knowledge utilization) with two integrative levels, the metacognitive system and self-system (p. 17). These six levels and three domains form a three-dimensional grid with the cognitive, affective and psychomotor domains of learning, as Figure 2.2 demonstrates.
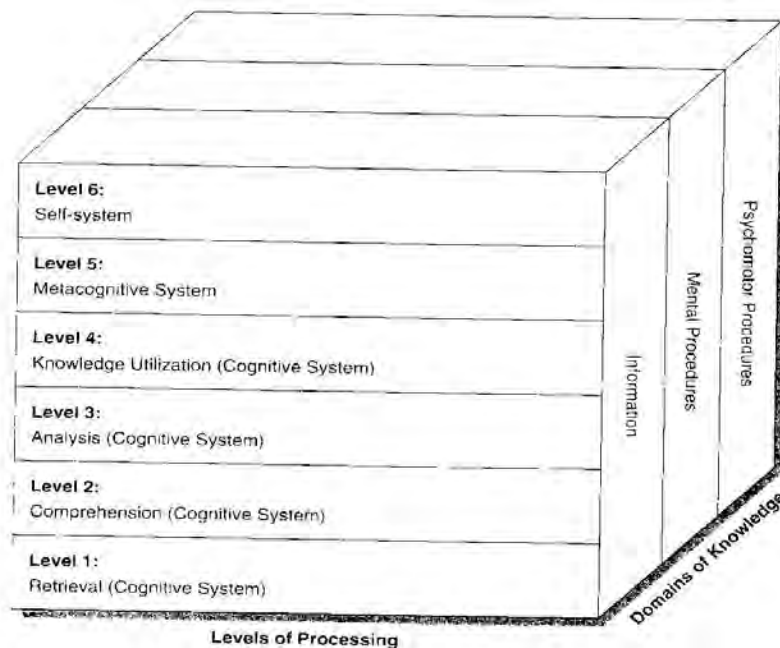
Figure 2.2 The New Taxonomy of Educational Objectives
(R.J. Marzano & Kendall, 2007, p.13)

This complex taxonomy recognizes that cognitive and affective objectives have been artificially separated, with cognitive learning emphasized most commonly for the past century. In the context of Christian education, the impact of this cognitive orientation is evident in the past emphasis on teaching doctrinal knowledge, overlooking experiencing God in relationships and through serving others. The GD curriculum balances the processes of *Connecting* (predominantly affective), with *Understanding* (predominantly cognitive), and *Ministering* (predominantly behavioural), in the community of faith which is

Equipping one another. The GDI items and suggested ways to engage in growing in each of the four processes (formative assessment next steps) were developed referencing this researched new taxonomy of educational objectives (J. S. Marzano & Marzano, 2008).

Recent findings on social intelligence (Goleman, 2006) support the power of the social aspects of teamwork and their impact on the curriculum product(s) such teams create, evaluate, or administrate. Social interaction further impacts the hidden curriculum. Like the Tyler and Taba models, Walker's Deliberative Model (1971, as cited in Hewitt, 2006, p. 142) was based on research experience, studying curriculum development teams and the way they made curriculum decisions. Walker proposed the deliberation process as key, with the team's value positions or underlying worldview perspectives shared to form the deliberation platform undergirding the curriculum work, a process followed in the development of both the GD curriculum framework and GDI.

Another influential curriculum model reflected in the GD curriculum is Bruner's (1977, 1996) spiral sequencing model. Bruner argued that the basic concepts of science and the humanities could be grasped intuitively at an early age. He believed that each body of distinct knowledge had a structure which could be patterned to fit the learner, and that curricula should be designed to foster and build on early intuitions in increasingly formal and abstract ways as education progresses. This spiral model is reflected in the GD curriculum's design where foundational concepts of lifelong spiritual growth or formation are applicable to all levels of Christian education.

Recognizing the cultural context as foundational to teaching and learning processes (Bruner, 1996), the transition in curriculum theorists' thinking about curriculum over the past century is of interest to this study developing a curriculum product for an education system than spans nations and diverse cultures globally. Pinar (2008, 2009, 2003; Pinar, et al., 2008/1995) proposes that answering the question, *What knowledge is of most worth?,* is still the vocation of curriculum studies, but the focus has shifted from curriculum development to understanding curriculum, and recently to internationalizing curriculum. "Bureaucratized curriculum development associated with Tyler's protocol, was replaced by a multidiscursive academic effort to understand curriculum: historically, politically, racially, (auto)biographically, aesthetically, theologically, institutionally and internationally as well

as in terms of gender, phenomenology, postmodernism and poststructuralism" (Pinar, 2008, p. 5).

Since the reconceptualisation of curriculum studies to focus on understanding curriculum (Pinar, et al., 2008/1995), curriculum development has shifted emphasis from protocols to research in a wide variety of disciplines (Wraga, 1999). In today's increasingly pluralistic and globally connected world, Pinar (2003) projects understanding curriculum internationally to be the next paradigmatic shift. Internationalizing curriculum inquiry, Gough (2003, as cited in Pinar, 2008) proposes, "might best be understood as a process of creating transactional *spaces* in which scholars from different localities collaborate in reframing and decentering their own knowledge traditions and negotiate trust in each other's contributions to their collective work" (p. 501). Developing an assessment tool such as the GDI for the global Adventist education system requires an international perspective and openness to learning through reiterative cycles of educational design research.

2.2.3 INSTRUCTIONAL DESIGN MODELS

Curriculum theorists focus on answers to the question, *What should be learned?*, where instructional designers are preoccupied with answering, *How should it be organized for teaching?* Although often considered as two separate domains or fields, Petrina (2004) notes that curriculum and instruction form one interdependent foundation to effective teaching and learning, united through the processes of curriculum design.

An understanding of the tools used by curriculum and instructional design specialists and teachers whose responsibilities include planning teaching and learning, is essential to curriculum practice (Hewitt, 2006, p. 150). Such models are useful for thinking about curriculum work, as well as planning and developing curriculum tools. Curriculum models can be:

- *Descriptive*, explaining an educational process or processes, e.g. Dimensions of Learning, or the GD curriculum.
- *Prescriptive*, as "a set of procedures or a sequence of steps about how to do something" (ibid, p.139), e.g. the backward design model.

- *Constructive* rather than predictive, in that the outcome or end product will not necessarily result in exactly what the model described, due to a number of unique and complex local setting factors, e.g. the new taxonomy of objectives.

Three prescriptive instructional design models help organize and structure the process of developing the GDI, and its position in the larger GD curriculum project: Wiggins and McTighe's (1999) *understanding by design/backward design* process (cf. 2.2.3.1), Dick and Carey's (2004) *systems approach to educational design research* (cf. 2.2.3.2), and Marzano et al's (1992) *Dimensions of Learning* framework (cf. 2.2.3.3).

2.2.3.1 Understanding by Design: The Backward Design Process

Wiggins and McTighe (2008) "challenge the common practice of teaching knowledge and skill for acquisition first and then teaching for meaning and transfer later" (p. 41). When understanding and real-world application are fundamental goals of education, the role of the teacher shifts from fervently funnelling facts to weaving the three instructional approaches - direct instruction, facilitation and coaching - as described in the *Paideia Program* (Adler, 1984). In the role of direct instruction, teachers help learners acquire basic information and skills through instruction and modelling, using a variety of instructional strategies including lecture, convergent questioning, demonstration, modelling, guided practice, and feedback. In the facilitation or coaching role, teachers help learners construct meaning and understand important ideas and processes using instructional strategies that foster active learning.

Understanding by design then refers to planning for thorough understanding of essential learnings. Within this conceptual framework, Wiggins and McTighe (1999, pp. 37-40) suggest that learning experiences should be intentionally planned with the final assessment in mind. To achieve this end, there are three stages to the *backward design* process:

1. Identify desired results. Because there is often more content than can be covered in the time constraints, determine and focus on enduring understandings, what learners should know, understand and be able to do when they have completed this course/unit/lesson, and what is worth understanding.

2. Determine acceptable evidence of learning, choosing forms of assessment to find out if learners have achieved the desired results and met the required standards.

3. Design teaching and learning experiences that will prepare the learners to demonstrate acceptable evidence of achieving the desired results.

Notably, assessment precedes planning of what is taught. Identifying desired results and determining acceptable evidence of learning, stages one and two, are like two book-ends or boundaries between which the educator plans, creates, finds or adapts instructional strategies, materials, and learning experiences to align goals and assessment outcomes.

2.2.3.2 A Systems Approach to Educational Research and Development

As education in the information age shifts increasingly to using distance education, research in psychology and information technology have shaped the field of cybernetics which guides a systems approach to education. Cybernetics is defined as "the regulation of human and machine behaviours through a system of information inputs, flows and processes, outputs and feedbacks" (Petrina, 2004, p. 93). Petrina's (2004) example of a shift from compartmentalization of curriculum and instruction to holistic interdependence in curriculum studies is evident in the increasing role of systems theory in instructional design.

"Systems theory, a product of the social sciences, provides curriculum planners with the critical concept of *interdependence* in organizations and helps to explain how one part of the organization influences the other parts" (Wiles, 2005, p. 122). In a sense, curriculum development recognizes the Gestalt principle of the whole being greater than the sum of its parts ("Gestalt psychology," Encyclopedia Britannica) and sets about to define the whole first, then systematically design the planned curriculum, recognizing the existence of the unplanned or hidden curriculum (formal education complemented by the informal or extracurricular) to form the desired whole.

Dick and Carey's (2004) systems approach model outlines ten steps to the process of educational research and development (M. D. Gall & Borg, 1997), illustrated in Figure 2.3:

1. Analyze needs to identify the goals of the product to be developed.

2. Analyze teaching to identify the specific skills, procedures, and learning tasks required to meet the instructional goals identified.

3. Clarify enabling objectives or entry behaviours required to begin the learning tasks, and determine the contexts in which the learned skills will be applied.

4. Write objectives based on needs analysis, instructional goals, instructional analysis and the enabling objectives set in steps 1-3.

5. Design tests or authentic assessments, which evaluate both learner mastery and the instructional system's effectives, prompting improvements to the specific goals and objectives created in steps 1-4.

6. Select teaching strategies to prepare the learners to demonstrate their mastery of the outcomes to be assessed.

7. Choose learning materials, adapted or created to facilitate teaching and active learning planned.

8. Conduct formative evaluation, using the criterion-referenced assessments designed in the fifth step.

9. Revise teaching materials and/or goals, using formative evaluation data. At any of steps 4-8, revisions may be called for of any other stages, in iterative cycles focused on improvement of the system as a whole.

10. After the system has passed through its formative stage, summative evaluation should be conducted to study the effectiveness of the system as a whole. (M. D. Gall & Borg, 1997, pp. 459-460)
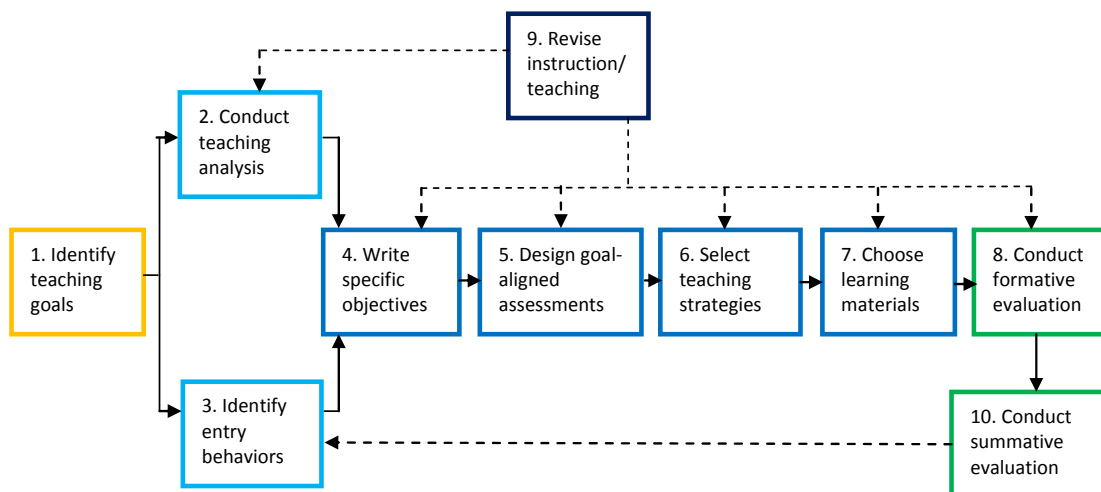
Figure 2.3 A Systems Approach Model to Instructional Design
(adapted from www.umich.edu/~ed626/Dick_Carey/dc.html)

Four types of criterion-referenced tests (entry behaviour tests, pre-tests, practice tests, and post-tests) are described in *The Systematic Design of Instruction* (Dick, et al., 2004). Entry behaviour and pre-tests determine what a learner knows and can do, and are *formative* assessments, informing group or individualized instruction planning. Practice tests are *ipsative* assessments, allowing for self-assessment and monitoring to improve performance and reach individual goals or mastery levels. Post-tests assess achievement of instructional goals; as *summative* assessments they serve as exit evaluations of individual performance and instructional strategy and materials effectiveness.

Christian education builds on an assumption that while educators plan and facilitate faith-nurturing learning experiences, learner transformation is dependent on the learner's personal encounter with the transcendence of God. Although age and course-specific objectives can serve a useful purpose, a systems approach recognizes the inter-related factors that impact educational outcomes, and intentionally seeks to guarantee that teachers focus on what matters most. In this context, the GD curriculum is a guiding framework rather than a prescription of specific objectives, affirming the professional teacher's role in designing or modifying instructional strategies and materials, objectives and an array of learner-centred assessments for their unique setting.

2.2.3.3 Dimensions of Learning Instructional Framework

The *Dimensions of Learning* instructional framework (R. J. Marzano, et al., 1992) is informative when considering the theory and practice of writing and assessing objectives, indicators, or outcomes and how to formulate inventory items aligned to the constructs defined by the curriculum goals. This model (Figure 2.4) has relevance to the processes and commitments of the GD curriculum.

In Dimension 1, students' positive attitudes and perceptions about classroom climate and tasks are critical to learning. Through Dimension 2, learners construct meaning, organize and store declarative knowledge (cognitive and affective understandings), as well as construct, shape and internalize procedural knowledge (skills, processes with sequential steps to act out). Learners extend and refine knowledge in Dimension 3 through methods such as questioning, comparing, classifying, induction, deduction, error analysis, constructing support, abstracting and analyzing perspectives. In Dimension 4, learners

use knowledge meaningfully through more complex cognitive processes requiring skills such as decision making, investigation, experimental inquiry, problem solving, and invention. To be competent in Dimension 5, learners have developed the mental habits of self-regulation, critical thinking, and creative thinking.
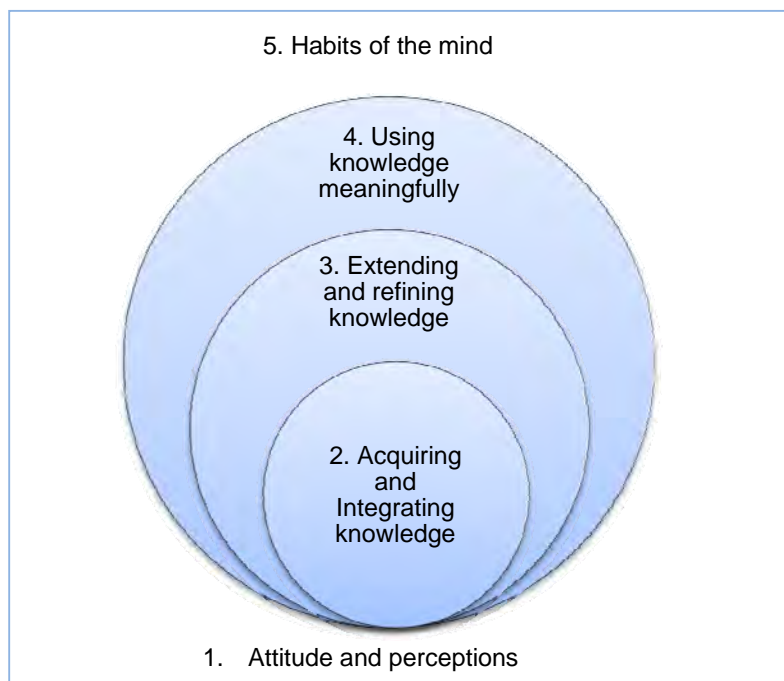
Figure 2.4 Dimensions of Learning Model
(R.J. Marzano et al., 1992, p.3)

Erickson's (2007) work on concept-based curriculum and instruction stresses identifying essential understandings in planning instruction, so that learning focuses on teaching learners to think conceptually. Content is organized by themes in single or multigrade settings, revisiting or spiralling through essential learnings of values and core concepts over a span of years. Erickson proposes a structure of six knowledge components (a) beginning with *facts*, (b) moving on to *topics* to organize sets of facts, (c) then to *concepts* as umbrella constructs of topics, (d) followed by *generalizations* of two or more related concepts, and (e) then the *principles* of two or more concepts that are foundational truths to a discipline, and finally at the most abstract level, (f) *theories* that explain the nature of behaviour or phenomena. Assessment of broader concepts spiralling through multiple years of education provides information to improve teaching and learning at the

overarching goals level. This is what the GDI seeks to do, supplementing teacher-created assessment of course-specific learning.

The foundational nature of attitudes, perceptions and habits of the mind are supported by Goleman's theories of emotional (1995) and social (2006) intelligence. His earlier emotional intelligence (EQ) research demonstrated that awareness and regulation of self (a habit of mind, linked to perceptions of self-efficacy, etc.) was a better predictor of academic success than cognitive intelligence (IQ). Findings from imaging studies in the field of social neuroscience led Goleman to propose two distinct brain pathways: "a *low road* for the rapid processing of interpersonal signals, be they cries of distress, flirtatious smiles, or the clasp of a comforting hand; and a *high road* that permits a more reflective awareness, communication, and regulation of our emotional experience" (Harris, 2006). Although findings are still tentative, it is evident that the social and emotional climate of learning environments impacts learning immensely.

2.2.4 CURRICULUM ALIGNMENT

Mechanics align a vehicle's wheels to maximize travel in the direction steered. Curriculum alignment follows the same principle, seeking the best match between curriculum, standards, instruction, and assessment to achieve the purposes of teaching and learning (L. W. Anderson, 2002; Barton, 2010; Black, 2003; Black, Harrison, Lee, Marshall, & William, 2004; Black & William, 1998; Glatthorn, 1999; R. McDonald & Van der Horst, 2007; Penuel, Fishman, Gallagher, Korbak, & Lopez-Prado, 2009; Roach, et al., 2008; Webb, 2007). The purpose of this study was to develop an assessment of essential learnings spanning every level of the foundational goals of Adventist Christian education. In order to maximize learning, this tool needed to be aligned to commonly shared standards across this international education system. An understanding of what curriculum alignment is, and processes to ensure alignment between curriculum, standards, instruction and assessment were thus central to the development phase of this educational design research.

One form of instructional design focuses on the scope and sequence of *content* taught through each consecutive grade (Wiles, 2005, p. 94). This method facilitates checking for inconsistencies and sequencing issues essential for multi-grade planning, but assumes

that subject matter or content *is* the curriculum. "A more useful approach to instructional design is the construction of a curriculum map or framework that details the curriculum in terms of purpose. In this technique, the curriculum is outlined not only in terms of content, but also in terms of concepts and learning outcomes (skills, behaviours, attitudes)" (p. 95). Following this concept and process approach to curriculum alignment enables standards-based instructional planning, as reflected in Wiggins and McTighes' (1999) backward design model, for example.

The term *curriculum alignment* is also used to mean the alignment of any two aspects of curriculum, where *curriculum* may be understood in several ways. Aligning the *written curriculum* is often debated in terms of aligning national curriculum standards with regional (province, state, etc.) and local school standards. Curriculum alignment can also refer to aligning the *written, taught and assessed curriculum* (Squires, 2005). Cohen (1987) discovered that misalignment between (a) what teachers teach, (b) what they intend to teach, and (c) what they assess as having been taught, had more to do with excellence in American schools than ineffective teaching *per se*. Continuing emphasis on standards-based reform led to research on alignment, accountability, methods, and measures (Chatterji, 2002). Such findings have spurred the use of *constructive alignment*, a curriculum model based on two premises: (a) that learners need to construct meaning from what they do to learn, and (b) that teachers need to align the planned learning activities and assessment tasks with the desired outcomes or essential learnings (Biggs, 2003; Houghton, 2004).

Beyond the internal level of authentic assessments which teachers develop, aligned to their specific course goals, the GDI provides Christian schools with a holistic formative assessment which can provide evidence of accountability, demonstrating to stakeholders the achievement of the broad goals of education from a Christian worldview. As the ease of travel and modern communication methods have opened political and economic collaboration globally, politically-motivated waves of international testing have heightened awareness of relative performance of learners (Anderson-Levitt, 2008; Baker & LeTendre, 2005; R. McDonald & Van der Horst, 2007; McGehee & Griffith, 2001; Penuel, et al., 2009; Roach, et al., 2008). As a result, comparative education studies and national competition have led to an emphasis on accountability (Apple, 2008; Helm, 2002; D. B. Reeves, 2002), teacher evaluation, and large-scale testing externally (state or nation

required) and internally (within local school systems). The standards-based reform movement impacts private Christian education as well as public schooling, because stakeholders expect standards for academic and spiritual excellence to be clearly visible, taught, and tested. In many world regions, private schools demonstrate student learning of the unique mission expressed in their Christian spiritual development goals as well as the requirements for public schooling, to be accredited or recognized institutions of learning.

Designing a criterion-referenced assessment for the international Adventist education system, the choice of curriculum to which to align the GDI was foundational to the development phase, as was international testing to the validation phase. Beginning with the end in mind, using the *backward design* process with a curriculum framework to maximize curriculum alignment, the GDI was developed as a formative assessment to facilitate learner self-assessment of Christian spiritual development.

2.3 ASSESSMENT

A review of curriculum theory and the rationale for curriculum alignment is foundational to an examination of educational assessment literature, and more specifically research and theory applicable to formative, self-assessment and available assessments of religious and spiritual development. Precedent literature pertinent to the conceptual framework for this study is discussed briefly in this section.

Although assessment is essential for effective teaching (A. V. Kelly, 1999, p. 128), "there is a lack of commonality in the definition of the terminology relating to it" (Taras, 2005, p. 466). Both *evaluation* and *assessment* refer to a single process, that of "making a judgment according to standards, goals and criteria" (p. 468); but they differ in their purpose or function. *Evaluation* commonly involves judgments of the system of education (i.e. curriculum evaluation examining courses or course delivery, or whole-program school effectiveness as in Adventist school evaluations), while *assessment* involves judgments of individual learner progress or achievement (p. 467).

Eisner (1993) notes that assessment, like evaluation, can serve educational, administrative and political purposes. Politically, it can be used as a mechanism for

changing and controlling the curriculum, with schools as "society's sorting machine" (Schubert, 2008, p. 410). Administratively, it can be used for selection purposes. Educationally, it can be used for quality control, to maintain or raise standards, as a form of extrinsic motivation, as a diagnostic tool, and as a source of data for curriculum evaluation (Eisner, 1993, pp. 224-225). With such divergent purposes, it must be remembered that "the purpose of an assessment determines priorities, and the context of use imposes constraints on the design" (Pellegrino, Chudowsky, & Glaser, 2001, p. 2). Using an assessment in any way other than it was designed will yield invalid judgments.

However, assessments can serve more than one purpose. Kelly (1999) outlines four purposes of assessment: *formative, diagnostic, summative* and *evaluative* assessment.

- *Formative assessments* provide feedback about the gap between the level of learner work being assessed and the required standard. The learners' progress can be reflected on, discussed and next steps planned to achieve personal goals and/or course requirements. *Formative assessment* is conducted during the course of learning; whereas *summative assessment* provides evidence at the end of a learning period.

- *Summative assessments* record the overall achievement of learners in a systematic way, whereas *formative assessments* may provide feedback on learning tasks at several incremental stages, e.g. projects or portfolios.

- Anonymous data can be summed by class, school or regionally for a secondary purpose, that of *evaluative assessment*, providing the school with a snapshot of the selected group of learners' Christian spiritual development at a specific time.

- *Diagnostic assessments*, usually completed at the beginning and ending of teaching and learning cycles, report on prior knowledge and skills of a learner, as well as the strengths and specific learning needs of an individual or groups of students in relation to intended outcomes. The GDI is primarily a formative self-assessment, but it could also serve as a *diagnostic assessment* if the individual reports help learners determine their spiritual strengths and growth points, and aid educators in tailoring teaching to learner needs.

It is possible to fulfil more than one purpose with one assessment. Kelly (1999) cites the (British) National Curriculum (DES, 1989) as one example, but the assessment results may be reported differently for each purpose, and the specific purpose should be kept

clearly in mind when analyzing the feedback. This understanding was fundamental to structuring the GDI. Although the primary purpose is creating a formative self-assessment, summative assessment reports are envisioned for class, school and regional evaluative purposes, within the fuller curriculum project beyond the scope of this study.

Knowing What Students Know: The Science and Design of Educational Assessment (Pellegrino, et al., 2001) is a research-based information-rich report on a three-year review of advances in the cognitive and measurement sciences regarding assessment of learning. Findings regarding new psychometric models for educational assessment, self-assessment and innovative technologies are of particular interest to this study. Technology makes complex new measurement models available to support a variety of new forms of assessment: using computers in the classroom, tapping into online assessments with intricate visual aids to report progress rapidly and regularly, storing these reports and keeping cumulative graphs and other forms of monitoring and assessing learning that a learner can readily understand and use to improve learning. This widely expanding array of technology-aided learning tools expands options for educators and learners. Of importance to this study, it is possible for technology-aided assessments to serve multiple purposes, with reports generated in different formats for each purpose. However, greater collaboration is needed between scientists, educators, designers and psychometricians to critique and implement the best educational technology (Pellegrino, et al., 2001, p. 6) for quality curriculum-aligned assessment.

Several styles of assessment are used in learner assessment: criterion- and norm-referenced, ipsative, profiling and graded tests. *Criterion-referenced assessments* (Horne, 1984; Popham & Husek, 1969) interpret assessment results for the individual against a pre-determined standard or set of goals, whereas *norm-referenced assessments* identify their criteria not from pre-set goals, but by referencing the average performance of a group defined as similar in some way (age, ability category, grade, gender, nationality, etc.). In reality, assessments that are criterion-referenced must take into account what is appropriate or 'normal' for a learner group, while *norm-referenced assessments* consider the criteria upon which to compare or norm a group after assessing. *Criterion-referenced assessments* are a product of standards-based education, and a response to the disadvantages of *norm-referenced assessments*, a discussion of which is beyond the scope of this dissertation.

Ipsative assessment refers to the comparison of an individual's assessment results with his/her results either in the same domain over time or across domains. Commonly used in physical education, in educational and recreational electronic gaming, and in the course of everyday life, *ipsative* assessment motivates the learner to improve his/her own records. *Profiling*, one approach to assessment, may include records of all other styles, both external/standardized and internal assessments, as well as learner self-assessments. The result is a cumulative record of learner achievement which can provide rich feedback for a number of assessment purposes listed above. As planning and assessment are an integral part of teaching, educators create and grade tests to assess the educational progress of learners, which includes continuous informal evaluation of the learner within the educational setting (A. V. Kelly, 1999, pp. 132-137).

Recent literature argues for performance or authentic forms of assessment designed within specific teaching-learning contexts rather than standardized system-wide measures (Horne, 1984; Wiggins, 1993). Reeves (2002) observed that balance is of essence, where multiple assessments of different kinds each inform the educational process. Performance assessments are more holistic and purposive, thus of formative value to the learner, where tests of broader curriculum goals may be of greater summative assessment value for comparative purposes and large-scale curriculum improvement.

As a formative assessment, the GDI will provide opportunities for individual planning. This follow-up activity could serve as an authentic assessment in local context. Thus this study seeks to bridge the authentic vs. standardized assessment divide, in assessing curriculum goals common to all Adventist schools and church religious education programs, yet intentionally formatted to provide the individual learner with a self-assessment tool prompting greater self-awareness and an opportunity to analyze an immediately available report as a graphic representation of strengths and growth points.

Assessment is an integral part of curriculum development and instructional design. Wiggins (1998) outlines five core concepts about assessment and assessment reform or change:
1. Assessment must focus on helping students to learn better and teachers to instruct better, with all other purposes (e.g. teacher accountability and program/system evaluation) of lesser priority.

2. "Students are entitled to a more educative and user-friendly assessment system", and by extension, "teachers are entitled to an assessment system that facilitates better teaching" (p.17).

3. "Assessment is central, not peripheral, to instruction... We learn through receiving and using feedback" (p.18).

4. As "assessment anchors teaching", so "authentic tasks anchor assessment" (p.18), evident in project-based and other active learning modes.

5. "All performance improvement is local" (p.18). That is, feedback from both national and local standards is ultimately acted upon in the local setting with individual learners.

The American Association for Higher Education, committed to assisting its 8,500+ member institutions to be more effective in education, outlines nine principles of good practice for assessing student learning (Astin, et al., 1996):

1. The assessment of student learning begins with educational values…. Where questions about educational mission and values are skipped over, assessment threatens to be an exercise in measuring what's easy, rather than a process of improving what we really care about.
2. Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time…. It involves not only knowledge and abilities but values, attitudes, and habits of mind that affect both academic success and performance beyond the classroom.
3. Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes. Assessment is a goal-oriented process.
4. Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes…. [It] can help us understand which students learn best under what conditions – [learner centred].
5. Assessment works best when it is ongoing, not episodic…. The point is to monitor progress toward intended goals in a spirit of continuous improvement.
6. Assessment fosters wider improvement when representatives from across the educational community are involved.
7. Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
8. Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change…. Information about learning outcomes is seen as an integral part of decision making, and avidly sought.
9. Through assessment, educators meet responsibilities to students and to the public... to improve. (p. 1)

So what is the real purpose of assessment? Costa and Kallick (2004) "believe that assessment is a mechanism for providing ongoing feedback to the learner and to the organization as a necessary part of the spiralling processes of continuous renewal: self-

managing, self-monitoring, and self-modifying" (p. 3). In the next two sections, self-assessment and self-directed learning are more fully discussed as they contribute to the conceptual framework supporting the construction of a self-assessment tool to facilitate lifelong Christian spiritual development.

2.3.1 SELF-ASSESSMENT

"Self-assessment is intrinsic to learning" (Black, 1998, p. 132). The purposes of self-assessment are "to identify areas of strength and weakness in one's work in order to make improvements and promote learning" (Andrade & Valtcheva, 2009, p. 12). Self-assessment is inherently formative, as the individual seeks to make meaning of life, integrating life experiences as a whole. The focus is not on competition, or comparison with others, but personal development.

Is self-assessment a contradiction of terms? Although the objectivity of assessing oneself has been questioned, all assessments are imprecise to some degree, and are at best estimates of what a learner knows and can do (Pellegrino, et al., 2001, p. 2; Tuck, 1997, p. 228). Tuck argues that examiners, even teachers who interact with learners daily, do not know learners as well as they know themselves. Learners learn more when they understand the criteria and engage in self-assessment during which they apply those criteria (Pellegrino, et al., 2001, p. 9). External forms of assessment (e.g. examinations based on national curricula) have advanced the view that assessment is "a form of measurement rather than the essentially judgmental process which in reality it is. The term *measurement* brings with it connotations of accuracy and precision, but it is plain to anyone who will look more closely at the matter that there is little accuracy, and precision varies inversely in relation to the complexity and sophistication of what is being assessed" (p.129). A balanced approach to assessment is a collaborative one, including self-assessment as a valid method of obtaining information to improve teaching and learning.

As with education for religious and spiritual development, character education includes beliefs, attitudes and practices. Regarding assessment, Roth and Brooks-Gunn (2003, as cited in Park & Peterson, 2005) reason that because people are able to reflect on their own character strengths and verbalize these in conversation with others, self-report surveys are a reasonable means to assess components of character (p.19). As spiritual development overlaps with character development in aspects of values and beliefs, it

follows that self-assessment would also be a reasonable method of assessing Christian spiritual development.

Although much has been written in European literature on religious education, its focus is the public sector. As one example pertinent to this study, examining the challenges facing teachers following the British National Curriculum (DES, 1989) for religious education, Fancourt (2005) differentiates between four types of self-assessment. Assessment *of* learning is a summative assessment of a pupil's ability at a defined point in the education process (e.g. end of a course or year), whereas assessment *for* learning is formative assessment aimed at helping the pupil's education process. When pupils identify aspects of their own learning that they can develop, self-assessment *for* learning occurs. Fancourt further differentiates between (a) self-assessment of *what* one is learning – the content, often cognitive, focused on in learning *about* religion; and (b) self-evaluation of *how* one is learning – the affective/reflective aspects of evaluating attitudes, feelings, and processes in learning *from* religion (Fancourt, 2005, pp. 116-117). The four types of assessment in religious education are clarified through the following examples (Fancourt, 2005, pp. 118-123):

1. Self-assessment *of* learning *about* religion happens when a pupil grades their knowledge and understanding about some aspect of religion at the end of term
2. Self-assessment *for* learning *about* religion occurs when a pupil determines their strengths and growth points with regard to their understanding about religion
3. Self-assessment *of* learning *from* religion is evident when a pupil assesses their attitudes toward, values and perceptions of their personal religious experience
4. Self-assessment *for* learning *from* religion expects a pupil to apply metacognitive processes to the reflective/affective domain of experiential learning in religious education

Fancourt (2005) concludes that "a better understanding of the challenges and techniques involved in helping pupils to assess themselves in religious education would inform pedagogy, which would then be more robust because it would be rooted in the pupil's learning processes" (p. 124).

Considering issues in assessing achievement of the goals and objectives of the British National Curriculum (DES, 1989) for religious education, Blaylock (2000) argues for

authentic assessments which include reflection or self-assessment, noting that borrowing numeric methods from science or mathematics to assess religious education lead to spurious claims of validity and fail to provide a holistic picture of what pupils have achieved in learning from religion. Teacher professional judgments are needed using an array of formative assessment strategies, avoiding assessment for comparability purposes.

Stanton (1988) proposes that learning is a process in which an individual creates personal meaning through acquired knowledge and through experience. Kolb's learning cycle built on Piaget and Lewin's four-stage experiential learning model (Kolb, 1984; Kolb & Kolb, n.d.), Wheeler's 5-stage cycle for curriculum planning, and Dewey's spiralling model (as cited in Tuck, 1997), all build on open or repeatable cycles of discovering meaning through thought and action. Empirical evidence for many learning cycles is refutable, but all models (http://tinyurl.com/2ajyg42) of learning experience include some process of reflection/review or self-assessment as formative assessment essential for continued learning. Responsibility for learning rests with the learner, making self-assessment an important aspect in any education intended to build competence for lifelong self-directed learning.

2.3.2 SELF-DIRECTED LEARNING

The educator's role in assessing learning is "to design diverse ways of gathering, organizing, and reporting evidence of continual learning and meaning-making to support learning in becoming self-managing, self-monitoring, and self-modifying" (Costa & Kallick, 2004, p. 3) These three characteristics define self-directed learners:

1. *Self-managing*: Knowing the significance of and being inclined to approach tasks with a sense of clarity about the outcomes, a strategic plan, and necessary data, and then drawing from past experiences, anticipating success indicators, and creating alternatives for accomplishment.
2. *Self-monitoring*: Having sufficient self-knowledge about what works, establishing conscious metacognitive strategies to alert the perceptions for in-the-moment indicators of whether the strategic plan is working or not, and to assist in the decision-making processes of altering the plan and choosing the right actions and strategies.
3. *Self-modifying*: Reflecting on, evaluating, analyzing, and constructing meaning from experience and applying the learning to future activities, tasks, and challenges. (p. 6)

These dispositions transcend all subject matter taught, and occur in all learning settings, emphasizing the importance of transitioning from assembly-line/industrial age views of discipline-specific content-delivery education, to differentiated learning focusing on whole person development for real-world living and life-long self-directed learning (Knowles, 1975). For this reason holistic Christian education is more than religious instruction and worship assemblies; it fosters principled living, connecting to every aspect of life and learning (Shortt, 1997).

Knowles (1975) coined the term androgogy in his research on self-directed learning in adult education. Criticism regarding his assumptions that the characteristics of self-directed learning applied to adult learners only led to revisions moving away from an andragogy versus pedagogy position to a continuum ranging from teacher-directed to learner-directed learning (Merriam, 2001). Self-directed and teacher-directed learning differ in significant ways (Knowles, 1975, p. 60):

- Self-directed learners grow in their need to be self-directing so nurturing this capacity facilitates development of mature learning skills. By contrast, teachers directing learning assume responsibility for what and how the dependent learner is taught.
- Self-directed learner's experience is an increasingly rich resource to be used along with expert input in future learning, where teacher-directed learning assumes the learner's experience is of little value and the teacher is responsible for transmitting expert resources.
- Self-directed learning assumes the natural orientation to learning is task or problem-centred where teacher-directed learning presumes subject-centred orientation is normal, and organizing learning around units of content best.
- Self-directed learning assumes learners are motivated by internal incentives where teacher-directed learning uses extrinsic motivation.

Teaching learners to be self-directed requires a paradigm shift for both teachers and learners. The teacher's role continues to be crucial, but different from traditional approaches (Costa & Kallick, 2004, p. 16), requiring different teaching methods and tools. It is hoped that the GDI will provide such a tool, useful to self-directed learning in Christian education.

Secular social science research works from the humanistic postmodern worldview which assumes that human beings have innate capacities for self-direction for the purpose of self-improvement. By contrast, the Christian worldview sees humans as sinful by nature (Romans 3:23), and transformation as the work of the Holy Spirit. A growing understanding of self *in relationship to God and others* is the basis for Christian spiritual development. From this Christian perspective, "the life force within all humans driving them to become self-managing, self-monitoring, and self-modifying" (Costa & Kallick, 2004, p. xx) is the God-given spirit, which prompts humans, consciously and/or unconsciously, to make sense of their world and ultimate reality. Furthermore, every living person, regardless of age, has a God-given life force evident in the smallest glimmer of hope and curiosity, which underlies motivation, goal-setting, and self-regulated learning (Zimmerman, 2008). It is from this Christian worldview that literature on self-directed learning is reviewed in this study.

From the field of adult education, Brookfield (1985) questioned the conceptual soundness of self-directed learning, noting (among other criticisms) the importance of teachers in facilitating self-directed learning in formal education, and the interaction with experts, tutors, and community resources in adult informal education. Vygotsky (1962) believed that development occurred in socio-cultural context. His concept of the zone of proximal development described a dynamic region in which children develop by working alongside with more experienced members of their culture, solving problems in natural social settings (Wertsch and Rogoff, 1984, cited in Neal, 1995). This development is self-directed to the extent that a child's curiosity and spontaneous questions are answered prompting further learning. Vygotsky (1962) used the term *scaffolding* to refer to the process of adults gradually withdrawing control and support as children increasingly demonstrate mastery of knowledge and skills.

The process of scaffolding is similar to Knowles' continuum of teacher-directed to learner-directed learning, and the concept of apprenticeship, where the novice works closely with the master until he/she internalizes the shared cognitive processes, becoming proficient at extending knowledge and skills through ever more self-directed learning (Hung & Der-Thanq, 2001). Notably, scaffolding focuses on the learner in relationship with the teacher, who has a set agenda (essential learnings), but allows the learner's behaviour and interests to guide the selection of teaching method. This developmental theory supports

the Christian philosophy of education, and the nature of the teacher-learner scaffolding relationship closely aligns with the *Equipping* process of the GD curriculum framework. Thus self-directed learning in this study is reviewed from the frame of reference of scaffolding, in the context of mentoring relationships where more mature Christians come alongside and guide less mature Christians into becoming increasingly self-directed, or "self-feeding" (Hawkins & Parkinson, 2007).

An electronic poll of 956 USA adolescent learners regarding the ways teachers could use the internet to motivate them and increase their learning found that online assignments that facilitate self-directed learning increase learner engagement (Strom, Strom, Wing, & Beckert, 2009). A survey of 398 middle school, 568 high school and 1159 USA college students (Lounsbury, Levy, Park, Gibson, & Smith, 2009), found self-directed learning was related to higher cumulative grade-point-average (an indicator of academic success) at all levels, as well as to personality traits, vocational interests, cognitive aptitudes, life and college satisfaction. And a report compiling responses from 368,000 American K-12 learners, parents, teachers and administrators identified *social-based learning* (utilizing emerging communication and collaboration tools), *un-tethered learning* (technology-enabled and self-directed), and *digitally-rich learning* (incorporating emerging technologies) as essential elements for 21st century learning (Speak Up 2009, 2010). Where learners are daily using the internet as their main source of informal self-directed learning, these recent findings are not surprising, and support the selected online format for the GDI for greatest global access to 21st century adolescents.

Because students each learn in their own way, all students need to learn how to self-monitor, self-assess, and self-regulate so that they can take an active role in learning in spite of poor teaching or other distracters inevitable in any class of diverse learners. To value lifelong learning, learners need to develop the skills to direct or regulate their own learning (N. Joseph, 2006). Thus self-regulated learning is a foundational, enduring, and essential learning in any educational endeavour.

"Self-regulated students select and use self-regulated learning strategies to achieve desired academic outcomes on the basis of feedback about learning effectiveness and skill" (Zimmerman, 1990, p. 6). In two studies of high school students, Zimmerman and

Martinez-Pons (1986, 1988, as cited in Zimmerman, 1990), found that "self-regulated learning strategies was strongly associated with superior academic functioning" (p. 8).

Commenting on the importance of feedback in academic tasks, Sadler (1989, as cited in Nicol & Macfarlane-Dick, 2006, p. 204) argued that learners must know what the goal or standard aimed for is, how their current level relates to the goal level, and how to close the gap. To be able to compare actual performance with a standard, learners must possess evaluative skills. Logically then "teachers should focus much more effort on strengthening the skills of self-assessment in their students" (p.204).

As self-assessment requires the ability to reflect on one's own thoughts and actions, investigating research on how students learn, with particular attention to metacognition, "the process of reflecting on and directing one's own thinking" (Pellegrino, et al., 2001, p. 5), is pertinent to this research. Metacognition refers to the thinking processes involved in self-monitoring and self-regulation, one of the sixteen *Habits of Mind* identified by Costa and Kallick (2001). A primary goal of teaching *Habits of Mind* "is the creation of self-directed learners" (J. Campbell, 2006, p. 7) .

Habits of Mind is a framework of attributes incorporating many intelligent thinking behaviours characteristically used by peak performers to solve problems and organize learning within vocational, relational or academic settings (p. 1). Developed by Costa and Kallick (2000, 2001, 2004), and extended through Marzano's (2007; 1992) *Dimensions of Learning* and new taxonomy of objectives work, *Habits of Mind* suggests thinking about intelligence as a single, pervasive, general mental ability (Spearman, 1904, 1927, cited in J. Campbell, 2006) is better replaced with thinking about intelligence as applying abilities a person is conscious of having, with sensitivity to appropriate timing and motivation to invest time and energy in using abilities, as important as possessing the mental abilities. So *Habits of Mind* serve both academic and practical life purposes (Costa & Kallick, 2000), as self-directed learners regulate their beliefs, cognitions, actions and motivations by selecting their own approach to learning and processing information (Shin, 1998, cited in J. Campbell, 2006, p. 7).

2.3.3 ASSESSING SPIRITUAL DEVELOPMENT

The purpose of an assessment is a key factor in determining the format or type of assessment. The GDI will serve as a curriculum-aligned self-assessment for Christian spiritual development, providing an option teachers may use creatively within their specific classroom culture, with regional curriculum parameters, unique learner needs, and personal instructional plans. A careful review of available literature regarding assessment in Christian spiritual development led to the discovery of many assessment tools for adults, but none focusing on discipleship or lifelong Christian spiritual development (cf. 1.6.2, 2.4.5) suitable to adolescents attending Christian schools. This section reviews key findings in this field that contributed to the conceptual framework guiding the development and validation of the GDI.

Academic databases online in the fields of religion, spirituality, education and psychology were used to locate journal articles, dissertations, conference presentations and recent books including keywords or phrases from three subsets:
1. The first subset related to the content area: *Christian education, religious education, spiritual, spirituality, spiritual growth, spiritual development, religious development, faith development, positive development, faith maturity, discipleship, spiritual transformation, spiritual formation*
2. The second subset related to assessment development: *self-assessment, assessment, inventory, profile, validating/validation, development/developing, construction/constructing*
3. The third subset narrowed the search to the life stage: *adolescent/adolescence, youth, child*

Assessment validation research using psychometric models in informal or formal education were reviewed, with priority given to empirical studies of youth, and broader age ranges of measures of any aspect of Christian spirituality.

2.3.3.1 Assessments of Christian Spiritual Development

Evaluation of the effectiveness of Christian education requires clear vision, aims and objectives to begin with, and systematic assessments of various components, including the learner's experience (Van der Walt & Zecha, 2004). To be an effective assessment

tool, a faith-based school system self-assessment of Christian spiritual development needs to be aligned to the essential learnings of the guiding curriculum, appropriate to the developmental level of those for whom the assessment is developed.

Of the many assessments of spirituality in general and Christian spiritual development in particular reviewed, the following secular and Christian assessments are mentioned as they are significant to the type of self-assessment developed in this study. While seeking comparable validated assessments, articles on assessment of Christian spiritual development in Christian education systems such as Guptill's (1998) qualitative assessment questions, helped sift and categorize assessments.

None of the assessments of religiosity included in Hill and Hood's (1999) comprehensive review of assessments of adult religious beliefs, practices, attitudes, orientation, development, commitment, involvement, and moral values are curriculum-aligned or designed for adolescents attending Christian schools. For example, the norm-referenced *Christian Moral Scale* by Francis and Greer (1990, 1992, included in Hill & Hood, 1999) and the *Salience in Religious Commitment Scale* by Pfiefer and Waelty (1995, included in Hill & Hood, 1999) may be useful in broadly evaluating levels of moral and religious commitment among college students, but they are neither applicable to adolescents nor curriculum-aligned. However, reviewing these established measures of religious and spiritual development provided benchmark information valuable to the development and validation phases of this educational design research.

Dorman (2001) validated a 30-item scale measuring associations between religious behaviour and attitude to Christianity among Australian Catholic adolescents. Fullerton and Hunsberger (1982) share the conceptualization, development and cross-validation process for their 24-item *Christian Orthodoxy Scale*. Although an older instrument, this Christian education assessment was informative because of its content, its multinational use (Australia and Canada), and its multi-age sample (high school and university students and their parents).

The interview protocol for the *USA National Study of Youth and Religion* (National Study of Youth and Religion, 2001; C. Smith & Denton, 2005), and the *ValueGenesis* 2 questionnaire items (Gillespie, et al., 2003) were carefully examined, as well as

considering the research findings from these two large-scale studies and the literature on spiritual development in childhood and adolescence. Item rewording, additions and changes were carefully noted with the findings for the Canadian, USA, and Australian versions of *ValueGenesis* 2, compared to *ValueGenesis* 1 ten years earlier. Items in the *ValueGenesis* study that fit the constructs within the four *GD* processes, were included. Some were reworded by the researcher as recommended by expert reviewers. Foundational to the *ValueGenesis* studies, Benson, Donahue and Erickson's (1993) review of the development and validation of the *Faith Maturity Scale* (Benson, et al., 1993; Derouen, 2005; Donofrio, 2004; Ji, 2004; Rohrer, 2000; Tisdale, 1999) was of direct interest to this study due to its use with other adolescent religious and spiritual development studies (Benson & Eklin, 1990; Benson, et al., 1990). A number of items were selected from both the *ValueGenesis* and the *USA National Study of Youth and Religion,* specifically to enable comparison of data in the validation phase of this study.

In the 1980s an *Adventist Religion Achievement Test* was designed as a comprehensive evaluation of growth in the knowledge and understanding of the Bible and the application of biblical principles. A series of five tests was created to be administered in grades 4, 6, 8, 10, and 12, measuring cognitive objectives of the North American Adventist Religion Curriculum (Department of Education, 2001):

> The specific purposes for which the *Adventist Religion Achievement Test* was designed were:
> 1. To determine the level of achievement of each student in the Religion curriculum to better develop curriculum materials and instructional procedures to meet individual needs and abilities.
> 2. To provide information to use in making administrative decisions in curriculum design and development.
> 3. To determine the relative effectiveness of alternate methods of instruction and the conditions which determine the effectiveness of various instructional procedures.
> 4. To provide a standard to depict what is expected of each student and to provide opportunity for feedback which will indicate progress toward suitable individual goals.
> 5. To report achievement to parents, students and the church membership in meaningful and objective terms.
> 6. To diagnose strengths and weaknesses in group performance which have implications for changes in curriculum, instructional procedures, or emphasis.
> 7. To diagnose specific strengths and weaknesses in a student's interpretation and understanding of the Bible. (J. D. Thayer, 1992, p. 2)

This series of tests was aligned to specific textbook content, limiting their use to grade-specific testing where these texts were used. The development process, report formats, and learner results provided practical suggestions for the GDI design and comparative data for validation.

The Search Institute's *Developmental Assets* (2009) research is an example of research on positive development, with versions for early, middle and late childhood (or adolescence). Examining the wording of the 40 assets divided into eight categories of human development, adjusted for three age groups, provided insights into developmentally appropriate items for the GDI. Reviewing the literature on positive development informed decisions about which aspects of the broad goals or commitments within the four processes of the GD curriculum framework to assess, and how to frame the individual reports to emphasize strengths to build on, and note growth points to prompt personal spiritual growth plans.

The 5-domain, 21-scale *Spiritual Transformation Inventory* (Council for Christian Colleges & Universities, 2006) is a web-based inventory assessing Christian spirituality with national norms targeted specifically for churches, mental health agencies, and faith-based universities and nonprofits. Used for both program evaluation and individual formative assessment, the STI is an example of assessment for multiple purposes, made possible by advanced technology, which can provide and securely manage/archive purpose-specific electronic reports.

LifeWay Research ("Spiritual growth assessment," 2007) shares the Southern Baptist Convention's assessment tools online. This model includes four steps:
1. assessing six spiritual disciplines: abiding in Christ, living in the Word, praying in faith, fellowshipping with believers, witnessing to the world, and ministering to others
2. drawing and evaluating a personal report, in the form of a discipleship wheel,
3. seeking accountability, by having three friends complete a spiritual observation response sheet to compare with your view of your spiritual growth, and
4. creating an intentional personal growth plan.

This adult Christian spiritual development assessment model provided examples of validation-accountability, easy self-reporting, and a template to guide intentional spiritual growth planning, all components built into the GDI.

Waggoner (2008) assessed the beliefs and actions of 2,500 active American Protestant adults who attended church on a regular basis, against seven standards of biblical spiritual formation: learning the truth, obeying God and denying self, sharing faith, serving God and others, exercising biblical faith, building solid relationships and seeking God. As all seven components of the *Spiritual Formation Inventory* (lifeway.com/sfi) were included in the four processes of the GD curriculum framework*,* the items in the *Spiritual Formation Inventory* were carefully reviewed, considering the long-term goal to establish the generalizability of the GDI self-assessment for wider use in evangelical Protestant Christian education.

A study of Protestants (Disciples of Christ, Evangelical Lutheran Church in America, Presbyterian Church in the USA, Southern Baptist Convention, United Church of Christ, and United Methodist Church) assessed the faith maturity of 3,121 adolescents, 3,466 Christian educators, 499 coordinators of Christian education, 519 pastors and 3,567 other adults in 561 congregations (Benson & Eklin, 1990; Benson, et al., 1990). As part of the six denomination study, the *Faith Maturity Scale* (Benson, et al., 1993; Derouen, 2005; Donahue, 2002) was developed to measure the strength of a person's relationship with God (vertical faith) and the behavioural results in relationships with others (horizontal faith), tested on a sample of 11,000 Christian adults and adolescents in the USA. Designed to measure "the degree to which a person embodies the priorities, commitments, and perspectives characteristic of vibrant and life transforming faith, as understood in 'mainline' Protestant traditions" (Tisdale, 1999, p. 173), the *Faith Maturity Scale* is built on eight core dimensions integrated by a mature Christian. While the *Faith Maturity Scale* has been used in multiple denominational studies of Catholic and Protestant youth (Benson & Donahue, 1990; A. B. Gane, 2005; Gillespie, et al., 2003; Kijai, 1993; Tisdale, 1999; Valuegenesis Europe," 2006-2008; *ValueGenesis: Study 1 core report*, 1993), findings indicate that some of the core dimensions are more strongly present (such as experiencing God's presence) than others (such as advocating social justice) in youth (Hoge et al., 1982; Rohrer, 2000). Although it is possible to value equality and social justice, most adolescents have little opportunity to act in these capacities of

their own free will yet, still developing awareness of social issues and personal strengths from which to serve, both foundational to any action. Thus items such as *I am spiritually moved by the beauty of God's creation enough to help the poor* and *I am active in efforts to promote social justice* (Tisdale, 1999, pp. 173-174) have questionable validity for use with adolescents at any level of faith maturity (Donahue, 2002; Ji, 2004; J. D. Thayer, 1993). These findings impacted item construction during the development phase of this study.

The *Christian Spiritual Participation Profile* (O. J. Thayer, 1996), based on Kolb's experiential learning theory, was designed to assess and promote Christian spiritual development. Thayer (1996) proposed a new theory of spiritual learning modes by which individuals engage with God and others through the spiritual disciplines. "Growth toward maturity in Christ results from participation in the spiritual development modes and transformation by the Holy Spirit" (O. J. Thayer, 1996, p. iii). The 50-item *Christian Spiritual Participation Profile* assesses the four modes of Religious Experience (concrete experience), Faith Quest (reflective observation), Vision (abstract conceptualization), and New Life (active experimentation).   Developed for adults and testing the spiritual development modes theory, related to Kolb's (Kolb, 1984; Moran, 2005) learning styles, this profile's items did not directly match the GDI*'s* underpinning discipleship model or the intended audience, but the methodology and report format were of direct interest to this study.

Faith Communities Today (FACT) "is an interfaith research report that provides key information on a range of subjects relating to congregational life in America" (http://faithcommunitiestoday.org). Conducted by the *Cooperative Congregational Studies Partnership* (http://hirr.hartsem.edu) this project brings together more than 25 USA faith communities including Protestant denominations, Catholic, Jewish and Muslim, seeking to increase the capacity of participating faith groups to conduct and use congregational research. A common core questionnaire is used to collect information, with each faith adjusting it to add items of unique interest to their faith (see http://www.fact.hartsem.edu). Similarly, the USA *National Catholic Education Association* (http://www.ncea.org) allows local diocese to add items reflecting local foci to their national *Assessment of Catechesis Religious Education* (Dudoit Raiche, 2000; NCEA, 2001; Palmer & Dudoit Raiche, 1998; Poggio, 2002). It is hoped that this assessment validation will provide a self-assessment

tool that will add to the field of curriculum studies in the area of Christian education, considering the possibility to build on this basis with additional items as desired for specific Christian denominations.

The *Spiritual Growth Survey* (Slamp, 1989, 1997) was field-tested in evangelical churches that were among the 500 fastest growing churches in North America. A number of standards ensured broad representation among the ten Protestant denominations that returned a total of 1,800 responses (personal communication, November 2008). Now used widely to assess adults in Christian church growth initiatives, its pencil-and-paper format is simply self-scored to report individual strengths in twelve spiritual qualities. Although validation research was unavailable on this assessment tool, both its structure and content (including items measuring most GDI commitments) provided a valuable comparative resource during GDI item construction.

2.3.3.2 Secular Measures of Spiritual Development

From the postmodern secular worldview, several other spiritual assessment development and validation studies were reviewed and compared during the development phase of this study. Leak (2008) evaluated two plausible models of factorial validity (not completed in the initial construct validation process) for the *Faith Development Scale* (FDS), "a brief, global measure of religious maturity derived explicitly from Fowler's (1981) influential theory of faith development" (p. 123). Leak and Fish (1999) documented the development and initial validation of their norm-referenced *Religious Maturity Scale* (RM-1 & RM-2) for adults, based on Gordon Allport's early conceptualization of religious maturity. Muse-Burke (2004) created and validated a self-report *Inclusive Spirituality Index* (ISI) for use with religious and nonreligious adults. Her specific research questions were of interest to this study.

Although Amram & Dryer (2008) designed the 83-item (or 45-item short) *Integrated Spiritual Intelligence Scale* (ISIS) for adults, several aspects of this study are noteworthy, illustrating the increase in research in secular spirituality, and new directions in intelligence theory and testing. The concept of intelligence has broadened beyond the cognitive focus on linguistic and logical abilities (Spilka, R, & Gorsuch, 1985) to include a range of intelligences (Amram & Dryer, 2008). Daniel Goleman's (1995, 2006) research provides

models of emotional and social intelligence, increasingly supported by neuroscience research. Howard Gardner's (1993, 2006) multiple intelligences model originally outlined seven types of intelligence: linguistic, musical, logical-mathematical, spatial, bodily-kinaesthetic, interpersonal, intrapersonal. He later added the eighth, natural intelligence, and suggested the possibility of an existential or spiritual intelligence, which further research has confirmed (Amram & Dryer, 2008). Zohar and Marshall (2000) focus their definition of spiritual intelligence on issues of meaning, recognition of our interconnection to all of life, and the capacity to utilize another level of consciousness and intelligence beyond analytical, linear, and rational thought. Zohar and Marshall's work adds credence to this study's stance that spiritual development is integrative, at the core of holistic human development, and the ISIS construction and validation process informed the methodology for the development phase of this study.

Park and Peterson (2005) explored the assessment of character strengths, building on the *Values in Action Inventory of Character Strengths for Youth* (VIA), with 189 items (7-9 items each of 24 strengths in non-systematic order) using a five point scale from 5 (very much like me) to 1 (not like me at all). They argue (Park & Peterson, 2005, p. 3) that a strength should be:

- visible in a person's thoughts, words, or actions;
- contribute to the good life for the self and for others, yet be valued in and of itself even if it does not produce clear benefits;
- not "diminish other people" but rather inspire or support them;
- be cultivated by the larger society and recognized by a societal consensus regarding its importance; and
- it should not be possible to decompose a strength into component elements.

This list of characteristics of a strength and the logical process of constructing the VIA was of comparative value in structuring the GDI, and evaluating the extent to which it was a reliable and valid curriculum-aligned self-assessment.

Gallup's strengths-based development assessments are "a product of a 25-year, multimillion dollar effort to identify human talents that form the building blocks of a strong and productive life." ("Strengths-based development," 2009) The online *Clifton Youth Strengths Explorer* (http://strengthsexplorer.com, 2009) assesses the ways in which 10-14

year olds most naturally think, feel, and behave as unique individuals. The assessment reports the individual's five strongest talents, with a report of how to strengthen these, rather than focusing on relative weaknesses. Strengths-based education is being promoted as a more successful strategy to helping learners succeed than the traditional focus on weakness identification and reparation (Benson, 2004). The format and reporting of this researched assessment tool was carefully reviewed for length, and website functionality suitable to early adolescents in particular.

2.4 ADOLESCENT DEVELOPMENT

Understanding the abilities and needs, interests and challenges of adolescents informs teaching and the assessment of learning. Many factors have prolonged the period of adolescence, but in this study *adolescence* refers to the years beginning with puberty and continuing through the final year of high school, usually corresponding with the teen years (thirteen through nineteen), and the sixth through twelfth or thirteenth year of schooling.

An understanding of developmental psychology, focusing on the period of adolescence, was essential to the development phase of this educational design research. Increasing emphasis on researching and understanding development holistically (Benson, 2004), with spiritual development central to thriving or positive youth development (Benson & Scales, 2009; Benson, et al., 2005; Dowling et al., 2004; King & Benson, 2005; Moore & Lippman, 2005), adds credence to the philosophy of Christian education foundational to this curriculum research.

A clarification of terms in transition, religiosity/religion/religious and spirituality/spiritual, transitions the review from human development in general to spiritual development in particular. The section concludes with a discussion and clarification of the term Christian spiritual development, as used in this study.

2.4.1 HUMAN DEVELOPMENT IN ADOLESCENCE

Research on human development seeks "ever more powerful and richer explanations of the patterns of developmental change" (Fischer & van Geert, 2009, p. 332) by asking questions about:

- how development takes place - continuously over time vs. dramatic stages,

- what drives it – learning vs. biological maturation processes,

- how change occurs – e.g. the role of experience, and

- what are the best methods to study it (Spencer, Thomas, & McClelland, 2009, p. xvii)

Many theories of human development address aspects of spiritual, religious and moral development. Major concepts which underpin assessment of Christian spiritual development are briefly reviewed in this section, as they informed the development and validation phases of this research.

2.4.1.1 Psychoanalytic Theories

Although Freud's (1961, cited in Roehlkepartain, Benson, King, & Wagener, 2006) negative view of religion downplayed the integral role of religion and spirituality in wellness for approximately half a century, several prominent psychoanalysts (e.g. Jung, 1938 & Rizzuto, 1979, cited in Roehlkepartain, et al., 2006, p. 6) saw productive ways spirituality and religiosity could function in the developmental process. Through their 30-year research on the inner life of children, psychoanalysts Robert and Jane Coles (1990) were surprised to discover the positive and transformational quality of children's spirituality. The phenomenological approach of Coles to understanding child spirituality "brought a deep quality of respect and illumination to the complex spiritual lives of children" (Roehlkepartain, et al., 2006, p. 7). King and Boyatzis (2004) noted that while less than 1% of social-science articles reviewed on children and adolescents addressed spirituality or spiritual development, a new field of spiritual and religious development is emerging with evidence confirming "positive links between adolescents' involvement in religion and many desirable developmental correlates" (p. 2).

2.4.1.2 Stage Theories of Development

(i) Cognitive Development

Disagreeing with Freud's psychoanalytic theories and Skinner's ideas of programmed instruction, Piaget (1952, 1977) explored the mechanisms and stages of cognitive development during childhood and adolescence. Piaget proposed that social interaction and the process of exploring tensions or problems, which he termed *disequilibration*,

promoted development. He believed growth took place in great leaps through four sequential stages: the sensorimotor stage (0-2 years), the preoperational stage (2-7 years), and the concrete operations stage (7-11 years) in childhood, and the formal operations stage begun by some but not all during the adolescent years (Piaget, 1947; Plueddemann, 1995).

Among other criticisms of all invariant, hierarchical stage theories (cf. 2.4.1.2(v)), Piaget's theory does not explain *how* cognitive development occurs or account for individual differences. Piaget's early observations included suggestions regarding religious development (Piaget, 1932).   His cognitive development research was extended by Vygotsky (Allen, 2005; Hung & Der-Thanq, 2001; Miller, 2002; Neal, 1995; Vygotsky, 1962) and more recently by neo-Piagetian theorists, including Pascual-Leone (1970; 1979), Case (1985, 1987, 1992), Halford (1982, 1993), Van Geert (Fischer & van Geert, 2009; Van Geert, 1994, 2000), Fischer (1980; Fischer & Rose, 1998; Fischer, et al., 2003) and Demetriou (Demetriou & Kyriakides, 2006; Demetriou, Mouyi, & Spanoudis, 2010; Demetriou, Spanoudis, & Mouyi, 2010).

Beyond the significant contribution to subsequent theories of development, a few points are noteworthy here regarding cognitive development theory. Piaget believed children are actively engaged in making sense of moral behaviour observed, interpreted from their developmental perspective (Miller, 2002; Piaget, 1932). This learning-through-modelling-and-coaching concept is amplified by Vygotsky's (1962) zone-of-proximal-development, where cognitive apprenticeship (Crawford, 2007, 2008) utilizes scaffolding and fading (Allen, 2005). The GD curriculum framework process of *Equipping* in Christian spiritual development, is both biblically-based and supported by these theories. The ability to think about thoughts developed during the adolescent years, according to Piaget, is an important aspect of metacognition necessary for reflection and self-assessment. A lower boundary for assessments such as the GDI is thus set at the beginning of Piaget's formal operations stage corresponding with early adolescence, around Grade 6 in most school systems.

(ii) Moral Development

The stage theory research of Kohlberg (1974, 1975, 1984), augmented by the work of Gilligan (1977, 1982) and Lickona (Kohlberg & Lickona, 1976; Lickona, 2004, 1976),

describes moral development as a progression from interpersonal conformity (obedience and self-interest driven in pre-conventional stages, as well as authority-focused conventional stages) to a sense of personal responsibility within the broader social community (in both social contract and universal ethical principle driven post-conventional stages). Kohlberg's androgenic focus on justice over other values, was first criticized by Gilligan, whose study demonstrated that females emphasize the ethic of caring and responsibility over the ethic of duty or obligation central to Kohlberg's theory (Helminiak, 1987; Kohlberg & Lickona, 1976; Webster, 1996).

Early moral development studies focused on discovering *why* participants believed something to be right or wrong. Findings raised questions which prompted further research on religious identity (Elkind, 1978), religious judgment (Oser & Gmunder, 1991; Oser & Scarlett, 1991), and faith development (J. W. Fowler, 2001; J. W. Fowler, Nipkow, & Schweitzer, 1991). Kohlberg's analysis of semi-structured interviews using moral dilemmas prompted the development of real-life dilemmas for youth discussion, as moral reasoning develops when adolescents learn to explain why certain actions are right or wrong and how their worldview and faith influence their decisions (Stonehouse, 1995, p. 74). Although Kohlberg, Oser and other theorists' approaches to moral thinking differ in area of focus, a comparison of findings relating to adolescence influenced the construction of items for the GDI.   A self-assessment has the potential to raise adolescent awareness of moral dilemmas in their lives and interest them in group discussion and personal decision making, key skills to self-directed learning for holistic living.

(iii) Identity Development

Quinn (2008) posits that spiritual development is a core construct of identity formation, which in turn is a central task of adolescence. Perhaps most well-known in the field of identity theories is Erikson's (1950, 1968) stage theory, built on eight psycho-social crises, each experienced in sequence, shaping future development by its positive or negative outcomes. The adolescent crisis focused on questions of identity: "Who am I? What do I believe and value? Who are my people?" (F. Anderson, 1995; Steele, 1995, pp. 97-98). Each of these aspects of identity relate to facets of religious and spiritual development. "Identity achievement is a crucial developmental milestone, as it enables a young person to make positive contributions to society and to avert identity diffusion and despair" (Furrow, King, & White, 2004, p. 17).   Erikson (1968) identified fidelity as the positive

outcome, embodied by a commitment to a worldview or belief structure that becomes the guardian of identity (B. Gane, 2009). A spiritual identity is evidenced in a personal sense of purpose in life, a sense of belonging and a commitment to community (Furrow, et al., 2004). Self-assessment tools such as the GDI can assist adolescents in discovering their spiritual identity in relationship to God, self and others (Habenicht, 2001).

(iv) Religious and Spiritual Development

Drawing on the constructivist development work of Erikson (1968; Steele, 1995), Piaget (1932, 1947, 1977), and Kohlberg (1974, 1975; Kohlberg & Lickona, 1976) as well as the theological work of Niebuhr (Astley & Francis, 1992), Fowler's (1987, 2001, 2004; 1991; 1990) faith development theory bears mentioning as one significant theory in the field of spiritual development. Fowler (1987) focused on the form of faith, the *how* (processes) rather than the *what* (content), in an attempt to build a theory universally applicable across religious differences in worldview (Astley & Francis, 1992). From a Christian perspective, Dykstra (1986a, 1986b) suggests that Fowler's faith development theory can help Christians understand readiness for faith, but their personal response to God's grace constitutes Christian faith. Fowler "speaks of faith in terms of making sense out of life, and getting meaning out of it, rather than as trusting in a supernatural being" (B. Gane, 2009).

According to Fowler, adolescents are likely to develop through the third stage of *synthetic-conventional* faith (Downs, 1995), characterized by conformity to outside authority, with beliefs "deeply felt but not deeply understood or examined" (Rohrer, 2000, p. 30). In the later teen years, adolescents may progress into the fourth *individuative-reflective* faith stage, in which beliefs are examined to develop an owned and personal or internalized faith. Meaning making and identity discovery, the key task during adolescence in Erikson's psychosocial theory, are closely tied to faith development progression to the next stage. Metacognition and self-assessment skills and experience are foundational to both developmental foci. It could be argued that the GDI as a self-assessment may facilitate faith development as Fowler outlines, from *synthetic-conventional* to *individuative-reflective* faith.

Clore and Fitzgerald (2002) define faith as "the search for an integrating center of value and meaning that is cognitional in nature, developmental in process, and transcendental in its dimensions" (p. 106). As an alternative to Fowler's universal faith model, intentional

faith development research, drawing on Lonergan's levels of meaning (1957, 1972), focused on four dimensions of knowing - common, thoughtful, responsible, and transcendent faith - each more differentiated and integrated than previous dimensions (Clore & Fitzgerald, 2002). Each dimension represents a distinctly different way of organizing thought rather than sequential stages of physiological, neurological, or psychosocial development. Where Fowler's theory is criticized for its lack of cultural consideration (e.g. cultures that do not move towards interiority), Lonergan's (1972, p.85) realms of meaning involve cultural and historical factors, in four deepening (and simultaneously functioning) dimensions of growing faith.

Westerhoff (1979, 2000) proposed four levels of Christian faith development. When the young child experiences trust, love and acceptance, a growing faith is fostered at the first level. If these needs are met, pre-adolescents may progress to the second level, desiring to affiliate or belong to a faith community, as their cognitive development matures into the ability to think abstractly. This awakening is recognized through religious practices such as baptism, catechism, and bar/bat mitzvah, for example, where the 10-to-14-year-olds make a personal commitment to their chosen faith and are publically welcomed and affirmed as participating members. Westerhoff considered preadolescents focused on *affiliating faith*, followed by a third level, *searching faith*, corresponding to Erikson's (1968) *identity* crises, and to some extent Fowler's (1990) *individuative-reflective* stage. Fowler suggests that adolescents experiment with alternative views as they try to make sense out of life, reflecting on their experience individually and within relationships they value. The GDI may assist the teen in heightening personal awareness of their strengths and potential growth points (weaknesses) as they search for an *owned faith*, the fourth stage into which Westerhoff proposes Christians mature.

(v) Other Stage Theories and Issues

Levinson's (1978) seasons of life theory sees childhood and adolescence focused on the development of basic knowledge and skills. Leaving the parent's world is the transformation Gould (Helminiak, 1987) proposes fits adolescence. And Loevinger's ego development theory highlights approval seeking judging on externals as central to the *conformist stage* typical of adolescence.

Although normative stage theories and structural models (as briefly discussed above) have provided valuable insights prompting further research on human development, the following criticisms should be considered in applying theory to Christian spiritual development. Stage theories:

- do not explain the nonlinear changes that occur in religious and spiritual development from birth to death;
- fail to capture the diverse ways in which individuals express themselves religiously and spiritually;
- are over-optimistic about the results of structural development; and
- superimpose Western, liberal values above others, overlooking cultural diversity and the complexity and uniqueness of individual religious development, and seeking the universal at the expense of other views (Boyatzis, 2008, p. 53; Scarlett, 2005, p. 26).

One reaction to overly cognitive stage theories is the 'spiritual child' movement, "based on the idea that spirituality is rooted in personal experience, feeling, and biology" (Scarlett, 2005, p. 28). Hay and Nye's (2006) qualitative research documents profound spiritual experiences in young children in Britain whose families were predominantly non-religious. Hart's (2005) research proposes that spiritual capacity is a product of brain development, having a biological root, not just socialized, findings corroborated by neuroscience (K. K. Kline, 2008). Hay and Nye's research methods have been criticized, and words such as *wonder, awe, wisdom*, and *relational consciousness* used in reports rather than *religious* or *spiritual,* yet these studies (among others, such as Clore and Fitzgerald, 2002, Korniejczuk, 1994) demonstrate that "children have the capacity for rich and varied spiritual experiences" (Scarlett, 2005, p. 28), without the limits previously touted by stage theories of development.

2.4.1.3 Developmental Systems

After decades of divergent perspectives and insular approaches to human development, an explanatory holistic framework is emerging as separate theoretical traditions (e.g. physical, cognitive, moral, social, faith development) begin to emphasize their integral part in a larger whole, a dynamic systems approach (M. D. Lewis, 2000). The difference between stage theories and dynamic or developmental systems theories are clarified by

examining two meta-metaphors. Like a ladder, stage (e.g. cognitive, identity, moral and religious development) theories explain development as a progressive process unfolding along a series of fixed ladder steps. Like a web, developmental systems theories (Figure 2.5) portray cognitive development as a complex process of dynamic construction within multiple directions… with "at least three important features:

- development occurs in a complex multilevel range;
- developmental pathways undergo dynamic transformation through multiple strands or network links; and
- multidirectional construction is the form of development" (Fischer, et al., 2003, p. 492)
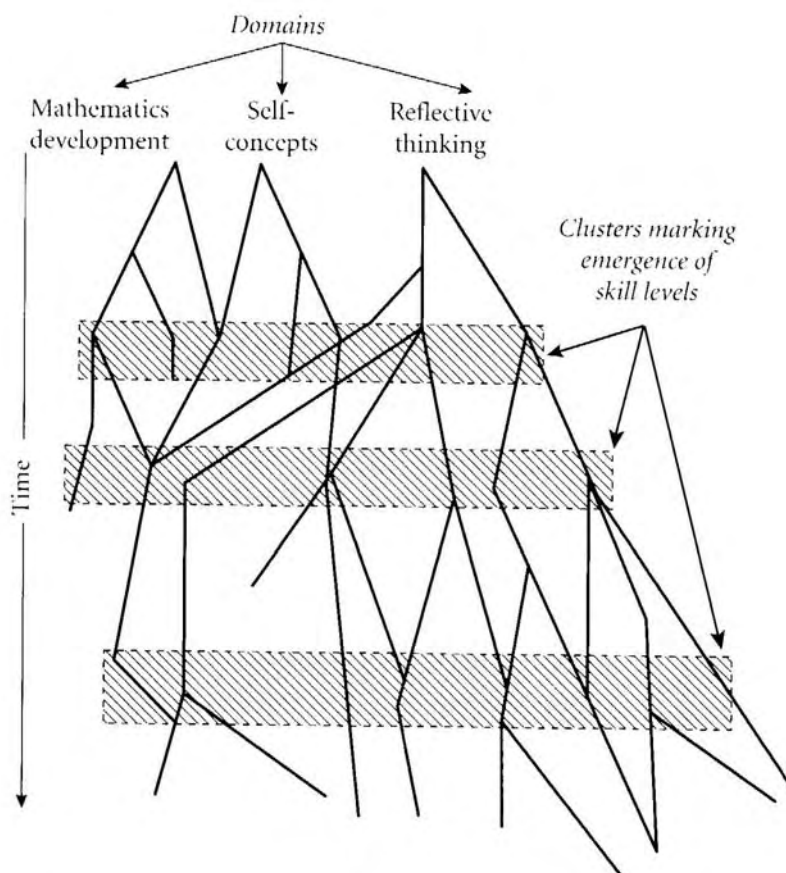
Figure 2.5: A developmental web
(Fischer & van Geert, 2009, p.330)

Is it possible that spiritual development's relationship to human development could be clarified through a better understanding of developmental webs? In contrast to stage or structural theories, developmental systems theories consider variation central, focusing on individual rather than group performance, allowing for multiple cognitive levels in each person simultaneously, with the interconnections within the web providing additional

information about the direction of construction e.g. forward consolidation or backward transition (p. 493).

Increasingly complex mathematical modelling along with new frontiers in neuroscience have led to new directions in developmental psychology research. *Connectionism* provides detailed models of the changes in neural networks underlying learning, and *dynamic systems theory* concentrates on motor skills analysis at the physical level (Spencer, et al., 2009). *Developmental systems theory* models the relationship among various factors that interact to produce developmental change in behaviour. "Developmental systems theories shift the focus from individuals to transactions between individuals and their various embedded contexts" (Scarlett, 2005, p. 30). Considering how socio-cultural context and cognitive development thread together to explain behavioural change is one example of the systems approach, moving towards a unified theory of development.

This developmental systems approach is evident in the increasing interest in faith-based communities and their role in positive youth development (Barber, 2005; Benson, et al., 2003; King & Boyatzis, 2004; Moore & Lippman, 2005; Regnerus, 2003; Regnerus, Smith, & Smith, 2004). Religious development is not a separate cognitive domain, for "religious thinking is neither more primitive nor more mature than other kinds of thinking" (Scarlett, 2005, p. 30). It is different, to be respected, and worthy of researching within and across religious traditions, where a holistic approach to education for positive development (Benson & Roehlkepartain, 2008; Moore & Lippman, 2005) is embraced. Reporting on research conducted through interviewing 239 Canadian preadolescents (9- to 12-year-olds) regarding their sense of self and wellbeing (i.e. spiritual awareness from a secular psychological perspective), Bosacki (2001, 2002) recommends a holistic (in place of the prevalent cognitive) approach to education that nourishes the mind, body, and soul, a stance shared by other research focused on helping children develop into resilient adults (Benson & Scales, 2009; K. K. Kline, 2008; Search Institute, 2009).

2.4.2 SPIRITUALITY AND RELIGIOSITY DEFINED

The increasing number of social science studies including aspects of religious and spiritual development reflects a growing awareness of and interest in this dimension of

human life (Benson, et al., 2003; Benson, et al., 2005; Bigger, 2008; Boyatzis, 2008; Kourie, 2006; Roehlkepartain, et al., 2006). Yet the ambiguity in the scientific community about the nature and scope of religious and spiritual development impedes comparison and clear analysis of findings. Defining spirituality and religiosity thus precedes a meaningful review of research on religious and spiritual development in childhood and adolescence necessary to constructing a quality assessment of Christian spiritual development.

In recent years, the terms *spirituality* and *spiritual* have increasingly been used in preference to the terms *religion* and *religious.* Pargament and Hill (2003) document a polarization in the United States, where the term *religiosity* is associated with words such as *institutional, formal, outward, doctrinal, authoritarian, inhibiting expression*; and *spirituality* is associated with *individual, subjective, emotional, inward, unsystematic, freeing expression* (Hyman & Handal, 2006; Kourie, 2006; Pargament & Hill, 2003, p. 64). Although comparison is an essential learning tool, oversimplification hides the fact that all forms of spiritual expression unfold in a social context and most religions are primarily interested in the spiritual growth and holistic development of individual members (Wuthnow, 1998). Western society's increasing tendency to interpret religiosity as negative and spirituality as positive (Wuthnow, 2003) overlooks the helpful and harmful sides of both, and inevitably results in confusion and duplication of concepts and measures thereof. The majority of adults and adolescents surveyed in recent American studies report experiencing spirituality within an organized religious context with little distinction made between religiosity and spirituality (Pargament & Hill, 2003; C. Smith & Denton, 2005).

Anthony (2008, 2006) uses the metaphor of a river to organize views of *spirituality* and *religiosity* (cf. Figure 2.5). At the broadest level, he defines *spirituality* as the "qualities of human existence which transcend the physical and animal aspects of being, and which can be found in the thinking, feeling and willing of human beings" (Anthony, 2006, p. 15). Within this broad river of spirituality, two main streams divide, termed *natural spirituality* and *religious spirituality*, each further branching into multiple perspectives on spirituality. Existential, developmental, psychological, humanistic and social science views of spirituality flow from a body of literature drawing on secular or nonreligious perspectives. Other major currents flow from a religious spirituality perspective, into streams of

contemporary religious spirituality, Christian spirituality, other world religions and New Age spirituality.

Perspectives in the religious spirituality current all begin with some belief in a higher power or deity. The Abrahamic faiths (Christianity, Judaism and Islam) flow from a shared belief in one true God (monotheistic). Christianity further flows in Catholic and Protestant streams, each dividing into yet smaller currents sharing theological perspectives with the broader stream, while unique in some specific beliefs and religious practices from all others.
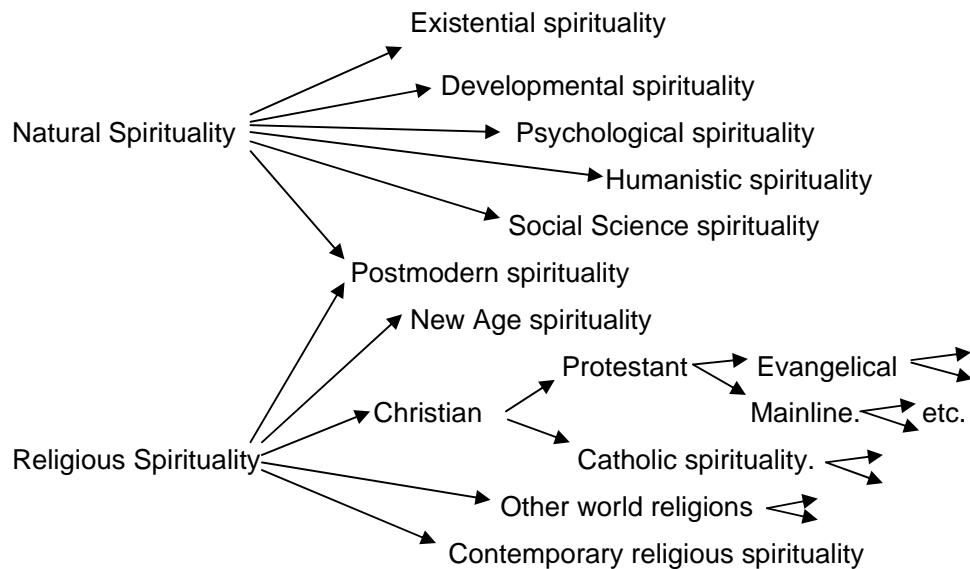
Figure 2.5 A Worldview Approach to Spirituality
(Anthony, 2008)

This spirituality model explains key differences due to foundational assumptions about the nature of spirituality, but does not address the impact of perspectives on each other. For example, postmodern spirituality bridges the gap between the sacred and secular spirituality divide; developmental and psychological spirituality research informs Christian education.

Psychological research on wellness examines how an individual subjectively and positively views their quality of life as a whole. Several assessment instruments reviewed reflect theoretical models of holistic health e.g. the *Wheel of Wellness* (Hattie, Myers, &

Sweeney, 2004), and Travis & Ryan's (2004) *Wellness Index.* The *Wellness Evaluation of Lifestyle* (Myers et al., 1998, cited in Hattie, et al., 2004) was developed from a pool of 500 self-statements, tested in several settings over a 6-year period, to measure each of the five life tasks (spirituality, then self-direction, encompassed by the triad of love, friendship, work and leisure) and twelve subtasks of self-direction in the multidimensional and dynamic *Wheel of Wellness.* Notably, spirituality is central to this psychometrically-tested secular-humanistic positive human development model, and self-direction is the second factor (Hattie, et al., 2004).

Counseling psychologists Chandler, Holden, & Kolander (1992) propose that optimum wellness occurs when the social, physical, emotional, intellectual, and occupational dimensions are balanced in the spiritual and personal realm. Spiritual health is the core component to wellness, a key part to the human being "to be attended to and fostered as much as the mind and the body" (Chandler, et al., 1992, p. 174). Reflecting on South African curricula changes and children's spirituality, Roux (2006, p. 156) described spirituality as "a whole-person approach, involving the person religiously, affectively, emotionally, cognitively and physically, with all aspects embedded in personal experiences". Such an approach calls for whole-child development through every facet of the educational endeavor.

Summarizing the plethora of definitions and perspectives on religiosity and spirituality, Kourie (2006) suggests that spirituality refers to "the values to which we subscribe which give meaning and orientation to our lives". Thus spirituality entails "the ongoing harmonious integration of the whole person" (p. 26). This perspective builds on two core elements: a personal value system (worldview) and holistic orientation which this study argues that Christian spiritual development (cf. 2.4.5) is positioned to encompass.

Making sense of terminology is essential to mapping the territory in any field of research, and certainly in the overlapping use of the terms *spirituality, religiosity,* and *spiritua*l and *religious development*. Against this background, the rest of this chapter hones in on spiritual development during the period of adolescence, before focusing on one stream of religious spirituality, Christian spirituality, as the context for this educational intervention research.

2.4.3 SPIRITUAL DEVELOPMENT IN ADOLESCENCE

Christian author Wangerin (1996) suggests that all children "dance at least one round with God" (p.48), drawn by God's love demonstrated through parents and fascinated by the wonder of God's created world. From this stance, if spiritual development is not nurtured and supported in childhood, the child's awareness of their first steps with God will fade. Erricker (2006, 2007; Erricker & Erricker, 2000) criticizes British religious education pursued through the lens of pluralism, resulting in people "insufficiently spiritually educated to deal with and adequately evaluate and respond to the realities of the modern world within which spiritual conviction has presented itself as a divisive as well as a cohesive factor" (Erricker, 2006, p. 137). "Religious educators need to understand and develop students as authors of their own life stories and teach them to tell their story with the inclusion of religious dimensions" (Ziebertz, 2003, p. 95).

Spiritual development is a missing ingredient in positive development (Benson & Scales, 2009; Currie, 1995; Emmett, 2008; Furrow, et al., 2004; King & Roeser, 2009; Moore & Lippman, 2005; Pittman, Garza, Yohalem, & Artman, 2008), when children and adolescents are not provided with the vocabulary and opportunities to explore their spiritual identity and grow spiritually, in their community, whether faith-based or secular (Benson, Galbraith, & Espeland, 1998; Benson & Roehlkepartain, 2008; Roehlkepartain, Benson, Scales, Kimball, & King, 2008; Search Institute, 2009). When development is viewed holistically, an understanding of developmental systems theory and current research on spiritual development is essential.

An overview of a significant current study on spiritual development in childhood and adolescence sets the stage for a more focused review of literature regarding Christian spiritual development for this curriculum study. The *Center for Spiritual Development in Childhood & Adolescence* (Search Institute, http://www.spiritualdevelopmentcenter.org) completed a multidimensional exploratory study of 6,500 twelve to twenty-five year olds in seventeen countries from 2006 to 2008 (Roehlkepartain, et al., 2008). Two-thirds of the young participants perceived religion and spirituality as positive and related, yet different. Although levels of religious involvement varied considerably across participating countries (and cultures, corroborated by other studies, such as de Souza, 2008; Savage, Collins-Mayo, Mayo, & Cray, 2006; Yust, et al., 2006), most youth noted their parents were modelling religious or spiritual activities as spiritually formative to them, and four out of five

said their family and friends help them spiritually. These adolescents reported that everyday experiences and relationships nurture them spiritually, and felt their spiritual development was nurtured most often by being alone or by helping others.

Consulting over a hundred experts and advisors across faiths, countries and traditions, resulted in the following guiding framework (Figure 2.7) and universal definition:

> Spiritual development is a constant, ongoing, and sometimes difficult interplay between three core developmental processes, which are emphasized differently in different cultures and traditions:
> 1. *Connecting and belonging:* Seeking, accepting, or experiencing significance in relationships to and interdependence with others, the world, or one's sense of the transcendent (often including an understanding of God or a higher power); and linking to narratives, beliefs, and traditions that give meaning to human experience across time.
> 2. *Becoming aware of or awakened to self and life:* Being or becoming aware of or awakening to one's self, others, and the universe (which may be understood as including the sacred or divine) in ways that cultivate identity, meaning, and purpose.
> 3. *Developing a way of living:* Expressing one's identity, passions, values, and creativity through relationships, activities, and/or practices that shape bonds with oneself, family, community, humanity, the world, and/or that which one believes to be transcendent or sacred.
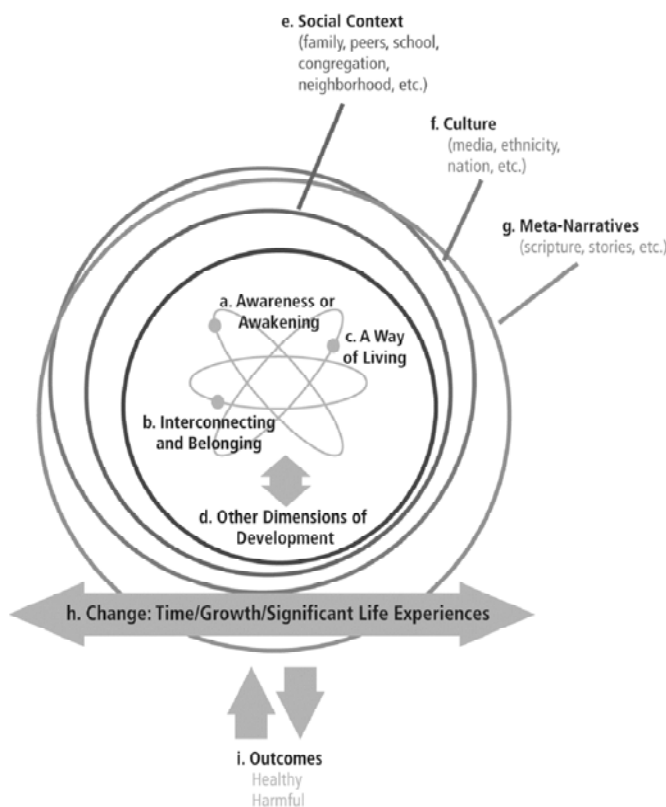
Figure 2.7: A draft spiritual development framework
(Roehlkepartain, et al., 2008, p. 40)

These dimensions are embedded in and interact with:
- Other aspects of development (physical, social, cognitive, emotional, moral, etc.);
- Personal, family, and community beliefs, values, and practices;
- Culture (language, customs, norms, symbols) and socio-political realities;
- Meta-narratives, traditions, myths, and interpretive frameworks (including religious traditions and sacred texts); and
- Other significant life events, experiences, and changes. (Roehlkepartain, et al., 2008, p. 40)

A phenomenological study of perceptions of spirituality gained through qualitative interviews with children and youth in diverse religious and secular communities and cultures guided the drafting of the *Spiritual Development Framework*. It is an attempt to understand spiritual development in its many diverse forms in and beyond major world religions, as a universal human process (Roehlkepartain, et al., 2006, p. 8). Comparing the drafted framework with the GD curriculum framework provided valuable insights and prompted deeper study of the interrelationships between areas of human development as related to Christian spiritual development.

Advances in neuroscience and modern theoretical approaches such as computational modelling (Spencer, et al., 2009), increasingly demonstrate the interconnectedness of previously separated areas of human development research, i.e. physical, cognitive, moral, socio-emotional, religious and spiritual development. The *Handbook of Spirituality in Childhood and Adolescence* (Roehlkepartain, et al., 2005) summarizes evidence of the connection between spirituality and other separately studied facets of human development. The following points are pertinent to this study:
- Reviewing recent neuroscience findings, Newberg and Newberg (2005) "argue that the basic mechanisms associated with spiritual experiences are correlated with essential brain functions and that the two processes mirror each other in development" (2005, p. 181)
- Johnson and Boyatzis (2005) draw on current cognitive research to show that people are naturally spiritual, ever oriented toward expanding a sense of meaning and value, connecting self to a wider reality i.e. the spiritual dimension of life.
- Walker and Reimer (2005) explored recent studies regarding the interconnections between moral and spiritual development, finding that "faith and spirituality are apparently foundational for many people in their everyday processes of moral decision making and moral action" (p. 235)

- Noting Erikson's psychosocial theory as a foundational model to understanding identity and spiritual development, Templeton and Eccles (2005), point out "the importance of understanding the social, cultural, ethnic, and historical influences on spiritual identity formation" (p. 182).

Research on religious and spiritual development during childhood and adolescence indicates wide variations exist within and between cultures. Coles (1990) found that young children engage in soul searching, experiencing deeper levels of spirituality than fit previous developmental stage theories of religious and spiritual development. Three spiritual growth modes called relational, meaning, and truth seekers emerged in Moran's (2005) study of 583 USA Christian college learners, assessing the relationship between learning style (Kolb, 1984) and spirituality type (U. Holmes, 1980). Aiming at helping the Christian church in Britain listen to young people, three researchers analyzed fifteen to twenty-five year olds' responses to music, clubbing, films, TV soaps and culturally iconic images. To their surprise, young Brits engaged in media forms studied had little interest in religion or spirituality in any defined form (Savage, et al., 2006).

In contrast to the impact of secularization and postmodernism on youth in many developed countries such as Britain (Yust, et al., 2006), the National Study of Youth and Religion (Denton, Pearce, & Smith, 2008; C. Smith, 2003; C. Smith & Denton, 2005) revealed that the majority of (USA) American adolescents still accepted their family's faith, neither rejecting it nor actively seeking other religious or spiritual connections. Using data from two waves of the National Longitudinal Study of Adolescent Health (with 11,212 participants), Uecker (2009) discovered that young adults who had attended Protestant schools were far more religious than those who had attended secular or Catholic schools. It is thus possible that while prevailing worldviews and cultural contexts strongly impact religious and spiritual development, the influence of education systems (such as Adventist Christian education) is notable.

Differentiation of secular and faith-specific terminology set the stage for exploration of literature within the field of Christian spirituality. Against the backdrop of increasing interest in and research on religious and spiritual development across the lifespan and more so in adolescent journal articles (Weaver et al., 2000), the conceptual framework for

this study now focuses on Christian spiritual development within the context of Christian education.

2.4.4 CHRISTIAN SPIRITUALITY DEFINED

Sheldrake (2000) defines *Christian spirituality* as "a conscious relationship with God, in Jesus Christ, through the indwelling of the Spirit and in the context of community of believers" (p. 40). This definition captures key elements common to other definitions of Christian spirituality reviewed: responding personally (transforming one's whole life) to knowing and experiencing God in ways that dynamically shape one's beliefs, values, worldview and chosen lifestyle. Christian spirituality is theocentric, focusing on knowing God, and through this transcendent relationship, knowing self and others (McMinn & Hall, 2001). This whole-life relationship-focus is evident in Holt's (2005) definition of Christian spirituality as:

> a style of walking in the Holy Spirit. It therefore involves the whole of life, not some private segment. It is the way we relate to God, to ourselves, to others, and to the creation as well as their relation to us. The Bible gives a series of normative principles, positive and negative examples of life experience, and the gospel of Jesus Christ, on which all else depends. (p. 203).

Postmodern spirituality centres on the individual's personally-constructed meaning in life, whereas Christian spirituality centres in belief in one true God (monotheism), who created all life, with humans as unique and infinitely valuable individuals. Feldmeier (2007) defines spirituality for the Christian as "one's engagement with God's grace and transcendence set within the matrix of human life in all its aspects" (p.16). Christian theologian Peterson (1997) reflects on this difference of focus, as follows:

> Spirituality is always in danger of self-absorption, of becoming so intrigued with matters of soul that God is treated as a mere accessory to my experience… Spiritual theology is the discipline and art of training us into a full and mature participation in Jesus' story while at the same time preventing us from taking over the story. (p. 15)

This working definition of children's spirituality with a Christian focus supports the four-process GD curriculum framework: "a conscious relationship with God, in Jesus Christ, through the Holy Spirit, within the context of a community of believers that fosters that relationship, as well as the child's understanding of, and response to, that relationship" (Allen, 2008, p. 11). The GD processes of *Ministering* and *Equipping* are responses to

Connecting with and deepening *Understanding* of God, self, and others, in a cycle of receiving-to-give lifelong spiritual growth.

McGinn and Meyendorff's definition of *Christian spirituality* as "the lived experience of Christian belief" (1997, p. xv) reflects the importance of an underlying religious worldview (God-centred rather than human-centred) to all of life's knowing, being and doing (Jantos, 2007). The definition is concise yet complete in construct as it fits other religious spiritualities too -- Hindu spirituality could be defined as the lived experience of Hindu belief. This study will focus on religious spirituality in the Protestant Christian stream (Figure 2.5), simply referred to hereafter as *Christian spirituality*. This could be shown as a mathematical equation:

spirituality + religion (Christian affiliation) = Christian spirituality

From this stance, the term *Christian spiritual development* is used throughout this study to refer to religious and spiritual development in the context of Christian education.

2.4.5 CHRISTIAN SPIRITUAL DEVELOPMENT

In broadest terms, Search Institute ("The Center for Spiritual Development in Childhood & Adolescence," 2008) scholars propose a definition of spiritual development that creates room for understanding spiritual development of children in diverse cultural, religious, and ideological contexts (Boyatzis, 2008, p. 48). They define spiritual development as growth in "the intrinsic capacity for self-transcendence, in which the self is embedded in something greater than the self, including the sacred… shaped both within and outside of religious traditions, beliefs, and practices" (Benson, et al., 2003, pp. 205-206). Viewed in this way, spiritual development is a core and universal dimension of human development (King & Benson, 2005; Roehlkepartain, et al., 2006).

From the Christian worldview, the sacred is God, and the self is seen in the context of the biblical metanarrative's cosmic perspective. Separating the sacred and the secular is a rationalistic endeavour, unrealistic for the Christian who believes that all truth is God's truth (A. F. Holmes, 1977), and all growth is spiritual growth (Cloud & Townsend, 2001). Drawing on a growing body of empirical evidence (Ratcliff, 2007, 2004), current research on spiritual development and thriving demonstrate the positive influence of religious and spiritual involvement (King & Benson, 2005; King & Roeser, 2009; O'Neill, Eccles, &

Wigfield, 2005) on adolescent development. Religious communities a) teach values connected to a coherent worldview, and b) provide an intergenerational network of enduring and caring relationships through which youth can explore and develop their identity and personal gifts. This enables adolescents to transcend their daily concerns through spiritual practices focusing on a supernatural God (King & Benson, 2005, p. 392).

One study on Christian spiritual development gathered data using developmental, semi-clinical interviews of 726 children and youth from convenience samples through the 1990s in a cross-section of Adventist churches in the United States and Canada (Booth, 1996), and a random sample of children in Argentina and Uruguay in 1993 (Habenicht, et al., 2003). This mixed-methods research added to an understanding of how the concept of salvation develops from the age of four through thirty-five years. In a list of implications for Adventist education curriculum, Habenicht (2001, p. 9) recommended that the concepts of salvation be taught spirally through the grades, including more advanced concepts along with clear revision of core concepts as wide variations in developmental levels were found. "Some concepts of salvation did not appear age-related as expected, but were environment- or instruction-related" (Korniejczuk, 1994, p. ii), findings supported by Hay and Nye's (2006) three-year research study of children's spirituality in Britain, and developmental systems theories (Fischer & van Geert, 2009; Van Geert, 2000).

Stonehouse (1998) describes the spiritual journey Christian parents and educators accompany children on as a cyclical, intertwined, spiralling process of Christian spiritual development. The concept of joining children, rather than directing them, reflects a praxis-process approach to curriculum (Groome, 1980, 1998; Mednick, 2006), principles of scaffolding (Miller, 2002; Neal, 1995), and coming alongside children (Ogden, 2007) in the *Equipping* process of discipleship (Barna, 2001; Beagles, 2009; Boa, 2001; Ministries Committee, 2007; Wilkins, 1992).

Catholic Christian theology traditionally teaches three stages of spiritual life: (a) *the purgative* - moving away from sin, (b) *the illuminative* - growing in virtue, and (c) *the unitive* - abiding in Christ (Boa, 2001; Helminiak, 1987). Loder (1989, 1998) focuses on the transforming moment of conviction (the purgative) leading to conversional transformation (the illuminative) and over time, the unitive. Christian spiritual development includes both development at crisis or critical turning points in life, and continuous growth "in the grace

and knowledge of the Lord Jesus Christ" (2 Peter 3:18), and holistic development as recorded of Jesus' life on earth, in the spheres of cognitive, moral, spiritual, social-emotional, and physical development (cf. Luke 2:52).

The cyclical, lifelong learning processes outlined in the GD curriculum framework are founded on the view that humans are created in God's image with the power to think and choose (and responsibility therefore), not merely react to environmental influences. Where secular developmentalists may not identify sin or its effects on human development, "Christian developmentalists realize sin's pervasiveness and … the Holy Spirit's power … as the sole means by which sin can be defeated and effective learning can occur" (Wilhoit & Dettoni, 1995, p. 38). Although empirical research leads to developmental theories that describe what is, philosophical and theological reflection is needed to formulate meaning out of these observations (p. 41). Thus Christian spiritual development draws on both the fields of human development research and Christian theology, the focus of the rest of this chapter.

2.5 CHRISTIAN EDUCATION

"All education is founded on certain beliefs and has particular aims in mind" (Watson, 2007, p. 3). In order to develop a self-assessment for adolescents attending Christian education, a clear understanding of the tenets of Christian education called for a review of literature on the foundations and philosophy of education from a Christian worldview in various settings. Yount (1996) considers the ultimate result of true Christian education to be evidence of Christ-likeness in the student's life. Christ-centred character development and Christian worldview formation are core goals to Christian education at any level (Roy, 2009; Van Dyk, 2000; White, 1903).

Christian education intentionally plans for learning that integrates faith in all facets of schooling, in preparation for holistic living (Shortt, 1997). Yount (1996) calls this faith-based teaching *discompartmentalization,* as it breaks down the barriers so often dividing life into compartments (home, school, church, professional life, etc.). Tracy (1922) contended that each person is naturally religious/spiritual, and religion (properly understood) is to be the supreme concern of all human beings. Christian education's essential role, Tracy argued, is to liberate persons from everything which hinders the

human spirit from developing and unfolding in response to the Holy Spirit and through their varied life experiences. As such, Christian education is a complex process of equipping (as defined in the GD curriculum framework), uniting instruction, training, and nurture to aid in a person's holistic becoming.

From a Christian worldview, Christian spiritual development is thus a core goal of Christian education, broader than traditionally compartmentalized subjects taught. So Christian education in this study relates to all aspects of curriculum – recommended, planned, written, taught, supported, assessed, learned and hidden (Glatthorn, 1999). Where Christian education's aim is to prepare learners for living a Christ-like life, Christian schools often include religious education classes, worship services or assemblies (Roy, 2009; Shortt, 1997) and experiential learning through Christian service projects within and beyond the school community. As the aims of Christian education are holistic, extending beyond the bounds of one or even a series of religious education classes into the entire school climate, developing the GDI needed to reference criteria or standards universal to Christian spiritual development in the broader spiralling curriculum rather than limited to attainment of essential learnings, outcomes or objectives in specific religious education classes: hence the importance of the selection of the GD curriculum framework, transcending regional and/or level-specific curricula.

The term *Christian education* is often used in reference to education within church settings (e.g. weekly Sunday school, youth ministry, mission trips, family worship services, and catechesis or confirmation studies). Research findings regarding Christian youth in congregational or informal religious education settings provide valuable insights considered in developing and validating the GDI, aligned to the GD curriculum framework, which serves as a guiding framework for both formal and informal Christian education.

As the GDI's development and validation takes place within the context of the Seventh-day Adventist education system, a closer look at theoretical perspectives and research findings regarding this denomination's Christian education is the next step in this literature review. The last section of this chapter focuses on the selected curriculum to which the GDI is aligned.

2.5.1 CHRISTIAN EDUCATION IN SEVENTH-DAY ADVENTIST SCHOOLS

The purpose of this study was twofold: (a) to fill a gap observed in the assessment of Christian education in the international formal school system operated by the Seventh-day Adventists church, a conservative evangelical Protestant denomination; and (b) to document the process and make the product available for wider use in inter-denominational Christian education. The philosophy of Adventist education (i.e. Christian education in Adventist schools, cf. 1.6.6) is foundational to each school's purpose, preparing

> students for a useful and joy-filled life, fostering friendship with God, whole-person development, Bible-based values, and selfless service in accordance with the Seventh-day Adventist mission to the world…. All levels of Adventist schooling build on the foundation laid by the home and church. The Christian teacher functions in the classroom as God's minister in the plan of redemption… The formal and non-formal curricula help students reach their potential for spiritual, mental, physical, social, and vocational development. Preparing students for a life of service to their family, church, and larger community is a primary aim of the school. ("Philosophy of education: Policy FE05, 10," 2003)

The philosophy of Adventist education is the common thread that uniquely links this diverse system of elementary, secondary and tertiary schools, colleges and universities in 145 countries, each contextualized or shaped by their own cultures and national educational requirements of private education. The majority of students attending North American Adventist schools come from families affiliated with the Adventist or other Christian faith communities (Gillespie, et al., 2003; North American Division Education Department, 2009). In many other countries, students represent a much wider diversity of family faith, and some schools operate in regions where ninety percent or more of students have no connection outside of school to the Christian faith. Religion classes teach Christian beliefs and Christian living as well as a respectful overview of world views and religions during secondary education (for example, Department of Education, 2001). Adventist schools include opportunities for Christian spiritual development through faith-integrated curricula and optional extra-curricular activities.

Within such a globally diverse education system, the GDI self-assessment is neither intended as a system-wide standardized assessment of individual progress nor a school evaluation. With whole-person development as a core goal, Christian educators teach, model and mentor from a Christian perspective on life, but confession of faith is respected as a personal choice and never a requirement at any level. Thus the GDI is an optional

self-assessment to help learners who are committed to Christian spiritual development better understand their current strengths and potential areas to plan for growth (e.g. through choice of classes, optional activities or personal devotional experiences). It will be most useful for educators and pupils interested in self-directed lifelong learning in the four processes of Christian spiritual development as articulated in the GD curriculum.

In a study of the explicitness of faith development curriculum for adolescents in private Christian schools, Rohrer (2000) lamented the absence of research on faith development in Christian schools and "the programs and experiences incorporated into the school's curriculum to help students mature in their faith" (p. 2). One contribution to this field is the continuing series of ValueGenesis studies of Adventist youth in USA and Canada (Benson & Donahue, 1990; Carlson, 1996; Donahue, 2002; Dudley & Gillespie, 1992; Gillespie, et al., 2003; Kijai, 1993; G. Rice & Gillespie, 1992), Australia and New Zealand (*ValueGenesis: Study 1 core report*, 1993), and recently with over 6,000 Adventist 14-25 year olds in 17 European countries ("Valuegenesis Europe," 2006-2008). These large-scale studies explored the influence of home, school, and church on the development of faith and biblical values during adolescence. Usable responses to the comprehensive ValueGenesis 1 study included completed surveys from 12,142 Adventist and non-Adventist youth predominantly attending Adventist schools (Dudley & Gillespie, 1992, pp. 296-304; G. Rice & Gillespie, 1992; C. Smith, 2003). Six groups participated using five different questionnaires (1,892 parents; 383 teachers; 176 principals; 155 pastors, and 6,000+ pupils), with about half the questions identical to allow for cross-group and cross-study (with Search Institute's previous data) comparisons.

ValueGenesis 1 was followed a decade later in North America by ValueGenesis 2, resulting in over 10,000 responses from a sample of more than 21,000 North American 6th through 12th graders in a random sample of Adventist schools in 2000-2001 (Gillespie, et al., 2003, p. 39). Although revisions were made to a number of scales, and new issues addressed in ValueGenesis 2, both studies provide a portrait of Adventist adolescent religious and spiritual development, "documenting and evaluating the current condition of their faith, their values, their loyalty to Adventism, and how each of these is reflected in their behaviours" (Dudley & Gillespie, 1992, p. 16). The two ValueGenesis studies are the only known studies of this scale of formal Christian education in school settings in any

denominational education system, so its findings are particularly valuable to this educational design research.

Focusing on the ValueGenesis 2 data, Boyatt (Gillespie, et al., 2003, pp. 297-313) described North American Adventist students' perceptions of their schools and their academic and spiritual growth as follows:

- The majority (71-81%) of learners reported their Adventist educators as caring, affirming, good teachers, and most (69% in grade 6 decreasing to 59% in Grade 12) felt discipline was fairly administered.

- Learners have high personal achievement goals with ninety-two percent intending to graduate from a college degree. (This is further supported by CognitiveGenesis research (North American Division Education Department, 2009), which indicates that learners attending Adventist schools in North America score above average in predicted achievement for ability, and above national averages for all school sizes, all ability and grade levels, across all subjects; and learners score higher in both ability and achievement the more years they attend an Adventist schools.)

- Most learners (53-70%) reported that their teachers, friends, Bible classes and weeks of spiritual emphasis facilitates their growth in religious faith (p. 303); and gaining a deeper relationship with God was the topic learners selected most frequently (81%) from a list of eight options given to indicate what they were interested in learning more about (Gillespie, et al., 2003, p. 303).

- School climate was positive for most. Learners were two to three times more likely than not to view their school as exciting, warm, organized, flexible, growing, kind, bright, inclusive, faith, and open (p. 305).

- Although a small percentage had engaged in at-risk behaviours, these figures were "much smaller than any public school statistics revealed by national research" (p. 75). The positive relationship between adolescent personal religious commitment and reduction in at-risk behaviour is consistent with findings in numerous other studies of positive development (K. K. Kline, 2008; Moore & Lippman, 2005; Pearce, Jones, Schwab-Stone, & Ruchkin, 2003; Regnerus, 2003).

Findings from this and other studies using the *Faith Maturity Scale* (Benson, et al., 1993; Tisdale, 1999) demonstrate that the vertical and horizontal dimensions of faith maturity are stronger predictors of risk and thriving than measures of the perceived importance of

religion or church attendance, the most common measures in large-scale studies of adolescents and adults. The *vertical* or internal dimension refers to individual engagement with God or the sacred experience, and *the horizontal* or external dimension refers to response to the vertical component through compassionate engagement with our world (Benson, et al., 1993). The percent of learners scoring high on the *Faith Maturity Scale* doubled, from 22 percent in ValueGenesis 1 to 44 percent in VG2 (2003, pp. 79-80). Positive changes to Adventist education as a result of ValueGenesis 1 recommendations are credited, at least in part, for the improvement in the decade between ValueGenesis 1 and ValueGenesis 2 studies.

The ValueGenesis finding that Christian schools may play an important role in the development of an active, maturing Christian faith in scholars supports the value of developing curriculum and assessment tools for Christian education, as is the focus of this study. ValueGenesis 1 found that high faith maturity and high church loyalty among students was directly related to the number of effective Christian environments (home, church and school) students experienced in their daily lives (G. Rice & Gillespie, 1992). ValueGenesis 2 identified eight positive school influences on faith maturity or Christian spiritual development, clustered in three themes:

1. quality teaching, teachers perceived as good, competent, caring and supportive;
2. school supporting the home and church in upholding Adventist values, and a venue for faith-talk; and
3. a school climate where discipline is fair, school spirit is high and scholars have a voice in school policy (Gillespie, et al., 2003).

It is hoped that the GDI will add a valued tool to support the second theme, facilitating meta-cognitive faith-talk as individual assessment results prompt self-reflection and individual planning for lifelong Christian spiritual growth.

2.5.2 THE GROWING DISCIPLES CURRICULUM

In order to develop a curriculum-aligned assessment (cf. 2.2.4), a review of literature pertaining to the content area, Christian spiritual development (cf. 2.5.2.1), and the selected curriculum to which the assessment was to be aligned (cf. 2.5.2.2), is essential.

Within the context of this assessment research focusing on the period of adolescence, the term *Christian spiritual development* (as defined in 1.6.2 and explored in 2.4.3) is used as a synonym for the term *discipleship* (as defined in 1.6.3) as described in the GD curriculum in Section 2.5.2.2. Although many models of discipleship exist, one way to describe Christian spiritual development is through the GD curriculum framework or GD model (cf. http://growingfruitfuldisciples.com), as it will be referred to for the purposes of structural equation modelling used during data analysis.

The last section of this literature review thus provides a brief overview of the theoretical and conceptual framework of the *Growing Disciples* (GD) curriculum which served as the criteria referenced in decisions regarding the construction of the GDI (cf. 3.3.2, 4.3, and 4.5) and evaluation of its curricular or construct validity (cf. 3.3.3, 4.2, and 4.4). The chapter ends with a brief review of research and literature (cf. 2.5.2.3) supporting this model of Christian spiritual development.

2.5.2.1 Christian Spiritual Development as Discipleship

Christian spiritual development has been described as a journey (J. D. Jones, 2006) as it is "an intentional and continual commitment to a lifelong process of growth toward wholeness in Christ" (Estep & Kim, 2009). Another metaphor Christians use to describe this journey is discipleship, building on the example of Christ who mentored and trained or discipled twelve men specifically, and many others to a lesser extent. In choosing the GD framework as the curriculum to which to align this assessment, an understanding of the biblical terminology used is important. The terms *disciple, discipling*, and *discipleship* are defined and briefly discussed below, as they relate to this educational design research.

"A *disciple* of Jesus is one who has come to Jesus for eternal life, has claimed Jesus as Saviour and God, and has embarked upon the life of *following* Jesus" (Wilkins, 1992, p. 40). "A *disciple* is one who responds in faith and obedience to the gracious call of Christ. Being a disciple is a lifelong process of dying to self while allowing Jesus Christ to come alive in us" (Ogden, 2007, p. 24). The term *discipling*, used as a verb most commonly, denotes the action of disciples helping one another to develop spiritually (Wilkins, 1992, p. 41). "*Discipling* is an intentional relationship in which we walk alongside other disciples in

order to encourage, equip and challenge one another in love to grow toward maturity in Christ. This includes equipping the disciple to teach others as well" (Ogden, 2007, p. 17).

Citing cross-sectional large-sample research of Christians across a wide spectrum of denominational and non-denominational affiliations in the United States, Barna (2001) proposes that true discipleship:

- Produces holistic personal transformation and renewed lifestyles,
- Creates Christians who intentionally pursue spiritual growth, more concerned about the quality of their character than the extent of their knowledge, and
- Facilitates people devoted to a lifelong journey to imitate Jesus Christ rather than the completion of a short-term regiment of tasks and responsibilities (pp 168-169).

Discipleship begins with commitment to Christ in response to His eternal love (salvation) and continues through lifelong spiritual growth (sanctification) (Samra, 2003, p. 234). Thus "*discipleship* and *discipling* both involve participating in the processes of receiving instruction from God and others and living out one's faith for others to see and imitate for the purpose of their spiritual maturity and their ability to disciple still others" (Beagles, 2009, p. 24). Fowler describes education in church (and church schools) as creative discipleship (Dykstra, 1986a, p. 255).

Christians count the cost, accept Jesus Christ as Saviour and Lord, and choose to follow Him. Although the first disciples followed Jesus around the countryside, Christians today can follow Him figuratively through every step of their everyday lives. Recognizing Jesus as a member of the Trinity (God) who created humans in His image and offers to restore all who accept salvation, Christians choose to be transformed into His likeness. As the seed dies to bring forth new life, so Christians surrender all aspects of their lives as the Holy Spirit regenerates their hearts, minds, bodies, and relationships.

2.5.2.2 The Growing Disciples Curriculum Framework

The GD curriculum framework or GD model was designed to help Christians better understand and engage in the multi-faceted processes of discipleship (*Growing disciples*, 2007). This model includes four cyclical processes: three focus on personal journey while the fourth occurs in community. The development of the GDI required careful analysis of the GD model to construct aligned items for each process and its commitments. Further, the first two steps of structural equation modelling (Blunch, 2008; Kenny, 2003; R. B.

Kline, 2005) - model specification and identification - require the statement of the theoretical model, and based on this, determination of the measurement model (see the methodology section 3.3.3 for a discussion of how structural equation modelling is used in the validation phase of this study).

Designing, developing and validating the GDI to reflect the inter-relatedness of these four cyclical processes is the focus of this study. How this is accomplished is elaborated in Chapter 3, and reported in Chapter 4.
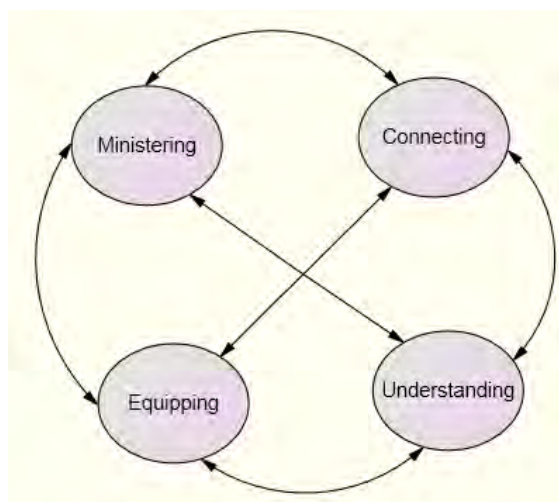
Figure 2.6 The Growing Disciples Model

Table 2.1 outlines the goals or commitments within each of the GD curriculum framework's four processes. The full GD curriculum framework, including several exemplars or indicators for each commitment, can be reviewed on this study's website (http://inventory.growingdisciples.info) or through the fuller *Growing Fruitful Disciples* project website (http://growingfruitfuldisciples.com/).

All four GD processes are understood by the curriculum designers to be accomplished through the ministry of the Holy Spirit. Separating these processes is artificial, but makes possible clarification of vital aspects of discipleship that might otherwise be overlooked. Because discipleship is life (i.e. Christian spiritual development), and occurs within loving relationships within the body of Christ, the processes cannot be reduced to statements in a grid. Rather, the GD curriculum framework serves as a skeleton of basic characteristics of spiritual growth. It is a structure around which individuals and groups can create

learning experiences in any method of discipling, including mentoring and teaching in Christian education of adolescents. Figure 2.6 provides a diagram of the structural model and the relationships between the four GD model processes of *Connecting, Understanding, Ministering* and *Equipping.*

Table 2.1 GD Curriculum Framework Processes and Commitments

Disciples grow in relationship with God, self and others.

CONNECTING

*C1. **With God**:* deepening my relationship with God.

*C2. **With self**:* discovering who I am in relationship to Christ.

*C3. **With family**:* developing Christ-centred family relationships.

*C4. **With church**:* developing Christ-like relationships with other Christians in my community of faith.

*C5. **With others**:* developing Christ-like relationships with those who are not part of my faith.

Disciples grow by learning the truth of God's relationship with humanity through the Word.

UNDERSTANDING

*U1. **Spiritual growth**:* learning that Christ calls me to be His disciple.

*U2. **The nature of God**:* learning that God is the source of life.

*U3. **Sin & suffering**:* learning about the human fall from God's original plan and its consequences.

*U4. **Redemption**:* learning that God has provided everything needed to save me from sin.

*U5. **Restoration**:* learning that God has provided all that is needed to restore me to His image.

Disciples grow by participating in God's mission of revelation, reconciliation, and restoration.

MINISTERING

*M1. **Personal Vocation**:* sharing my faith through my daily activities.

*M2. **Discipling Others**:* helping others grow more like Jesus.

*M3. **Community Service**:* responding to the needs of God's children and His world.

*M4. **Stewardship**:* supporting my church's ministries with personal resources.

*M5. **Evangelism**:* helping my church tell the story of Jesus.

Christians grow by supporting one another in connecting, understanding and ministering.

EQUIPPING

*E1. **Devotional Life**:* Growing helping one another deepen their relationship with God.

*E2. **Christ-like Relationships**:* helping one another build Christ-like relationships.

*E3. **Bible Study**:* helping one another study and obey God's Word.

*E4. **Distinctive Lifestyle**:* helping one another live as committed Christians.

*E5. **Doing God's Will**:* helping one another discover God's working in their lives and His world.

*E6. **Using Spiritual Gifts**:* helping one another discover and use spiritual gifts in God's work.

2.5.2.3 Research Supporting the Growing Disciples Curriculum

A review of Christian theology on discipleship and social science research on adolescent religious and spiritual development led to the discovery of numerous studies and theoretical works which support the GD curriculum framework. A thorough understanding of these foundational elements was essential to decision making regarding the format of the GDI, item writing and final selection. Content validity depends on careful review of the curriculum content area to be assessed.
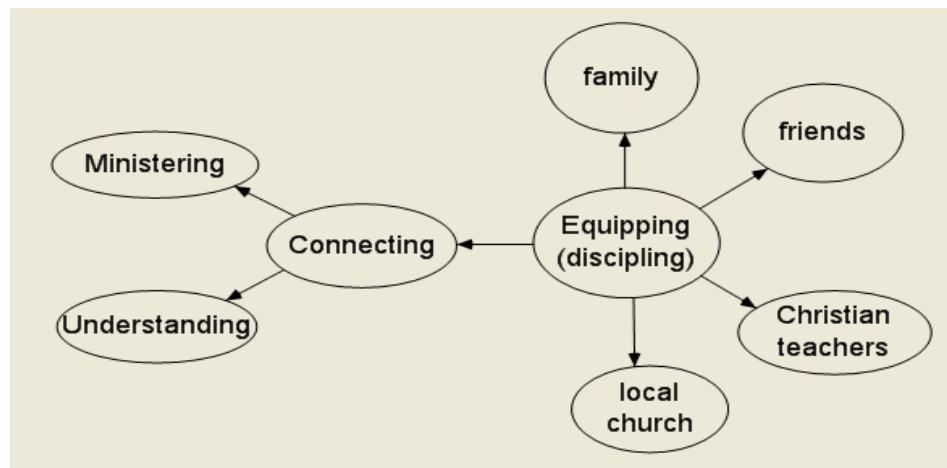
Figure 2.7 *Growing Disciples in Community* structural model
(Beagles, 2009)

Direct support for the GD curriculum framework is evident in Beagles' (2009) study focusing on the corporate process of *Equipping* adolescents who are engaged in the personal processes of discipleship (*Connecting*, *Understanding* and *Ministering*). Confirmatory factor analysis and structural equation modelling with some 11,000 datasets from the ValueGenesis 2 study of adolescents attending Grades 6 through 12 in North American Adventist schools validated Beagles' (2009) *Growing Disciples in Community* model (Figure 2.7). This structural model proposes causal paths focusing on *Equipping* as foundational to growth in *Connecting*, which in turn is central to the processes of *Ministering* and *Understanding*.

The *Growing Disciples in Community* conceptual framework (Table 2.2) is Beagle's proposed revision of the GD curriculum framework, based on her research findings (personal communication, January 2010). Broader literature review provided further

connecting threads to the theoretical underpinnings of the GD curriculum framework. Several key studies are noted in general reference, followed by more specific sources for each of the four processes.

Table 2.2 The Growing Disciples in Community Conceptual Framework

PERSONAL PROCESSES OF CHRISTIAN DISCIPLESHIP
The processes through which an individual Christian grows in
spiritual maturity and fruit-bearing (John 15:5-8)

UNDERSTANDING	MINISTERING
Learning the truth of God's relationship with humanity through Jesus Christ, the Word (Matthew 4:4; John 8:31; 14:23)	Participating in God's mission of revelation, reconciliation, and restoration (Matthew 25:40; 28:19,20; Galatians 5:22-23)

CONNECTING
"Loving God completely, ourselves correctly, and others compassionately"
(Boa, 2001) (Matthew 22:37-38; John 13:35)

"All Christians are disciples and are called to participate in the discipleship process,
⇧ ⇩
Both by receiving instruction and living out their faith for others to see and imitate."
(Samra, 2003)

EQUIPPING
Intentionally walking "alongside other disciples in order to encourage, equip, and challenge one
another in love to grow toward maturity in Christ" (Ogden, 2003)
(Deuteronomy 6:4-9; Ephesians 4:11-16; 1 Thessalonians 5:11)

COMMUNITY PROCESS OF CHRISTIAN DISCIPLING
The discipleship living within the body of Christ (local church, Christian home,
Christian friends, Christian teachers) that impacts others' attitude toward and engagement in the
personal processes of maturing as a disciple.

From the field of secular spirituality research, an article noting advances in the conceptualization and measurement of religiosity and spirituality and their positive impact on physical and mental health (Pargament & Hill, 2003), provides the following support to

the GD curriculum framework processes of *Connecting, Understanding* and *Equipping*, respectively:

- "To know God is… the central function of religion….Measures of perceived closeness to God have been significant predictors of mental and physical health" (p.67).

- Psychologists have observed that religion and spirituality act as "overarching frameworks that orient [people] to the world and provide motivation and direction for living" (p.68).

- "Religious support has emerged as a significant predictor of psychological adjustment after controlling for the effects of general social support" (p.69).

Boa's (2001) in-depth exploration of twelve approaches to Christian spirituality builds on the premise that all growing Christians, regardless of temperament and natural aptitude, need a healthy balance of doctrine/knowing, experience/being, and practice/doing (p. 480). The GD processes of *Connecting, Understanding* and *Ministering* correspond to Boa's (2001) constructs as well as those Rice (1997) labels as *being, believing, and behaving*. Similarly, two Christian education summations of the holistic nature of Christian spiritual development, *educating the head, heart and hand* (Taylor V, 2000), and *helping students know, love and serve God* (Trent, Osborne, & Bruner, 2000), capture the essence of the three individual processes of the GD curriculum framework (as shown in Table 2.3), reflecting holistic development in the cognitive, affective and behavioural domains.

Table 2.3 Models of Christian Spiritual Development Compared

GD Model	Boa	Rice	Taylor	Trent et al	Domains
Connecting	Experience	Being	Heart	Love	Affective
Understanding	Doctrine	Believing	Head	Know	Cognitive
Ministering	Practice	Behaving	Hand	Serve	Behavioural

Single words cannot capture fully a theological or psychological construct, but they provide helpful handles to compare parallel metaphors that support the GD curriculum structure. Although this table illustrates similarities, each model defines its components slightly differently, adding insights through comparing and contrasting, thereby confirming

the GD curriculum as a fair model to represent the goals of Adventist education in the domain of Christian spiritual development. Henning (2007) describes a framework for discipleship where the three processes of knowing, loving and serving God are the legs of a three-legged stool. Balance is needed between the three to support the seat of the stool. The GD curriculum framework could be described as the fourth process, *Equipping*, which metaphorically serves as the seat uniting the three legs or individual processes. Maturing faith is nurtured through disciples helping one another (equipping or discipling) to grow in the processes of *Connecting, Understanding* and *Ministering*.

A Southern Baptist lifeway.com (Lifeway Research, 2009) article outlines five signs of spiritual growth in a Christian's life. Two signs – (a) *models love, trust and obedience*; and (b) *has a relationship with other believers* - encompass elements of the *Connecting* process. Two additional signs - (c) *lives in harmony with God's Word*; and (d) *sees the world through the lens of scripture* - mirror the *Understanding* process. The *Ministering* and *Equipping* processes are reflected in the last sign, (e) *makes God's love known to others, as God's love prompts them to serve unselfishly, and make disciples.* Although different models feature different aspects of Christian spiritual development, the consistent overlap mirrors the GD curriculum model as a whole, as well as its four cyclical processes.

In his book *Educating for Life: A Spiritual Vision for Every Teacher and Parent*, Catholic educator Groome (1998, p. 55) describes becoming disciples of Jesus as the first vocation of Christians. In response to God's love, Christians commit to "act justly, love tenderly and walk humbly with God" (Micah 6:8) in their daily life or vocation. Brochu and Baragar-Brcic (2007) propose four focus areas as "quadrants within a circular configuration where the quadrants intersect and the circle has no beginning or end" (p. 353) for experiencing God from the Catholic faith perspective, namely: *relationships, experience, covenant/tradition*, and *role modelling*. *Relationships*, similar to the GD curriculum framework process of *Connecting*, focuses on building deepening relationships grounded in the unconditional love of God which enables relationships with each other and all of creation. *Experience* emphasizes experiencing God by engaging in the stories of God's people and the student's personal experiential learning. This is similar in purpose to the GD curriculum process of *Understanding*, but focuses on experience rather than deepening understanding based on personal study of God's Word, the Bible. Covenant/tradition focuses on responding to God's love, becoming partners in serving Him in our community.

This is similar to the GD curriculum process of *Ministering*. Christian teachers are called to model how to live a Christ-like life of service and discipleship. This is also similar to the GD curriculum process of *Equipping*.

Validating the GDI, not the GD curriculum framework, is the purpose of this research; but numerous studies clarifying and supporting the four GD processes informed the development of the GDI, particularly during item construction. Pertinent studies are briefly reviewed below.

(i) Connecting with God and Others[1]

Christian discipleship occurs in relationships. It begins with responding to Jesus' call to connect with and abide in Him. Through this transforming connection with Him, disciples come to know themselves as Jesus created them to be and to appreciate their infinite value to Him. As they grow in their connection with Jesus they also grow in a more balanced view of our strengths and potential growth points or weaknesses. They are then better able to connect with those around them in healing and redeeming ways.

In the GD model, a dynamic and deepening relationship with Jesus, through His Spirit, is the most important and first listed *commitment* (cf. Table 2.1). Through relationship with Christ, growing Christians come to understand themselves in a more balanced way, which anchors them with reasons for ultimate reality, meaning and purpose in life. The next *commitments* are to ever deepening relationships of grace within families, then the local and global body of Christ, and ultimately with every child of God to whom He seeks to be reconciled. Christians become avenues for "administering God's grace in its various forms" (1 Peter 4:10), as they strengthen their connections with God, and all of His children.

Social science research increasingly supports the construct of connecting. Commenting on the development and validation of their 49-item 5-factor *Spiritual Assessment Inventory*

---

[1] The following Bible passages reference the theological underpinnings of the *Connecting* process, listed in the order of concepts presented: Matthew 22:37,38; John 15; Psalms 139:13-18; Luke 12:6,7; Psalms 139:23,24; John 13:35; Romans 12:10,16; Ephesians 5:21; and Romans 5:10. A comprehensive discussion of these processes is beyond the scope of this curriculum study focusing on educational assessment, not Biblical exegesis.

(Hall, 1996; Hall & Edwards, 2002), the researchers note that "the overall framework for this measure is the notion of relationship, which integrates theistic and relational psychological perspectives (i.e. attachment and object relations) of personality" (Hall, Reise, & Haviland, 2007, p. 158). Furthermore, their observation that "the quality of one's relationship with God is highly related to, and may be significantly influenced by, one's relational maturity" (Hall, 1996, p. 103), parallels the *Connecting* process, linking the lifelong process of deepening relationship with God, to the development of relationships with others.

Recognizing a crisis in the deteriorating mental and behavioural health of children and adolescents in the USA, the *Commission on Children at Risk* (Brazelton et al., 2003) reports crucial findings from a study by 33 children's doctors, research scientists, and mental health and youth service professionals (2003). The underlying cause is identified as weakening of the social institutions (families, churches, community informal groups) that "foster close connections to other people, and deep connections to moral and spiritual meaning" (p.5). Drawing largely from the growing field of neuroscience, the report compiles scientific evidence showing that the human child is "hardwired to connect" to other people and predisposed to seek "moral meaning and openness to the transcendent" (p.6). Each of the study's major goals and eighteen recommendations focus on renewing and building *authoritative communities,* defined as "groups of people who are committed to one another over time and who model and pass on at least part of what it means to be a good person and live a good life" (p. 6). These activities parallel closely the process of discipling within the context of growing discipleship or lifelong Christian spiritual development, as frame by the GD curriculum.

Subsequent studies (K. K. Kline, 2008) add new insights to the *Commission on Children at Risk's* positive findings, drawing from developmental, attachment, neurobiological, spiritual, and community perspectives. Although humans are biologically primed or hardwired for relationships, nurturing environments can *rewire* brain circuitry later than previously thought possible (p.10), *nurture* filling in for defects in *nature*. Several plans for the new scientific case for authoritative communities are particularly pertinent to this study on spiritual development:

- Primary nurturing relationships influence early spiritual development… and spiritual development can influence us biologically in the same ways that primary nurturing relationships do.

- Religiosity and spirituality significantly influence well-being.
- The human brain appears to be organized to ask ultimate questions and seek ultimate answers. (p.10)

Huebner states the centrality of connection to spiritual development in Christian education like this:

> Here, then, is our agenda for religious education. It is one of scrutinizing the fabrics of relationships that we have, those of intimacy and those of community, and of asking how God is present or absent in those relationships. And then, with the help of our religious traditions, imagining how we can practice the presence of God in these relationships… (Huebner, 1987, p. 392)

These findings suggest that moral behaviour can stem as much from relationships as from rules, and that "our moral sense is an integral part of our personhood" (p.19), which implies that the moral needs of children are not merely personal and private – they are also social and shared, "requiring the attention and resources of the community as a whole. Conversely, ignoring the moral needs of children can be a form of child neglect." (p.19) The neuroscience research finding of the remarkable human capacity for plasticity (Fischer & Rose, 1998), in learning or relearning across the life span, corroborates the theological truths outlined in a Christian worldview of growing through relationship with God, self and others.

(ii) Understanding God's Word and World[2]

The *Connecting* and *Understanding* processes are theoretically interrelated: "every mode of knowing is also a mode of being in relationship" (Huebner, 1985, p. 349, linking Buber and Habermas). From the Christian worldview, disciples come to Jesus for life. Learning how to study the Bible is foundational to coming to know God and forming a Christ-centred biblical worldview. Reading, meditating on, praying, and obeying the Scriptures are Christian spiritual practices used by the Holy Spirit to restore disciples into the image of their maker, God. In the broadest sense, Christians learn through the Word what God intends them to be and to do. Disciples come to understand how the *story* of their life fits into the G*reat Story* of God and His creation.

---

[2] The following Bible passages reference the theological underpinnings of the *Understanding* process, listed in the order of concepts presented: John 8:31, 14:23; Matthew 4:4; 1 Corinthians 2:10,11; Hebrews 6:1-3; John 16:13,14; and Psalms 119.

The *Understanding* process focuses on the study of Jesus' life and teachings as revealed in the Bible. Of the five constructs (cf. Table 2.1), the first *commitment* focuses on understanding the process of lifelong spiritual growth. The other four *commitments* trace a grand narrative of God and His relationship with human beings. Each major theme is introduced by the following example Biblical passages:

- God, the source of life, creates the world and its inhabitants (Genesis 1,2; John 1);
- Human beings reject Him and suffer the consequence of sin, separation from God (Genesis 3; Isaiah 53, 59; Romans 6:23);
- In infinite love, God created a plan to redeem human beings (Deuteronomy 7:7-8; Ephesians 1:7, 2:13-17; Philippians 2:5-11; Colossians 1:15-22);
- God provides everything needed to restore human beings to their original perfection of reflecting Him (Romans 8, 12:2, 2 Corinthians 3:18).

From a Christian biblical worldview, these understandings are foundational to knowing God and to responding to His love in ministry to others, evident in the interwoven nature of all four GD processes. Psychologists Cloud and Townsend (2001) explain how the central themes, doctrines or belief structures of Christianity are an organizing framework in their counselling practice. Working from this Christian spiritual growth framework, they support their tenet that "all growth is spiritual growth" (p. 22), with qualitative studies stressing integrated whole person development, anchored in a Christian worldview. Taggart (2002) criticizes Britain's phenomenological and experiential approaches to religious education, where truth is "self-authenticating, freely chosen and with no connection to communal reality" (p.9). Criticizing Erricker's (2006, 2007) postmodern spiritual pedagogy, Wright (2001b) argues that authentic spirituality, while rooted in nurturing relationships, demands spiritual literacy. He believes that spiritual and religious education must equip learners to engage with spiritual questions in an informed, sensitive and intelligent manner. Spiritual discernment, insight, understanding and wisdom should be taught in order for learners to flourish spiritually, a proposal echoed by positive youth development theorists and researchers (Benson & Roehlkepartain, 2008; Quinn, 2008; Regnerus, 2003), and relating to the centrality of the *Understanding* process to the GDCF.

Yount and Barnett (2007) use the metaphor of an upward spiral to illustrate deepening understanding as a growing disciple of Christ:

Knowing, understanding, and wise-doing carry us upward toward spiritual maturity. Students discover and remember what the Bible says (knowledge). They process this knowledge in order to establish clear Bible concepts (understanding). As they use biblical concepts to make decisions (wisdom), they grow spiritually. As they grow in wisdom, they learn more about what the Bible says about life (knowledge increases), which in turn allows them to deepen their understanding of life in Christ, which enables them to live as citizens of the kingdom, which in turn produces spiritual wisdom, and so on throughout life. (p. 77)

Distinguishing between *understanding about* religion and *believing*, Yount and Barnett (2007, p. 83) see cognitive understanding as the first step. The next step, believing, requires personal valuing of what is understood, and acceptance in the affective and behavioural aspects. Commenting on religious education in British public schools, Astley (2007) believes that "all decent religious education possesses the potential of being religiously transformative" (p.175) when the affective or valuing component is included. Seeking a holistic personal response, the items relating to a Christian worldview and beliefs in the GDI were worded beginning with "I believe that….", to elicit the cognitive and affective aspects of understanding.

In a keynote presentation at the 2006 Children's (Christian) Spirituality Conference, Stonehouse and May (2008) focused on three ways to nurture children's spirituality, based on their research. First, they emphasized "the power of THE Story, that is, the biblical metanarrative" (sic, p. 366). For Christians, the Bible is God's true story of the world past, present and future. *THE Story* helps Christians understand the meaning and purpose of life, even in a postmodern world sceptical of the existence of any master story. Stonehouse and May believe that every learner needs the big picture of God's plan from creation to re-creation to understand ultimate reality. *THE Story* provides the context and meaning for each growing disciple's personal story of their spiritual journey. The GD process of *Understanding* is structured around the metanarrative of God's creation, human sin, and God's plan of redemption, reconciliation, and restoration.

The human search for meaning, purpose and what is really real, are at the heart of the process of *Understanding*. Everyone has a worldview, which Sire (2004) defines as:

a commitment, a fundamental orientation of the heart, that can be expressed as a story or in a set of presuppositions (assumptions which may be true, partially true or entirely false) which we hold (consciously or subconsciously, consistently or inconsistently) about the basic constitution of reality, and that provides the foundation on which we live and move and have our being (p.17).

Sire believes this commitment is a spiritual orientation more than a matter of mind alone. In today's pluralistic world, contrasting and overlapping worldviews are encountered, and without conscious evaluation, may be juxtaposed in a personal worldview. Balanced Christian spiritual development includes a deepening understanding of God's Word that guides the formulation of answers to essential questions from a Christian theistic worldview: "What is really real? What is the nature of the world around us? What is a human being? What happens to a person at death? Why is it possible to know anything at all? How do we know what is right and wrong? What is the meaning of human history?" (p.20)

Although Sire writes from a Christian worldview, evidence from secular perspectives supports the foundational role of worldview, whether consciously or unconsciously held, to spiritual development in general. As one example, Hodge (2007) developed an eight-item *Spiritual Competence Scale* representing one aspect of cultural competence. In the field of secular social work, cultural competence was characterized by three interrelated dimensions:

1. developing the appropriate beliefs and values to engage culturally different worldviews,
2. knowledge of a culturally different worldview, and
3. developing skill sets and intervention strategies that are relevant and sensitive to a culturally different worldview (p.287).

Motivating his focus on beliefs, Hodge (2007) cited sociological research indicating that the beliefs or values dimension provides the foundation for the knowledge and skills dimensions of cultural competence. Further evidence regarding the centrality of worldview or belief and value formation is found in the literature on religious education in British common schools (Bastide, 2007; Blaylock, 2000; Fancourt, 2005; R. Jackson, 2004) which criticizes focusing on learning *about* religion (understanding for respect of different religions) rather than learning *from* religion (experiencing and responding to religion personally) and includes forming personal worldviews, beliefs and values.

Several empirical studies note the importance of understanding God's Word for Christian spiritual development. Personal Bible reading, including reflection on the meaning and application to daily living, has been identified as the Christian spiritual practice most correlated with continuing Christian spiritual growth in the Reveal (Hawkins & Parkinson, 2007) study of over 157,000 congregants attending more than 500 churches of all kinds of

evangelical Christian churches, of varying sizes and contexts, conducted by Chicago's Willow Creek Church in three waves (2004, 2007, 2009). Another study of over a thousand 20-29 year olds who had regularly attended evangelical churches during childhood but no longer did, led researchers (Ham, Beemer, & Hillard, 2009) to recommend defending and living God's Word as essential to lifelong Christian spiritual development, and in particular, to nurturing faith in adolescents who experience dissonance between their faith foundations and the post-Christian world they are immersed in daily.

Reporting on a study of over 2,500 Baptists, validating Lifeway Research's *Spiritual Formation Inventory*, Waggoner (2008) states that "statistically, the number one issue correlated to higher maturity scores was the discipline of daily Bible reading" (p.296). He notes that being "a disciple means being a learner. Being a learner involves both attitude and behaviour" (2008, p. 59). Thus the *Spiritual Formation Inventory* includes items regarding perspectives and practices. Growing spiritually as a Christian does not focus on changing behaviour, but rather begins with allowing God to transform or renew the mind (knowing), to understand truth from a biblical perspective (being), which influences behaviour (doing) (Waggoner, 2008, pp. 76-78). These steps are reflected in the GD processes of *Understanding* (knowing), *Connecting* (being) and *Ministering* (doing).

The *USA National Study of Youth and Religion* (http://www.youthandreligion.org) involving a USA-wide random phone survey of parents and adolescents followed by in-depth interviews with adolescents who agreed to meet in person, reported the vast majority of adolescents considered themselves religious, and were involved in conventional religions, but were surprisingly inarticulate (C. Smith & Denton, 2005, p. 131) about their beliefs. A 45-item internet-based survey (Cole, 2009) of a random sample of 1,009 pre-adolescents (8- to 12-year-olds), with 51 percent female and 77 percent Caucasian, found that the number of days pre-adolescents read or listen to the Bible was a statistically significant predictor of lower relational and behavioural risks. But less than one-fifth read or listen to the Bible with their family at least four days a week, and only one-fourth personally read the Bible at least four days a week.

(iii) Ministering to Others[3]

From the Christian theological perspective, growing Christians minister to others by participating in God's mission of revelation, reconciliation, and restoration (cf. Table 2.1). As they connect with Jesus and learn of His unfailing love, they are eager to invite others to share in the joy that they experience as His followers. They are compelled, through experiencing God's love, to share the story of the Holy Spirit's work in their lives and of their blessed hope of salvation through faith in Jesus.

Realizing that God's mission entails "reconciling the world to Himself" (2 Corinthians 5:19), the growing Christian's territory is global in scope. They begin serving and discipling those nearby and extend their ministry as God leads. Daily they seek the guidance of the Holy Spirit, the only agency that can empower their ministry. Not only do disciples support Christian ministry with money, gifts and prayers, but like Jesus, they invest themselves in building God's kingdom as they serve others.

Increasingly, secular education is recognizing the value of service learning in positive adolescent development, with empirical studies reporting a significant correlation between adolescents who consider themselves religious and volunteerism (Donnelly, Matsuba, Hart, & Atkins, 2005; Regnerus, 2003; Youniss, McLellan, & Yates, 1999). The *USA National Survey of Youth and Religion* found that adolescents who defined themselves as "devoted" were twice as likely (50%) to do non-compulsory volunteer work as the religiously "disengaged" (25%), and to volunteer more frequently (C. Smith & Denton, 2005, p. 230). Sherr, Garland and Wolfer (2007, p. 44) review several studies which show that the more important religion is in the lives of adolescents, the more likely they are to be involved in serving others. Their purposive sample of 35 congregations of various denominations (including Adventist) across six USA states drew a sample of 7,403 participants of which 631 were 13-18 years old. Although predominantly Caucasian (70%), the sample reflected national trends for race, gender and age. "Teenagers who were involved in community ministry through their congregations scored significantly

---

[3] The following Bible passages reference the theological underpinnings of the *Ministering* process, listed in the order of concepts presented: Matthew 10:24-27; Romans 1:16,17; 2 Corinthians 5:19; Job 33:26; Psalms 80:7; Isaiah 58:8; Luke 9:11; Acts 3:21; Galatians 5:22,23; 1 John 3:16; Matthew 28:18-20; Mark 9:33-50; Galatians 5:13; James 2:21-24; 2 Corinthians 5:19; Acs 1:8; Matthew 22:37,38; John 14:26, 15:26, 16:7-15; and Matthew 20:26-28, 26:37-40.

higher on the *Faith Maturity Scale* and on the degree to which they practice their faith in daily life" (Sherr, et al., 2007, p. 50).

Briefly, these studies illustrate the interactive nature of the cyclical processes of the GD curriculum framework. Ministry through community service stimulates growth in other processes; and in turn, religious commitment (which is assumed to include elements of both *Connecting* and *Understanding*) is correlated with increased volunteerism.

"One ministry to which all disciples are called is discipling others" (Beagles, 2009, p. 46) Although teaching is a spiritual gift that enables ministry to others that can include elements of discipling, the interactive aspect of being discipled while discipling others separates this from other forms of ministry in the GD curriculum framework.

(iv) Equipping One Another

In the Bible, Christ described the church as His body to show the influence of the health of one part on the health of all other parts. This metaphor helps Christians understand their role to support, nurture, and strengthen one another after committing their lives to Christ. It is within the church that Christians are equipped and mentored to disciple others.

The *Connecting, Understanding*, and *Ministering* processes are nurtured and supported through the *Equipping* process (cf. Table 2.1). Growing Christians have the unique opportunity, through the ministry of the Holy Spirit, to be discipled by other Christians and in turn, to invest themselves in helping Christian friends grow spiritually. *Equipping commitments* represent the actions of those who are fulfilling the Great Commission by "teaching them to obey all things" (Matthew 28:19).

The first *Equipping commitment* begins with helping one another learn how to connect with Christ and His Word through a dynamic personal devotional life. The second *commitment* is about showing one another how to nurture and maintain Christ-like relationships. The final three *commitments* focus on helping one another learn how to share God's love through both witness and service, the focus of the *Ministering* process: disciples help one another learn (a) how to share what God is doing in their lives; (b) how to recognize the work of the Holy Spirit in the world around them; and (c) how God has called them to minister to others using their spiritual gifts.

Equipping addresses the training/mentoring aspect of the gospel commission in Matthew 28:18-20, "teaching them to obey everything I have commanded you". Because the first part of the gospel commission, to "go and make disciples" has often been emphasized, the teaching-equipping process has been dubbed "the great omission", as is evident in its absence from other models of Christian formation or spiritual development. This aspect of Christian growth, like ministering, involves serving others. But its key role in the gospel commission, and the frequent biblical references to building up the community of fellow believers (i.e. growing disciples in the body of Christ) in all three other processes, led to formulating *Equipping* as a separate process in the GD curriculum framework.

Equipping focuses on Christians helping *one another* grow in the three individual processes of *Connecting, Understanding* and *Ministering*. For example, seventy-two Bible (New International Version, 1984) passages include the phrase *one another*, over forty referring to the process of *Equipping*, as these examples demonstrate:

- "Encourage and build *one another"* (1 Thessalonians 2:7-8; 5:11, Hebrews 3:13)
- "Be compassionate toward *one another"* (Zechariah 7:9; Ephesians 4:32)
- "Bear *one another's* burdens" (Galatians 6:2)
- "Forgive *one another"* (Colossians 3:13)
- "Comfort *one another*" (2 Corinthians 1:4)
- "Love *one another"* (John 13:34; Romans 13:8; 1 Peter 1:22; 1 John 3:11, 23; 2 John 1:5)
- "Be hospitable to *one another"* (1 Peter 4:9)
- "Live in harmony with *one another"* (Romans 12:16, 1 Peter 3:8)
- "Instruct *one another"* (Romans 15:14)
- "Serve *one another* in love" (Galatians 5:13)

Thus GDI items were constructed to assess evidence of equipping friends/peers and siblings as well as awareness of being equipped by parents or other family members, by friends or peers, by Christian teachers and/or by other Christians in the local church, or others in their community (see items 88-98 in Appendix A). Beagle's (2009) structural equation modelling confirmed the involvement of family, friends, Christian teachers and local church members in discipling or equipping adolescents. Parents were separated from other family members (grandparents, siblings, aunts or uncles, cousins, etc.) based on the number of studies indicating the importance of parents in spiritual nurture (Regnerus & Uecker, 2006; Schwadel & Smith, 2005; C. Smith & Denton, 2005).

Groome's 5-step *Shared Christian Praxis* model (1980, 1998) fits many characteristics of the *Equipping* process in the GD curriculum framework. Noting the complex social problems Christians face today, Fleischer (2004) draws from the systems approach and disciplines of learning organizations to propose ways religious educators can serve as catalysts for true communal praxis, where Christians come together to dialogue about problems and then communally act and reflect on solutions. Allen (2005) proposed a macrotheory for intergenerational Christian community learning (equipping), drawing on situated learning theory (see M. K. Smith, 1999) and concepts from Vygotsky's (1962) sociocultural theory (e.g. *zone of proximal development* and *scaffolding* learning in complex, authentic environments). The increasing volume of literature on positive development (Emmett, 2008) and intergenerational ministry (Thurber, 2005) emphasizes mentoring, guiding, and supporting youth in authentic relationships, journeying together in faith.

The role of the Christian educator is emphasized in both the *Connecting* and *Equipping* processes. Because growth in faith happens through personal relationship (J. W. Fowler, et al., 1991), religious educators have the opportunity to be sponsors or spiritual mentors, through:

> affirmation, encouragement, guidance, and models for growth and development. The sponsor is one who walks with you; one who knows the path and can provide guidance. The sponsor is one who engenders trust and proves trustworthy in supporting you in difficult passages and turns. The sponsor may, as needed, confront you, insisting that difficult issues be faced and that self-deceptions or sloth be avoided. The sponsor or sponsoring community should be able to provide both models and experiences in education and spiritual direction that deepen and expand one's initial commitments and provide the nurture for strong and continuing growth (p. 287).

In a study analyzing factors of Christian spiritual growth, Currie (1995) surveyed over 100 sources in which Christian educators cited factors perceived as significant to adolescent Christian spiritual development. A list created by Jordan, Dudley and Stewart (cited in Currie, 1995, p. 209) organizes clusters of factors cited in numerous studies. Although some factors address multiple GD processes, the mapping as a whole adds credence to the GD curriculum as a complete framework. Factor similarities may be seen as follows:

- *Connecting:* attending church services; participating in youth group activities; the influence of Christian parents, friends, a pastor and significant adults;
- *Understanding:* personal Bible reading and prayer;

- *Ministering:* volunteering for service projects and/or mission trips; and
- *Equipping:* one-to-one discipleship; counselling by a pastor or counsellor.

A key finding of Sewell's (2009) study of four New Zealand primary schools was that caring, reciprocal relationships in a community of learners can evoke and nurture spiritual development.

Fuller development of the theological underpinnings and research support for the GD curriculum is beyond the purpose of this study, which is focussed on the development and validation of a self-assessment aligned to the GD curriculum. Further pertinent findings are included in the discussion of research methods used in the GDI development in Chapter 3, and research results in Chapter 5.

2.6 SUMMARY

The impact of modernization and globalization is evident in educational theory, practice and research. The conceptual framework for this curriculum study focusing on assessment development was built on a review of literature from the diverse fields of curriculum and assessment, youth development and Christian education in faith-based schools, within the context of today's pluralistic and increasingly diverse post-modern world.

Chapter 2 began by reviewing curriculum studies theory, focusing on the shift towards international collaboration. Understanding global curriculum issues as well as best practices in curriculum development informs and improves curriculum design for student learning in increasingly diverse Christian education settings in local communities. Models of curriculum development, instructional design, and curriculum alignment practice guiding decisions regarding the construction of the GDI were described. Literature exploring learning theory regarding self-assessment and self-directed learning and their interplay was reviewed, demonstrating the benefits of education aiming to develop attitudes and skills needed for lifelong Christian spiritual development.

Understanding the adolescent learner was foundational to developing the GDI. A brief review of theories of developmental psychology, research on youth development, as well

as religious and spiritual development in childhood and adolescence, further informed the conceptual framework used in the development and validation of the GDI. Drawing on Christian theology, recent research on spiritual development in general, and Christian spiritual development in particular, the conceptual framework is situated specifically within Adventist Christian education. The chapter concludes with a brief overview of the theological foundations of the GD curriculum framework to which the GDI is aligned.

In summary, an interdisciplinary review of curriculum studies, developmental psychology and Christian theology, guided the development of the GDI as a curriculum-aligned self-assessment tool designed for adolescents within the context of Seventh-day Adventist Christian education. Literature informing the validation phase is reviewed in Chapter 3, focusing on the research design.

3   CHAPTER 3
RESEARCH DESIGN

3.1   INTRODUCTION

Chapter 3 describes the research design to serve the purpose of developing and validating a curriculum-aligned formative self-assessment for adolescents participating in Christian education. A mixed methods approach is used to address this empirical study's four research questions. The target population and sampling methods are described, and precedent literature referenced to support each phase of assessment construction and initial evaluation of validity.

The rationale (in Section 1.2) and purpose (in Section 1.3) guided the review of educational theory and practice as summarized in Chapter 2. These underpinnings answered questions about *why* this study was needed. The description of the context, target population and sampling methods, introduced in 1.5.1 and developed in Chapter 3, Section 3.3.1, clarifies *who* is studied and *where.* This chapter also answers questions of *what* is assessed (cf. 3.2.2) and *how* it is to be done during the development and validation phases (cf. 3.3.2 and 3.3.3), building on precedent literature discussed in Chapter 2, Sections 2.2.3, 2.2.4 and 2.3. Reporting on the *quality* of the end product, that is, the extent to which this research has successfully developed a valid curriculum-aligned assessment tool, is the focus of Chapter 4.

3.2   RESEARCH DESIGN

"Research is vitally important in curriculum … as a means to the end of improving curriculum practice" (D. F. Walker, 2003, p. 132). This curriculum study researches the development of a curriculum-aligned assessment in the interests of improving lifelong holistic education from a Christian worldview. In this section, the theoretical framework for the research design (as introduced in Section 1.4) is developed, providing the structure for decisions regarding methodology, methods, and processes for the bi-phase study.

3.2.1 EDUCATIONAL DESIGN RESEARCH

Gall and Borg (1997) distinguish between *basic research*, *applied research* and *educational design research* as three different types of research, similar to Rothman and Thomas' (1994, pp. 3-21) three components of intervention design and development research in other social sciences. The Organization for Economic Co-operation and Development (OECD) defines these three types of research as follows:

1. *Basic research* is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.
2. *Applied research* is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
3. *Experimental development* [e.g. educational design research] is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. (OECD, 2002, p. 31)

The purpose of this curriculum studies research (cf. 1.3) is innovative and exploratory, developing a new curriculum assessment tool for an observed gap in Christian education curriculum. According to the OECD's Frascati Manual (2002), and reflected in the facets of intervention research called (a) knowledge development (basic research), (b) knowledge utilization (applied research), and (c) design and development (or innovative, practical, and experimental), this research can be classified as the *experimental development* of an educational product. This study's purpose also fits the classification of a *practical* curriculum study, suited to discovery-oriented research using new or innovative research designs, such as *educational design research*, described hereafter.

3.2.1.1 Origins

In its broadest sense, *educational design research* describes research that uses findings in reiterative cycles of innovation as well as product design and development (Bereiter, 2002). Already playing a leading role in engineering and medicine, this research approach has more recently been recognized as valuable in education, and the field of instructional design and distance learning in particular. Rooted in the United States military training surge to cope with the demands of World War II, funding followed for research and development in the area of learning and cognition (Leigh, 1998), setting the

stage for educational design research as a new field of education and social science research.

As a re-emerging model for research in education, various terms have been used for this approach to innovation, using technology to improve teaching and learning:

- *design research* (Bereiter, 2002, 2005; A. Collins, et al., 2004; Edelson, 2002; A. E. Kelly, 2004; T. C. Reeves, et al., 2005; Van den Akker, et al., 2006),
- *design-based research* (Barab & Squire, 2004; Bell, 2004; Dede, 2004, 2005; Design-Based Research Collective, 2003; Hoadley, 2004; D. Joseph, 2004; T. C. Reeves, 2005; Sandoval & Bell, 2004; Simonson, 2006; Wang & Hannafin, 2004, 2005),
- *design and development research* (Richey & Klein, 2007; Richey, et al., 2004; Van den Akker, 1999),
- *design-experiments,* the term first used by Brown (1992) and Collins (1992) (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Cobb & diSessa, 2004; A. Collins, et al., 2004; T. C. Reeves, 2000),
- *formative research, inquiry, experiments and/or evaluation,* which informs curriculum development (Walker, 1992, as cited in Van den Akker, 1999),
- *educational design research* (Van den Akker, et al., 2006).

The most self-explanatory and recently used term, *educational design research,* will be used in this study. A closer look at the characteristics (cf. 3.2.1.2), outputs (cf. 3.2.1.3) and empirical background (cf. 3.2.1.4) of educational design research is foundational to decisions about research methods in both the development and validation phases.

3.2.1.2 Characteristics

Bereiter (2002) outlines four distinctive characteristics that differentiate educational design research from other research designs, all of which apply to the context within which this study is situated as part of a larger GD curriculum project:

- Design research is carried out by or in close collaboration with designers. … Design research is part of the design process; if separated from it, it ceases to be design research.
- Design research is inherently interventionist. ... Design researchers, by contrast [to other educational researchers], are trying to make something happen, and this frequently means crossing the boundary between observer and actor.

- The most immediate goal of design research is the solution of problems formulated on the basis of perceived shortcomings and obstacles. Accordingly, design research requires a community of practice in which people both believe in what they are doing and pay close attention to negative results. This is in contrast to many educational communities that vigorously reject any negative evidence or criticism of their favoured approach.
- Design research is guided by some vision of as-yet-unrealized possibilities and is characterized by emergent goals - that is, goals that arise and evolve in the course of cycles of design and research. (Bereiter, 2002, pp. 331-332)

Action and *educational design research* share characteristics of *applied research*, differing in the relationship of researcher to participants, the scope of the research, and the choice of research methods. Poscente (2006) describes the relationship between the researcher and practitioner as follows: "While design-based research and action-based research are both interventionist, they differ because in action research the teacher is the researcher, whereas in design-based research the teacher and researcher work together to form new understandings of teaching and learning" (*design-based research discussion board*). In action research, the teacher-researcher utilizes data collection and analysis methods used by professional researchers to answer questions about the applicability of an intervention researched for other settings or practice they have uniquely developed for their specific situation. Action researchers use research methods to answer their site-specific questions; generalization of results is not their concern. Educational design research is a broader form of applied research where the generalization of the process and/or product of research is of interest. Both action research and educational design research use qualitative and quantitative methods in a participatory design to solve complex real-world educational issues (Barab & Squire, 2004; McKenney, et al., 2006).

In *educational design research*, the developer-researcher partners with teacher-practitioners in iterative cycles of development and intervention-oriented research to solve specific curriculum challenges, "advancing theory through the design-analysis-redesign of instructional activities and artifacts" (Shavelson, Phillips, Towne, & Feur, 2003, p. 26). Assessing Christian education within Adventist schools is the context selected for this educational design research. Limiting the study to enable interaction with a sample of real teachers and learners in real classrooms during the construction and testing of the GDI facilitates Wenger's (2007) concept of *communities of practice*, where groups of practitioners share a passion for something they do and work together to do it better through regular interaction or shared practice.

Even though educational design research is often a long-term research project, it may also focus on producing a specific curriculum product or tool to complete some of the steps of a larger instructional design project. Richey, Klein and Wayne (2004) note that "sub-studies may be conducted to analyze and define the instructional problem, to specify the content, or to determine instrument reliability and validity" (p. 1104). This study focuses on just one component of broader research needed for improving teaching and learning in Christian education during adolescence. In the context of backward design (as discussed in 2.2.3.1) as a systems approach (cf. 2.2.3.2) to educational research and development (J. P. Gall, Gall, & Borg, 2005, pp. 459-462), this assessment product development research is the second step, following the GD curriculum design. The essential outcomes of the curriculum and the assessment developed in this study form two ends, with teacher-created lessons appropriate to diverse local settings spanning the gap between the two curriculum ends. Needs assessment, and goals and objective formulation were completed in a prior phase. Broader testing for global use, along with the creation of teaching materials and learning activities appropriate to specific cultural contexts and developmental levels are envisioned additional research projects.

3.2.1.3 Outputs

The educational development and design research process results in one or more of three outputs (McKenney, et al., 2006, pp. 72-74):

1. *Design principles*, theories, lessons learned or knowledge generated is foremost in innovation common to technology enhanced developments.
2. *Curricular products* or programs of value to schools or a broader educational community build on or contribute to validation and effectiveness studies which enable curriculum development based on scientific insights.
3. *Professional development* of the researchers and educators participating in iterative cycles of intervention and product refinement.

Design principles discovered through this educational design research process are noted, and observations referenced in recommendations for further research in this project (cf. 5.7), or future technology-aided self-assessment research in similar settings. By its nature, the interaction between researcher-designer and teacher-practitioners engaged in this study could result in professional development for both, enriching the real world

curriculum application in each of the sampled schools. Although all three of the educational design research outputs above may be achieved, the focus of this study is on validating the GDI as a *curriculum product*.

3.2.1.4 Empirical Foundations

This study is empirical in that findings are based upon analysis of data and participant experience rather than on speculation, theory or logic. However, Van den Akker's (1999) illustration of the philosophical differences between traditional empirical research and development or educational design research is informative (Figure 3.1). Where empirical research traditionally tests a hypothesis based on observations or existing theories in order to refine theory, educational design research analyzes complex practical problems, develops solutions within a theoretical framework, then evaluates and tests the solution within a real-world context. The outcomes of this testing in turn contribute to the theoretical framework through documentation and reflection.
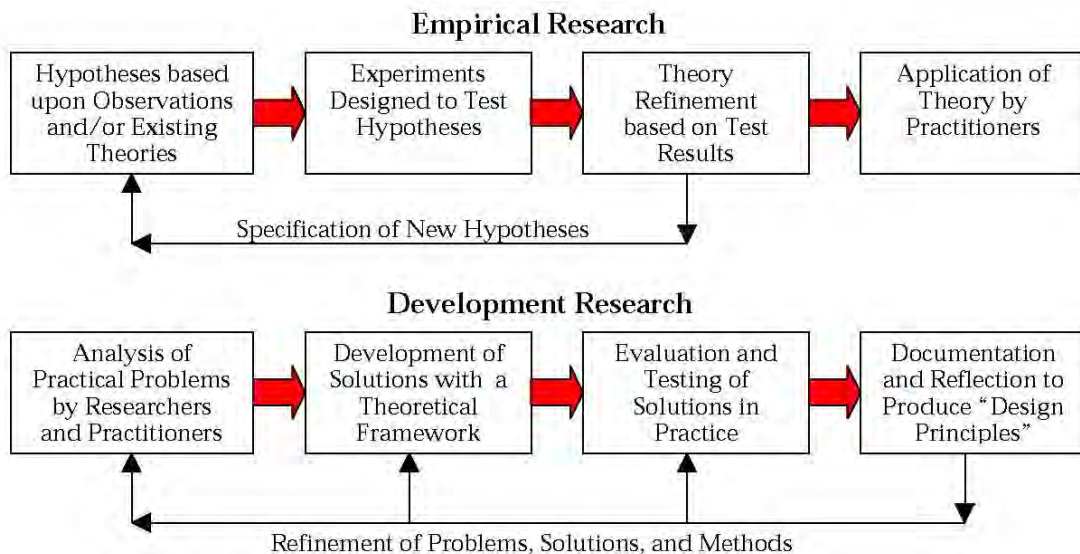
Figure 3.1: Comparing traditional empirical research and development research
(Van den Akker, 1999)

Educational design research is iterative, with improvement and change an integral part of the development at and between each step or phase. Traditional empirical research hopes that practitioners will apply findings, which rarely happens to the extent hoped. Collaboration between teacher-practitioners and researchers makes it possible for educational design research to provide direct benefits to all stakeholders (learners,

teachers, educational administrators, trustees) within the research context (McKenney, et al., 2006, p. 76; D. B. Reeves, 2002, p. 10). In order to produce an assessment product of practical value to Christian education, the literature reviewed regarding the origins, characteristics, outputs and empirical foundations of educational development and design research seems to indicate that this research purpose is best served by the research design approach which this study will refer to as *educational design research*.

3.2.2 MIXED METHODS RESEARCH

Sustained innovative development, often in technology-enhanced learning environments, is what characterizes educational design and development research (Design-Based Research Collective, 2003; Sandoval & Bell, 2004).   Bereiter (2002, p. 332) note that educational design research uses various methods from other research approaches as needed. This may include aspects of applied, descriptive, exploratory, non-experimental and evaluative research designs, and a pragmatic selection of quantitative and qualitative methods to create a unique mixed methods approach for this GDI development and validation research.

Quantitative, qualitative and mixed methods research, are three approaches to educational research, each with strengths best suited to specific types of research:

- *Quantitative research*, prominent prior to the 1980s, focuses on collecting and analyzing precise, quantitative or numerical data in support of already constructed theories (B. Johnson & Christensen, 2008, p. 33)
- *Qualitative research* relies primarily on qualitative, in-depth or richly detailed data usually collected in naturalistic settings (ibid, pp. 441-443).
- *Mixed methods research* has the advantage of eclectically drawing on the full complement of quantitative and qualitative methods to create research designs that best meet the purposes of the study (Bereiter, 2002; T. C. Reeves, 2000).

Introduced first as *triangulating* information from diverse data sources in psychology (D. Campbell & Fiske, 1959) and in sociology (Denzin, 1978), Tashakkori and Teddlie (2003) concluded that mixed methods research is yet to be recognized as a true research paradigm. More recently, mixed methodologists have proposed subdividing research into *exploratory* and *confirmatory* methods rather, pragmatically integrating quantitative and

qualitative methods as best suited to the purposes of specific studies (Onwuegbuzie & Leech, 2005; Onwuegbuzie & Teddlie, 2003). Such a methodological reframing concurs with the emphases of this research design, as the development phase utilizes methods for predominantly exploratory purposes, while the validation phase focuses more on confirmatory mixed methods.

When blending quantitative and qualitative methods in mixed methods research, documenting the sequencing and interactions between methods becomes expedient. Leading and competing typologies (design type matrices) are proposed by Tashakkori and Teddlie (2006) and Creswell and Clark (2007), for example, a discussion of which is beyond the scope of this study. One concise, clear typology (B. Johnson & Christensen, 2008, pp. 446-448) fits this educational design research. It conceptualizes mixed methods research as a function of two dimensions:

1. *Time orientation*: when the qualitative (QUAL) and quantitative (QUAN) components occur – either concurrently or sequentially.
2. *Paradigm emphasis*: whether qualitative and quantitative aspects of the study have approximately equal (QUAL-QUAN) or dominant (QUAL-quan, or QUAN-qual) status.

This dissertation's mixed methods educational design research can be described by the following typology (Table 3.1). Quantitative data were collected from experts to confirm the inventory-curriculum alignment in the first phase (cf. 4.1.1.1 and 4.2), and from 606 learners completing the GDI to validate the developed assessment product in the second phase (cf. 4.3, 4.4, and 4.5). Qualitative data were gathered through expert reviewer comments and dialogue, through teacher interviews/in-service training, and through learner pilot testing in the first phase (cf. 4.3 and 4.5). Teacher interviews regarding administering the GDI and observations of their learners completing the GDI, reviewing their instantly-generated, secure, individual online reports, and the short GDI exit survey, provided both quantitative and qualitative data in the second phase. Learner responses to the GDI exit survey provided rich qualitative data to triangulate with quantitative responses, and the data from educator interviews (as reported in Sections 4.3 and 4.5).

Table 3.1 GDI Mixed Methods Research Typology

Phase	Focus	Typology
1	GDI Development	QUAL + quan (concurrent, qualitative dominant)
2	GDI Validation	qual + QUAN (concurrent, quantitative dominant)

Thus quantitative and qualitative methods are simultaneously or concurrently used in both phases, with data analysis informing further cycles of development and validation, as typical of educational design research.

3.2.3 RESEARCH QUESTIONS

This study focuses on the development of a self-assessment of spiritual growth, appropriate for adolescents, aligned to the GD curriculum framework, and filling a gap in the assessment of Christian education. The focus is on researched curriculum innovation, not experimental hypothesis testing. In this context, the following questions (as presented in 1.4.1) are considered to be the guiding rubric to ensure the end product meets research standards of internal and external validity, reliability and utility for the intended users, adolescent learners and their Christian educators.

3.2.3.1 Phase 1: Design & Development Research Questions

1. To what extent is the GDI aligned to the GD curriculum framework?
2. To what extent is the GDI design appropriate as an adolescent self-assessment?

3.2.3.2 Phase 2: Validation Research Questions

3. To what extent is the GDI a reliable and valid self-assessment of adolescent Christian spiritual growth as outlined in the GD curriculum framework?
4. To what extent is the GDI appropriate for international use in Christian education?

Table 3.2 Research Phases, Questions and Methods

	Research Questions (1.4, 3.2.2)	Research Methods (3.3.1, 3.3.2, 3.3.3)
Phase 1: Development	*1.Alignment* (4.2) To what extent are inventory items *GD curriculum*-aligned? i.e. Does content/curricular evidence support the GDI's validity?	Expert reviews of how well items measure framework commitments & processes QUAN: agreement scale QUAL: suggested rewordings/new items
	2.Design (4.3) To what extent: ● is the online format intuitive? ● Are items clearly worded? ● is length appropriate? ● is the report self explanatory?	Pilot think-aloud protocol reviews final format QUAN/QUAL: thought process comments & research observations during piloting with learners QUAN/QUAL: educator interview & learner exit survey data
Phase 2: Validation	*3.Validity* (4.4) To what extent: ● does internal consistency evidence support reliability? ● does construct-related evidence support the GDI's validity?	4 constructs & 5-6 scales each need 21x20=420+ learners & their educators QUAN: ● Item analysis: Cronbach alpha ● Structural equation modelling QUAL: teacher exit interview comments
	4. Consequential evidence (4.5) ● To what extent are results consistent across grades, gender, and country? ● What are the value implications of GDI use?	Examine relationship by demographic characteristics: QUAN: SEM and COR analysis USA vs. international, grade level, and gender QUAL: educator and learner perceptions of utility by country

Table 3.2 was developed as a guiding framework summarizing how the research questions would be addressed within the two phases of this study. The research methods briefly listed here are fully defined and supported by literature as discussed in Section 3.3, including sampling methods (3.3.1), and methodology for Phase 1 (3.3.2) and for Phase 2 (3.3.3).

The four questions shaped the interaction with participating experts, teachers and learners within the selected study context. In creating solutions to real-world educational dilemmas, educational design research intervenes to improve instructional design and develop procedures and theory to inform future studies in the field of curriculum studies. Data analysis thus included descriptive summaries of the process of development and validation that go beyond answering the direct research questions, in the interests of

informing the field of educational design research and further cycles of research for this specific curriculum project (for example, cf. 5.7.2).

3.3 RESEARCH METHODS

Because educational design research is immersed in complex, multivariable, situated real-world settings, documentation of educational interventions (such as the development and validation of the GDI as an assessment tool) produces a narrative account of the process engaged in creating the instructional activity or tool. Retrospective analysis of quantitative (e.g. GDI learner data sets) and qualitative data (e.g. teacher interviews, learner exit survey data sets) along with narrative accounts (e.g. researcher journal of design process) helps make explicit some of the implicit knowledge the designer used to understand and implement the intervention (Shavelson, et al., 2003). Thorough grounding in literature further assists in establishing the validity of the study outside of the specific research context.

The methods for data collection and analysis are organized within the development and validation phases of the design. The research methods used and the cycles of data collection for formative evaluation of the assessment prototype in each stage are described (McKenney, 2006, p. 78). This sequence allows for documentation of the curriculum product development process, which in itself may contribute design principles to the field of instructional design research (Van den Akker, 1999).

3.3.1 SAMPLING METHODS

The target population (cf. 1.5.1) and sampling methods are outlined as an introductory overview before the fuller discussion of research methods within each phase. Sampling for the validation phase delimited sampling for the development phase, so beginning with the end in mind is foundational to understanding the rest of this chapter.

3.3.1.1 Target Population

The GDI was designed for the population of learners attending Grades 7-12 in Adventist schools globally, with internet access, using English as the language for teaching and learning. As Grades 7 and 8 are included in elementary schools in some regions, the

exact number of schools and learners in this population is unknown. A recent report lists 7,313 elementary schools with 1,085,076 learners, and 1,755 secondary schools with 458,555 learners globally ("Adventist world education statistics: December 2009," 2010). Including Adventist homeschooled learners, for which no statistics have been found but to whom this product would also be applicable, increases the population to more than a half million 13 to 18 year olds. No figures are available to indicate how many learners do not have internet access and/or do not use English, the language of this assessment tool, so the exact population size is unknown.

3.3.1.2 Sample Selection: Experts, Educators and Learners

Non-probability methods of convenience, purposive, expert, snowball and quota sampling (Babbie, 2001, pp. 178-182; Trochim, 2006) were used in this multi-phase mixed methods research. Cost and time constraints called for convenience sampling of the regions to be included. At first, schools were selected in the Lake Union Conference of Seventh-day Adventists, USA, and the South African Union Conference of Seventh-day Adventists. When only two classes within the sample of three South African schools participated, the offer of one school in the South Pacific Division of Seventh-day Adventists was accepted in an attempt to include a large enough international sample of learners to analyze the extent to which the GDI was relevant cross-nationally.

To address the research question regarding generalizability or transferability, the GDI collected background information, including age, gender, country of residence, family nationality, religious affiliation, and personal Christian commitment (if applicable) during the validation phase. The original purposive sample of schools was selected to include as broad a range on each of these demographic characteristics as possible. To facilitate quality educational design research, a small number of teachers are preferable in order to interact directly with the researcher in cycles of developing, piloting, and testing the curriculum assessment product. The choice to begin this study with Adventist schools was determined by (a) the fact that the philosophy and curriculum of Adventist schools was known to incorporate the GD curriculum framework, and (b) the researcher's access to this population. Including participants in more Adventist education settings globally and across other denominations will hopefully follow this preliminary study.

With the population selected, the sampling methods were then determined for each of four groups: (a) expert reviewers, (b) learners for the development phase cycles of piloting, (c) learners for the full validation sample and (d) at least one educator who administered the GDI from each school.

A snowball sampling method was utilized as ten educational leaders and religious education professors were asked to recommend educators who met the listed criteria for experts to review and evaluate one or more versions of the GDI during the development phase. Invited experts represented eight countries on five continents, including Adventist education curriculum specialists and education administrators, experienced high school Bible teachers, qualified youth pastors, and experts in Christian spiritual development in childhood and adolescence. Expert reviews were gathered in three waves, each reviewing an updated version of the GDI. Some experts reviewed more than one version; others assisted in one iterative cycle only.

Convenience and proportional quota sampling methods were used for the online pilot testing with adolescent learners (Trochim, 2006). Participants for the pilot study were gained through the local schools in the researcher's area in the first cycle in July 2009, and through a local homeschooling network in the second cycle in October 2009, both convenience samples. Appointments were made with learners who volunteered, seeking a proportional quota of one male and one female each per grade (approximately ages 13-19), representing a wide multicultural mix. To meet ethical standards, learner- and parent-signed consent was obtained prior to participation. Learners who completed the pilot test/interview were offered a small gift coupon.

During the validation phase, all learners and the teacher who administered the GDI at the selected schools formed the sample. In order to counteract this nonprobability sampling method which may impact the generalizability of results, a sample of schools with over 1,200 learners was initially selected for at least 1,000 valid responses, allowing for learner absences on testing days, school and personal choice not to participate, and unusable data. Anderson and Bourke (2000, p. 115) suggest sample size should be at least 10 times the number of items, so with 100 GDI items, the planned sample size was on target.

3.3.1.3 Unit of Analysis: Individuals

As the purpose of this study is to develop and validate a self-assessment (cf. 1.3), the individual learner is the unit of analysis. However, the focus was not on characteristics of the student as such, but on evaluating the developed assessment. Thus data were collected from expert reviewers, learners in the pilot study, as well as educators engaged with the learners who participated in the validation phase, each adding evidence about the extent to which the developed assessment could be considered valid and reliable. The unit of analysis in all components of development and validation remained the individual.

3.3.1.4 Ethical Considerations

Providing clear information about the benefits or risks involved in participating in a study, with freedom to choose whether and to what extent to participate, is essential in ethical research. This section reviews the research design's procedures selected to ensure ethical standards were met or exceeded during both phases of this educational design research.

Although few guidelines for research involving faith communities exist, Gruppetta (2008) highlights the importance of being aware of the cultural and/or religious context when phrasing qualitative questions or quantitative survey items in order to maximize information and minimize marginalizing any group. As the GDI may be used in schools where all learners are Christians, as well as in schools where most learners are from very different cultural and religious persuasions, expert reviewers were specifically asked to verify every item worked in their setting, free of jargon and unnecessarily complex sentence structure.

Personal choice was respected during the expert review process by providing adult participants with a brief introduction to the research purpose and procedure before inviting them to participate. The introduction also explained how their feedback would be confidentially processed, and anonymously reported. Researcher contact information was provided for any with further questions, and all correspondence promptly answered.

Before developing the GDI for completion online, standards for internet research were carefully reviewed. The *Report of Board of Scientific Affairs' Advisory Group on the*

Conduct of Research on the Internet (Kraut et al., 2004) discusses the advantages and challenges of online empirical research. Although advantages of reaching a broader sample of the population at less cost are significant, difficulties must be considered (Nosek, Banaji, & Greenwald, 2002, p. 162):

- the absence of the researcher during participation;
- adequate informed consent, explaining instructions, and effective debriefing; and
- the protection of participant's anonymity and confidentiality.

These considerations (Kraut, et al., 2004; Nosek, et al., 2002) along with other recommendations for ethical human subject research with minors (younger than 18 years old) were addressed as follows:

- Regional education directors and their local conference education superintendents were invited to review the study and recommend schools to participate that met the criteria for this study. Their written approval was gained and stored confidentially.
- Principals of participating schools were invited to review the research purpose and procedure before agreeing to participate. Letters of consent to participate in the research as an educational activity with their full learner body were procured. In order to protect school identity, all results are communicated anonymously.
- The teachers who administered the GDI to learners in each school were invited to review the GDI during the development phase. One contributed as an expert reviewer. Others recommended procedural improvements. Three principals made suggestions during the introduction or after overseeing learner participation. The researcher communicated with participating teachers and principals to ensure adequate information was available for uniform administration of the GDI with learners. A teacher exit interview provided valuable qualitative data sharing observations on learner participation and their personal evaluation of the utility of the GDI in their context.
- Parents of learners participating in the pilot study, not within a school setting, gave their consent by signing a letter that explained the purpose and extent of the study, and providing them an opportunity to ask the researcher any questions about their child's participation (Appendix C).
- Learners gave their permission by listening to oral instructions (Appendix D) read by teachers before they completed the GDI and reading the written introduction online which stated that completion of the GDI online inferred consent to

anonymous use of data.   Learners had the option to leave out any items they were uncomfortable with or quit at any point without penalty. Teachers provided class time or extra credit for completing the GDI in their own time when logistics precluded in-class participation.

- As two schools were operated through the researcher's employer, approval was requested and granted through its Institutional Review Board (Appendix E). Although a time consuming additional step, this process respected local ethical standards, and provided an additional check and balance to support the adequacy of ethical considerations built into the research design.

Individual access codes protected participants' privacy while allowing them to freely access their own results online from any computer following the study. Access codes also limited learner access to a single entry, and limited participation to the purposive sample, both important to overcoming the obstacles of sampling and data quality control in online research (B. Johnson & Christensen, 2008, pp. 124-126; Kraut, et al., 2004; Nosek, et al., 2002).

Access codes were assigned by the participating teacher to their learners. This list was kept confidentially, known only to the teacher (so learners who lost/forgot their code could be helped) and never shared with the researcher. No personally identifying data were collected, so all participants in the validation phase were anonymous to the researcher. Learners and teachers participating in piloting selected their access codes (away from the research, to preserve anonymity) from a range of codes reserved for piloting.

The time and date of the qualitative think-aloud protocol notes allowed the researcher to link this data to the digital audio recordings, without links to the online entries, as the purpose was to test the survey items, format, and online delivery. Although the researcher could identify some of the pilot study participants by voice recognition on the audio recordings, all participants and their parents signed consent to participate confidentially.

3.3.2 METHODOLOGY FOR PHASE 1: ASSESSMENT DEVELOPMENT

Although Adventist schools globally share a common vision and mission, their purpose is implemented uniquely in locally constructed (or nationally-required) curriculum goals,

shaped by a complex interplay of leadership strength, cultural expectations, learner-body dynamics, community support or lack thereof, type of school, etc.. Evaluating Christian spiritual development has focused on assessment of specific content in specific classes in a specific culture. Concern about adolescent religious and spiritual literacy (A. W. Collins, 1991; Prothero, 2007; C. Smith & Denton, 2005; Taggart, 2002; Whelply, 1997) raises questions about how well churches and religious-affiliated schools and colleges are achieving their core goals of spiritual nurture. These findings prompt better assessment, aided by recent research in religious and spiritual development, neuroscience, education and psychology.

The development phase began with a comparison of existing Christian spiritual development curricula (called Religion or Bible) used in the Adventist education system for Grades 7-12 (see http://circle.adventist.org/browse/?browse_node=327). The North American Religion Curriculum (Department of Education, 2001) outlined goals and objectives for each year, Kindergarten through Grade 12, detailed further in the teacher editions of the textbook series. The Pacific Island Bible Story Plans curriculum for multigrade use covered similar goals and objectives using a historical-sequential approach. Correspondence with Bible curriculum developers in Australia and New Zealand provided additional curricula from the South Pacific for review, each with unique organizing structure, scope and sequence. Adventist schools in Africa and Europe have adapted the North American religion curriculum and other Christian spiritual development resources to complement national religious studies curriculum. Reviewing the South and Inter-American Spanish Bible curriculum, and visiting with the developers of the Southern Asia Bible curriculum showed creative and regionally-effective variations in curriculum planning for Christian spiritual development.

Each curriculum had strengths and weaknesses, using curriculum models available and appropriate to the cultural context or teaching setting for which it is designed. An assessment of the spiritual goals of Christian education as a whole was not included in any reviewed curricula. Developing an assessment aligned to the shared goals of Christian education could affirm local curriculum development and encourage continued assessment of class/level-specific objectives. As a complementary tool, freely available for any school but never universally required, a global assessment should focus on

formative assessment of individual student learning rather than summative assessment of teacher or school performance.

Focusing on individual learner formative assessment could also avoid any misconceptions of purpose. Although reviewing written Adventist Christian spiritual development curriculum internationally was a good start to determining to what extent the curricula overlapped and to which to align a self-assessment, the broader goals of Christian education needing assessment lay beyond one specific course, including school mission statements, faith-integration in all other courses, and choice of extra-curricular and enrichment learning experiences. This required careful review of the overarching philosophy of Adventist education (cf. 2.5.1), and a sampling of school documents implementing this in specific cultural contexts.

A review of the literature on human, faith and spiritual development through childhood and adolescence provided a conceptual framework (Chapter 2) to *what* needed to be assessed. However, for meaningful learner formative assessment, more than a research base was needed. A clear curriculum framework that could guide self-directed learning in areas of strength and growth points (rather than weaknesses) compared to a curriculum standard (criterion-referenced), rather than to a similar population (norm-referenced) was needed (cf. 2.3).

Most assessments of religiosity and spirituality reviewed were norm-referenced and for adults. Although several scales, inventories or profiles of Christian spiritual development included items that address some goals in the reviewed Bible curricula, none included all of the general goals of adolescent Christian education guiding Adventist Bible teaching in Grades 7-12. Various online Christian spiritual development, personality, physical education, career guidance inventories, as well as online math tests and instant reports, provided examples of available self-assessments that informed the development of the GDI (cf. 2.3.3).

Networking with colleagues led to the discovery of a broader curriculum initiative. The development of the GD curriculum framework, described in Chapter 2 (cf. 2.5.2.2), was commissioned by the General Conference of Seventh-day Adventists, for the purpose of clarifying the goals and focus of a wide range of ministries within one overarching

framework. The resulting GD curriculum framework was simple enough for adolescents to comprehend, while profound enough to address the complex interactive nature of lifelong spiritual development. It succinctly framed the core elements of the existing Adventist Bible curricula, supported by the biblical and research foundations explored. Selecting the GD curriculum framework as the curriculum to which to align the GDI, enabled criterion-referenced self-assessment rather than a norm-referenced or comparative score on a scale developed from an adult perspective of what faith maturity looks like.

The process of curriculum review described here answered the question of *what* to assess, considering a broad range of educational curriculum and spiritual development research along with current practice in Adventist education of adolescents globally, briefly described in Chapter 2, Sections 2.5.1 and 2.5.2.   The GD curriculum framework provides the standard upon which to develop a criterion-referenced assessment.   *How* this is constructed, is discussed in the following sections (3.3.2.1 and 3.3.2.2).

3.3.2.1 Designing the Assessment

The process of constructing the GDI began with selecting a curriculum model or framework which encompassed the enduring understandings or key learnings for Christian education of adolescents, beyond the parameters of a single course or class. A review of existing curricula and assessments of Christian spiritual development clarified what was essential to achieve the research purpose, and led to the choice of the GD curriculum framework.

Both Dick, Carey and Carey's (2004) model of instructional design (as discussed in 2.2.3.2), and Wiggins and McTighe's (1999, 2008) backward design process (cf. 2.2.3.1) begin with identifying what learners should know, understand, and be able to do. Starting with the end in mind, the next stage is to determine acceptable evidence of the attainment of outcomes. This involves the development of appropriate assessments to evaluate whether or not learners have met the standards or provided evidence of proficiency in skills or understanding. Planning teaching and learning experiences follows after developing assessments. The systems approach includes more steps to each of the backward design's three stages, with goal setting first, assessment second, and instructional planning last in sequence. Having clarified the goals by selecting the GD

curriculum framework as the best curriculum model organizing desired lifelong spiritual development processes, developing the GDI was the next step in the backward design process.

Wiggins and McTighe (1999) consider self-assessment or self-evaluation (cf. 2.3.1) to identify strengths and growth points as one of four key aspects to the second stage of backward design. Self-assessment results can guide the learner in setting personal goals for the future. Examples of self-assessment may include reflecting on a single question, checking a simple rubric, or completing a comprehensive self-report survey, such as the GDI.

Extensive social psychology research (Forsyth, 1999, as cited in McMillan, 2007) found that attitudes include an affective component of positive or negative feelings, a cognitive component describing worth or value, and a behavioural component indicating a willingness to engage in specific actions. As Christian spiritual development (cf. 2.4.5) includes beliefs, attitudes and actions, the selected assessment method must effectively measure cognitive, affective and behavioural components.

Because beliefs and attitudes are personal traits that are privately held, they are best assessed through reflection and self-report. Reliability of self-reporting can be compromised because participants may be inhibited due to lack of motivation or fear of consequences or who may view self-disclosing responses (McMillan, 2007; Tourangeau & Smith, 1996; Tourangeau & Yan, 2007). Reasons to fake responses can be minimized by clarifying the purpose, creating a stress-free environment in which self-reporting is done, guaranteeing anonymity, respecting freedom of choice not to participate. These ethical issues were considered in the selection of the method of assessing spiritual development in this study.

Using online technology for learners to take the GDI and view individual result immediately limited self-reporting options to survey or questionnaire formats using selected-responses. The benefits of selected-response survey methods are (a) rapid scoring, (b) perceptions of greater anonymity, and (c) easier analysis of large amounts of quantitative data (Reichard, 1999). For adolescents in many world regions, internet access is part of their daily lives,

and an increasing number of assessments are available online using selected-response scales, making this a familiar format to use for this population.

3.3.2.2 Selecting Item Formats

Ordered-category items are commonly used in a wide range of surveys because of their versatility in measuring the immeasurable or unobservable, such as cognitive and affective responses in social sciences (Uebersax, 2006). Building on the work of Likert (Babbie, 2008, p. 188), ordered-category items provide a scale-like range of responses to select from. Although adapted Likert item response formats are subject to distortions such as central tendency bias, acquiescence bias, and social desirability bias (Babbie, 2008, p. 277), care in wording statements and item responses, ordering items designing attractive, clear survey designs help combat potential biases.

Item response formats commonly include ratings of agreement or frequency. Ratings of agreement include a range of options, often from strong disagreement to strong agreement, as potential responses to item stems. This is often used for surveys of motivation, beliefs and attitudes. Ratings of frequency include a range of options to answer questions of how often item statements are true for the respondent. Frequency ratings are less abstract and thus easier for children and youth to respond to, best for measuring cognitive and behavioural components (McMillan, 2007, pp. 312-315). As the GDI includes cognitive, affective, and behavioural components:

- the first section (59 items) used a frequency rating format;
- the second section (items 60-82) used an agreement rating format;
- the third short section (items 83-87) used a different ordered-category response format for each item; and
- the fourth section (items 88-98) used the same ordered-category response format, including the last two items (99-100) in the section with one more selected-response item format.

To minimize confusion, all items using one scale were grouped, and a change of scale clearly indicated by explaining the scale at the beginning of the section, always on a new webpage. Items measuring different constructs were mixed intentionally, to keep participants conscious of each individual item thereby limiting bias. This also provided a

built-in cross-check in data cleaning, alerting the researcher to potential inaccuracies where learners simply marked the same value down a complete page without reading the statements to personally evaluate and respond to differing item statements (L. W. Anderson & Bourke, 2000, pp. 95-100).

Responses on all adapted Likert scale and ordered-category items were weighted with the spiritually strongest response scoring highest. For example, 50 of the first 59 items included a response set with the response *always true* assigned the highest score of 5, and the response *never true* the lowest score of 1, with three responses between these extremes scoring 2, 3 and 4 respectively. Summated rating scales were calculated by adding scores for items measuring the same construct then determining the mean for the most reliable overall score of that construct. Each of the 21 GD curriculum framework commitments are measured as a separate construct or scale, with four to six items included for each. These considerations set the minimum of at least 100 items for initial validation of the GDI.

Three, five or seven-point scales are common, with a wider range of options allowing for a finer comparison of responses, yet more complex to understand or differentiate between. An odd number of options provides for a neutral middle score (or midpoint response), which may provide meaningless data. In some cases, an even number of points are preferred, forcing a positive or negative choice on agreement scales. A study of adolescent's midpoint responses (Raaijmakers, Van Hoof, Hart, Verbogt, & Vollebergh, 2000) demonstrates that a midpoint intended to allow responses that are truly neutral in a scale between two opposite extremes, may reflect the responses of participants who would like to give a genuine response to all items, and this one best matched their undecided, not-understanding position on this item. Thus it was decided not to include a neutral midpoint, but to include an option "I don't understand" or "not applicable" in each response set.

Considering adolescent development and what items were measuring led to the development of as few different scales as possible. In the interests of simplicity, three adapted Lickert scales and a checklist were found to work for all concepts being assessed, one with slight variations in wording (for Section 3). One hundred items were grouped in four sections, ordered by the type of scale.

1. Items 1-59 asked adolescents to indicate *how often* a statement about personal choice, action or attitude was true for them, using a 5-point frequency scale: *always true, often true, sometimes true, not often true and never true*.

2. Items 60-82 asked adolescents to respond to statements of biblical understanding, based on this stem question: "Which words best describe what you personally believe about each statement?" A 5-point scale included these choices: *I strongly believe, I believe, I have some doubts, I strongly doubt, I don't believe*.

3. Items 83-87 used similar 4-point frequency scales, each tailored slightly to the specific item stem (see Appendix A for exact wording), assessing active experiences of religious and spiritual development.

4. Items 88-100 assess the extent to which the teen is being equipped or nurtured in their religious and spiritual development by supporting adults. Adolescents select ALL the options that are true for them regarding the item stem, or statement: *one or both parents, one or more other family members, one or more school teachers, one or more adults in my church, one or more friends, other.*

The online format allowed adolescents to select only one answer each for Items 1-87 in Sections 1, 2 and 3. Each item in these three sections included an additional response option, *I don't understand,* for those who could not make sense of the item statement, or considered it not applicable. Although this may include several distinguishable responses if more options were provided, the need for clarity and brevity for young scholars overruled possibly greater precision. Chapter 4 includes a discussion of findings regarding this response item, which will prompt improvements to item stems and choice of which items to discard.

The decision to create 100 items was largely determined by a minimum number of items needed for reliable evaluation of the 21 commitments in the 4 processes of the GD curriculum framework.   In one comparison, an online assessment of positive development strengths for 10-14 year olds ("Clifton Youth Strengths Explorer," 2009), included 78 items of similar length and response style to the GDI. One 14-year old took 15 minutes to complete this. The United States (USA) National Catholic Educational Association's (NCEA, 2001) Assessment of Catechesis/Religious Education (ACRE) includes approximately 110 items (differs slightly in each of the 3 levels, designed for Grades 5, 8 and 11) in three parts, to be completed in about one hour (National Catholic Educational

Association, n.d.). The faith knowledge section includes about 60 items which require reading of the item stem and four multiple-choice items, so considerably more reading than planned for a short item stem and repeated one or two-worded response options. The ValueGenesis 2 (Gillespie, et al., 2003) learner questionnaire included over 500 items, which learners completed in two class periods, a maximum of 100 minutes, setting an average of five items per minute. Considering these comparative adolescent assessments, the GDI was designed with a total of 100 items which could be completed during an average 30-40 minute class period. As the assessment did not have a time constraint, it was designed online to store partial responses, allowing learners to log back in online and complete it at a later time. Once completed, no further access to the GDI itself was allowed, only to the individual report.

3.3.2.3 Constructing the Assessment Item Stems

The construction of statements to which adolescents would respond, called item stems, was guided by the GD curriculum framework and informed by literature on curriculum development (cf. 2.2.2), curriculum alignment (cf. 2.2.4) and self-assessment (cf. 2.3.1), adolescent development (cf. 2.4.1), and Christian spiritual development (cf. 2.4.5), as reviewed in Chapter 2. The GD curriculum framework (cf. 2.5.2.2) provided the organizing hierarchical structure of four processes, with four, five or six commitments each for a total of 21 commitments (cf. Table 2.1), to assess. The four processes could be considered the overarching goals or top level constructs. Each commitment could be called essential components or areas of lifelong learning, forming a lower level of latent constructs or factors as used in analysis in this study. For each of the 21 commitments, five indicators were developed, as examples rather than a comprehensive list of objectives or outcomes. These indicators were used as prompts for the first writing of item stems.

Then various assessments of spirituality, faith development, religiosity, spirituality, spiritual formation and spiritual gifts were completed by the researcher, in paper and/or online version, for adults, teens or children. Careful notes were kept of item construction, scales used, formatting details, length, apparent purpose, report format, and on any available research publications on the construction and/or validation of each (cf. key studies reviewed in 2.3.3). If peer reviewed or organizational publications were not found, personal communication with authors or developers was attempted. Discussions and

working experience with Christian teachers and educational leaders in several world regions factored in, as did research findings and qualitative feedback from the researcher's 2005 needs assessment (Bradfield, 2007) of 837 Adventist high school teachers globally.

Although the primary purpose of the GDI is to provide individual reports to inform learners and prompt self-directed lifelong Christian spiritual development, the secondary purpose of providing information to improve teaching was considered during item construction. Additional items were included in the *Understanding* process sections to enable anonymous by-class (or school, or region) profiles or reports of Adventist belief, increasing the usefulness of the GDI for the secondary purpose of providing information specific to teaching, in a later phase of the larger GD curriculum project. Less than ten items reference doctrines or beliefs shared by a small number of Christian denominations, all within the *Understanding* construct. This consideration makes possible minor adjustments for potential wider use in evangelical Protestant Christian education.

Table 3.3 Considerations for Universally Designed Assessments

For both paper/pencil and computer-based assessments, does the item…

- Measure what it intends to measure?
- Respect the diversity of the assessment population?
- Have a clear format for text?
- Have clear visuals (when essential to item)?
- Have concise and readable text?
- Allow changes to its format without changing its meaning or difficulty?
- Have an overall appearance that is clean and organized?

For computer-based assessments, have the following been considered?

- Layout and design
- Navigation
- Screen reader
- Test specific options
- Computer capabilities

Considerations for the development and review of universally designed assessments (S. J. Thompson, Johnstone, Anderson, & Miller, 2005) were used as a checklist during item

construction and online formatting. Programming built in compatibility with assistive technology for special needs education accommodations at a preliminary level, noting further refinements necessary to allow more complex formatting in later phases of this educational design research. All other considerations briefly summarized in Table 3.3 were addressed during item construction.

3.3.2.4 Expert Reviews

Internal validation was achieved by inviting experts to review the constructed GDI. Expert review is the process whereby persons with practical and theoretical expertise critique a research design or product (Richey, 2005; Richey & Klein, 2007), in this case, the GDI during the development phase. To answer this study's first research question, expert reviews were gathered in three waves, each reviewing an updated version reflecting the qualitative and quantitative feedback from previous reviewers. Expert responses provided data to establish curricular or content validity (cf. 4.2).

First, 166 proposed items were refined in five initial reviews by members of the GD curriculum framework development team and Bible teachers. These individuals considered both the wording and fit within the GDI processes and more specific commitments. Next, the first revision with 139 items was emailed to 32 experts in curriculum development, Christian education, Adventist education leadership, youth ministry or discipleship. Of these, nine experienced educational leaders were invited to recommend curriculum or discipleship experts to be included in this review process. This added 16 more invitations to teachers in six countries on three continents, from which several thorough reviews with excellent regional insights were gained. Lastly, building on the second wave of reviews of how well items measured the constructs they were written for, and with further literature review on adolescent spirituality and Christian spiritual growth, the proposed final 100 items were sent to those who were unable to review the second version, but who were willing to assist at a later date.

Several of the expert reviewers contributed additional suggestions or shared time in personal dialogue with the researcher, adding qualitative analysis of the items in relation to the aligned curriculum, and their appropriateness for adolescents engaged in Christian education within Adventist schools globally. Emails and notes of oral interview were

analyzed as data along with the expert reviews in finalizing the items for pilot review (cf. 4.1.1.1 and 4.2)

3.3.2.5 Technology-Aided Assessment

The rapid increase in online learning systems serving learners asynchronously and often globally provides an ever expanding array of options for improving teaching and learning. A variety of technology forms are available to assist the educator in assessment design, administration and reporting. Although development costs are higher than that for pencil-and-paper versions, instant global access, automated data collection, analysis, storage, and reporting rapidly outweigh the initial investment. Literature regarding the pros and cons of, and guidelines for, online assessments was reviewed to form the technical framework for implementation decisions outlined in the following sections regarding e-assessment theory and website design.

(i) E-Assessment Theory

Prensky (2001a) coined the terms *digital native* to describe learners growing up in the age of technology. In the first world, and increasingly elsewhere, 21st century adolescents are comfortable in their "twitch-speed, multitasking, random-access, graphics-first, active, connected, fun, fantasy, quick-payoff world of their video games, MTV, and Internet" (Prensky, 2001b, p. 5). *Digital immigrant* educators, using technology foreign to their educational training and personal life in previous decades, have discovered that teaching methods of the past don't reach learners whose brains have literally been rewired by their interaction with technology. Today's learners seek interactive learning experiences with instant feedback, assessment that individualizes options for learning in multi-sensory, non-sequential modes. Developing e-assessments, or assessments using technology, in education for Christian spiritual development, is thus a key next step in this milieu.

A survey of 130 British undergraduate students (Dermo, 2009) who used e-assessments during the 2007-2008 academic year investigated their perceptions during e-assessments, as well as the validity, practicality, security and reliability of online or e-assessments. Programming converted responses regarding attitudes and feelings on an adapted Likert scale into numbers. Open-ended questions invited qualitative feedback. Analysis of

correlations indicated a "normal range of distribution of attitudes" (p. 210) to using e-assessments with no significant difference for age or gender.

With increased emphasis on developing more economical and accessible methods of assessment, online testing offers reduced costs for assessment, reduced time in report generation and increased variety of reports for different informational purposes. Using technology, e-assessments serve the individual learner as formative assessment, while data may be summed for evaluative purposes by classes, school, or district/region. Mills (2008) notes that skill in using technology, and investment in the hard and software for assessments, is a necessary part of successful transition from paper-and-pencil testing to e-assessment in school systems today.

There is evidence that internet delivery of surveys reduces human error (Tourangeau & Smith, 1996), yields better response rates and is considered a more enjoyable experience. Kiesler (1984, cited in Reichard, 1999) notes that electronic communication (via the internet) differs from any other communication form in speed, time, space, ease of use, fun, audience, and opportunity for feedback. Online surveys can be completed in remote areas, with the data stored immediately and directly, eliminating potential errors through loss in mailing, differences in administration, and recording data. Kiesler and Sproull (1986, as cited in Reichard, 1999) thus suggest that electronic surveys result in better response rates with faster turnaround time and fewer incomplete item than paper-based forms. Boothe-Kewley, Edwards and Rosenfeld (1992, as cited in Reichard, 1999) reported that results for web- and paper-based questionnaires were similar, but found that participants completing web-based questionnaires reported the experience to be more interesting and important than those completing paper-based versions.

Researchers have questioned whether people provide different information depending on the mode of questionnaire delivery – administered by an in-person or phone interview, or self-administered in pencil-and-paper or web-based/online modes. Several studies indicate that adolescent self-reports (via traditional means other than web-based) are reasonably accurate (Hindelang, Hirschi, & Weis, 1981; Junger-Tas, Terlouw, & Klein, 1994, as cited in Pearce, et al., 2003, p. 1693). Risko, Quilty and Oakman's (2006) investigation of the candour hypothesis did not support the findings of previous studies (Kiesler & Sproull, 1986; Martin & Nagao, 1989; as cited in Reichard, 1999) that

administering self-assessments online resulted in a decrease in socially desirable responses; however they concurred that no significant difference existed between paper-and-pencil and computer-aided survey formats. In comparing responses to a school-based study of young people's health-related behaviour, using web-based and paper-based questionnaires, Denscombe (2006) concluded that there was "little evidence of a mode effect linked to web-based questionnaires" (p. 246).

Noting that few studies of the effects of survey mode on response rates and social desirability were validated, Kreuter, Presser, & Tourangeau (2008) studied a random sample of 1,501 recent college graduates to compare a survey administered by interview via computer-assisted telephone interviewing (CATI), with two methods of self-administration, interactive voice response (IVR) and web-based response. Participants were randomly assigned to one of these three groups. External records from the alumni's place of study were used to confirm/disconfirm respondents' true values on items sensitive to social bias. Findings indicate that "web administration increased the reporting of sensitive information relative to conventional CATI, with IVR intermediate between the other two modes" (p.847), with differences by mode larger for socially undesirable items than socially desirable ones. These findings regarding mode differences in both levels of reporting and reporting accuracy are consistent with past literature on social desirability biases and mode effects, as reviewed by Tourangeau and Yan (2007).

(ii) Website Design Considerations

Considering the literature reviewed, online self-assessment of Christian spiritual development may facilitate the most accurate data collection and reporting on items eliciting personal information subject to social bias. Furthermore, adolescents in many world regions are increasingly using the internet for educational and recreational purposes, making online assessment the preferred delivery medium for tech-savvy digital natives.

One of the benefits of online administration of the GDI is the flexibility it provides the learner. The GDI can be completed and results viewed online from any computer with internet access. For this validation research, access to the online version is limited to learners in the sampled schools, with the school providing learners with individual access

code which becomes the learner login for secure storage of their completed assessment and results.

Security of data collection was important for ethical research, so encrypting technology was included in the programming specifications, along with secure server storage. Individual access codes protected participant privacy as no personal data were stored. Non-identifying background information was collected to answer research questions and enable data cleaning. Secure access to the GDI limited use to the purposive sample for this study with pre-assigned access codes. This precluded the problem of duplicate entries (once completed, access to the survey is blocked). With these safe and secure provisions, the GDI online may be considered an invited-accessibility- design (Nosek, et al., 2002).

In order to ensure that ethical standards of research were adhered to, developing standards for internet research with minors were carefully reviewed ("Analysis of rules implementing the Children's Online Privacy Protection Act (COPPA)," n.d.; Frankel & Siang, 1999; How to comply with the Children's Online Privacy Protection Rule," n.d.) to be familiar with potential risks and best practices for secure data collection, storing of individual learner reports, and sharing of reports via email. Details of the planned development were reviewed and approved by the Andrews University Institutional Review Board (cf. Appendix E), by regional Adventist education administrators, and by the school principals before participating in the validation phase (letters filed confidentially by researcher).

Taking multiple online personality, interest and other self-assessment inventories and profiles (as reviewed in 2.3.3.1 and 2.3.3.2) provided comparisons to evaluate best practices for teen-friendly assessments. This data, together with the researcher's experience in website project management (e.g. http://circle.adventist.org, http://www.journeytoexcellence.org), guided the development of project specifications for a website including the GDI, instantly generated individual reports secured by personal access codes, information for learners and educators about the curriculum, spiritual development, and suggestions for taking action in response to personal reports (http://inventory.growingdisciples.info). Two teams with the necessary skills were consulted before contracting the website design and programming.

Guidelines for quality website development were followed, referencing the *Research-Based Web Design & Usability Guidelines* (http://www.usability.gov), and considering the intended audience (adolescence) and the purpose (spiritual development self-assessment). Envisioned additions, beyond the scope of this research, were discussed during the GDI design to facilitate programming with the end in mind. Future improvements envisioned, and those suggested by participants were included in the researcher's journal documenting the design process, for future cycles in this educational design research.

3.3.2.6 Piloting the Assessment

The GDI was piloted to determine learner perceptions of (a) the GDI content, (b) the delivery mode, and (c) the report format and utility. Pilot studies are conducted to examine how well a curriculum product does what it was designed to do, so that improvements can be made before use with the full intended audience. As far as possible, pilot studies are completed in conditions expected for the intended audience, so that all possible interactions of real-life factors can be observed, and refinements made based on real-world feedback. Piloting a website is more commonly termed prototype or usability testing. In both pilot and usability testing, "representative users do typical tasks with the product while observers, including the development staff, watch, listen, and take notes" (US Department of Health & Human Services, Usability Testing).

A convenience quota sample of sixteen Grade 7-12 learners participating in Adventist education within driving distance of the researcher was used. A range of eight to sixteen participants is considered typical, with fewer necessary if iterative cycles of prototype or usability testing are conducted (http://www.usability.gov/refine/learnusa.html). In this study, two cycles of piloting were planned, with nine participants in the first cycle, and seven in the second cycle. Learners were invited individually, upon recommendation from local teachers or personal contacts. A checklist was used to meet a quota of at least one male and female per grade level, with diverse cultural backgrounds and academic abilities. The researcher phoned parents to explain the study and gain verbal consent before inviting their child to participate. Appointments were set up and an *Informed Consent Letter* (see template in Appendix C) was signed by parent and teen before participating. Piloting was done in the researcher's office, providing space free of

distractions, with privacy while visible through a window in the door, in keeping with ethical interview protocols.

Protocol analysis is a research method used in cognitive and educational psychology and usability testing to understand what participants are thinking in a research setting (Ericsson & Simon, 1993). Developed by Clayton Lewis at IBM (C. Lewis & Reiman, 1994, 2008), the think-aloud method is recommended for piloting questionnaires and other research activities, particularly using current technology (B. Johnson & Christensen, 2008, pp. 189-190). Participants are asked to reflect aloud on what they are thinking, doing, and feeling as they complete the research process or specified task. This is often recorded to enable the researchers to later review and further objectively analyze the data with others involved in the product development (C. Lewis & Reiman, p. 6). This probing of the processes underlying test responses, Messick (1994, p. 12) suggests, is potentially the most illuminating information about construct validity. Protocol analysis includes natural opportunities to begin to understand the social consequences of the intervention or curriculum product being tested (cf. 4.3.1).

Permission was requested (and consent signed) to audio record the piloting process, explaining that this would be reviewed by the researcher only to improve the GDI for adolescents. Two laptop computers using two operating systems, Apple OS, and Windows XP, were used, alternately using four different web browsers, Apple Safari, Internet Explorer, Mozilla Firefox, and Google Chrome. Learner interaction with the actual GDI content and common operating system and browser combinations provided rich qualitative data. The research was positioned behind and facing away from the computer to maximize a sense of privacy and least intrusion while the learner experienced the self-assessment. While learners completed the GDI, the researcher noted body language, level of interest, time taken to complete each screen, any reading difficulty, and ease of computer use. A piloting checklist was followed for consistency in interviews (Appendix G). After completing the GDI, participants were asked the following questions if their comments had not spontaneously included comments about these themes:

- What was your first impression of this website (look and feel, or design)?
- Was anything confusing? Why? (follow up to clarify as needed – re website, items)
- How would you describe this experience to a friend who didn't know about it? (follow up as appropriate to clarify responses)

As the purpose of usability testing was to improve the product, an iterative process was used, making improvements to the prototype based on findings, before further test-analyze-and-revise cycles. Learner observations that indicated preferences for website design or ideas about report format were compared with other participants' responses to analyze frequency and patterns before making changes.

The researcher also met with teachers (in person or online) to demonstrate how to administer the GDI, answer any questions about the assessment process or possible connections to their current curriculum and school setting. Educator feedback received during the demonstration of the GDI and in the follow-up interviews provided additional practical feedback for improving the product. Demonstrations to key educational leaders and Adventist education researchers provided a number of quality expert reviews, complementing earlier cycles of expert review and piloting with teachers and learners. Feedback that was not essential to testing the validity of the GDI, but would enhance some aspect of the GDI's website, was documented for recommendations for future refinement, beyond the time and budgetary constraints of this study.

3.3.3 METHODOLOGY FOR PHASE 2: ASSESSMENT VALIDATION

The second and final phase of this educational design research examined data collected from a larger sample of adolescents using qualitative and quantitative methods. The purpose of this data analysis was to determine the extent to which the GDI is a reliable and valid measure of the constructs of Christian spiritual development defined by the GD curriculum framework.   Pilot and usability testing was done during cycles of design-test-redesign in the first phase of this study. Large sample testing of constructed assessments provided data to verify if acceptable standards of construct validity are met, such as with the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999). Including situated educators and learners (i.e. in real-world school settings) increases the chances of the developed assessment being trustworthy, curriculum-aligned, easy to administer and useful (Sireci & Parker, 2006).

A review of current and precedent literature on assessment validation shaped the methodology for examining the extent to which the GDI is a valid curriculum-aligned assessment. Tashakkori and Teddlie (2003, p. 13) tabulate 35 types of validity to demonstrate the explosion of the number of validity types proposed in the past ten years. In this section, key theories and research methods regarding validation of assessments and tests are examined prior to discussing types of validity selected for this research.

The study of educational and psychological measurement theory and techniques, concerned primarily with the construction of instruments and procedures for measurement, and the development of theoretical approaches to measurement, is defined as psychometrics. Created in the quest for measures of intelligence, beginning with the work of Alfred Binet, measurement theory has grown with the field of standardized testing (Wikia, n.d.).   Psychometric methods formed the theoretical framework for most of the evaluation of validity of the GDI.

The development of researched assessment tools has focused on construct validity to establish the extent to which the assessment fairly and accurately measures what it was intended to measure (J. D. Brown, 2000; Brualdi, 1999; Clark, 1995; Latham, 1997). Quantitative methods of validity testing have, however, not considered the real-world factors of value to the end user, and the social consequences of using the designed instrument.   Messick's (1994) expanded theory of validity integrates considerations of social consequences into a construct framework where:

> validity, reliability, comparability, and fairness are not just measurement principles, they are social values that have meaning and force outside of measurement whenever evaluative judgments and decisions are made. As a salient social value, validity assumes both a scientific and a political role that can by no means be fulfilled by a simple correlation coefficient between test scores and a purported criterion (i.e., classical criterion-related validity) or by expert judgments that test content is relevant to the proposed test use (i.e., traditional content validity). (p. 3)

Messick (1994) criticizes the traditional view of content, criterion and construct validity as fragmented and incomplete, lacking evidence of the value implications of score or result meaning for any form of assessment. His comprehensive theory of validity addresses the meaning of assessment results for practical use (evidential basis) as well as the value implications and social consequences (consequential basis) of test or assessment interpretation and use (Table 3.4).

Table 3.4 Messick's Facets of Validity

Facets of Test	Test Interpretation	Test Use
Evidential Basis	Construct Validity	Relevance/Utility
Consequential Basis	Value Implications	Social

The evidential basis includes both construct validity of test interpretation, and evidence of the relevance of the scores to the applied purpose. In the value-laden area of religion and spirituality, the consequential basis Messick adds provides a better model for addressing and incorporating measures of the value implications and social consequences of Christian spiritual development.

Messick (1994) views validity broadly as "an overall evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretations and actions based on test scores or modes of assessment" (p.6). It is a property of the assessment results rather than the assessment itself. Validation is a continuing process of examining the extent to which the implications of assessment results are consistently valued across individuals and diverse groups, and settings or contexts.

Central to Messick's (1994) unified concept of construct validity are six aspects that serve as general criteria or standards for all educational and psychological measurement:

1. Content: evidence of content relevance, representativeness, and technical quality…
2. Substantive: theoretical rationales for the observed consistencies in responses…
3. Structural: fidelity of the scoring structure to the structure of the construct domain…
4. Generalizability: across groups, settings, tasks, and test-criterion relationships…
5. External: convergent and discriminant evidence from multitrait-multimethod comparisons, and criterion relevance and applied utility…
6. Consequential: the value implications of score interpretations as a basis for action; actual and potential consequences of test use, especially in regard to sources of invalidity related to issues of bias, fairness, and distributive justice. (pp. 15-17)

These standards inform the methodology selected for the validation phase, and the processes of data collection and analysis as addressed in Chapter 4 (cf. 4.3.2, 4.4, 4.5) guided by the four research questions (cf. 1.4.1 and 3.2.3).

Encouraging academic excellence in design research, McKenney, Nieveen & Van den Akker (2006, p. 77) observe that design principles can build on qualitative or naturalistic research that demonstrates rigor, including clear evidence for internal and external validity, reliability and utilization. O'Donnell (2008) notes that measuring the fidelity of curriculum interventions and empirically relating their implementation to the desired outcomes is necessary to ensure internal and external validity. Yet Woolley (1996) queries the feasibility of expecting researchers to test for social consequences to the extent Messick's model suggests. Answers to questions probing teacher and learner perceptions of the value of the GDI provide initial evidence of the value implications and social consequences (cf. 4.5.3). Fully testing social consequences would require a longitudinal study, beyond the scope of this dissertation. The GDI individual report is a visual map or summary of strengths in the four processes of *Connecting, Understanding, Ministering* and *Equipping* (see example in Figure 4.1). No numeric scores are included, to minimize misuse of results for any grading, norming or ranking purposes. The purpose of this self-assessment is not for academic promotion, reward or other judgmental/political consequence. The GDI primarily evaluates the evidential basis of construct validity and assessment utility. Analysis of learner responses to the GD exit survey will allow preliminary exploration of Messick's consequential basis for validity.

In the field of psychometrics, Swezey (1981, pp. 15-18) recommends seven steps to the construction of reliable and valid criterion-referenced tests:

1. Evaluate inputs to the criterion-referenced test development process.
2. Plan the test.
3. Develop a pool of items.
4. Select the final criterion-referenced items.
5. Test administration and scoring.
6. Measure reliability.
7. Measure validity.

The development phase methodology follows the first four steps; while the validation phase methodology encompasses Swezey's last three steps, focusing on the processes of test or assessment administration to a representative sample followed by evaluation of reliability and validity.

Swezey's model is evident in the design of many inventory and other self-assessment development and validation dissertations reviewed, of which the following examples of interest to this study are briefly mentioned here for comparative purposes:

- Beile (2005) developed and validated the *Information Literacy Assessment Scale for Education* (ILAS-ED), aligned to USA national educational technology standards, of interest to this study because it was a curriculum-aligned self-assessment, a rare find in the reviewed literature.

- Dowson & McInerney's (2004) validation of an 84-item *Goal Orientation and Learning Strategies Survey* (GOALS-S) was of interest to this study because of the similarity of psychological constructs to those assessed by the GDI. How four sets of constructs for high schoolers were included in one instrument was informative.

- Goggin et al. (2007a, 2007b) report on two preliminary validation studies: a measure of God control beliefs over sexual risk behaviour (SexGLOC-A); and a 36-item measure of alcohol-related God/higher power control beliefs for adolescents (AGLOC-A). Both studies are excellent research design examples of adolescent self-assessments from the field of sociology.

- Built on Borg and Gall's (1997) research and development cycle, Kadhi's (2005) dissertation focused on the validation and implementation of a formative online diagnostic tool in developmental mathematics for college learners, called *Fraction Diagnoser*. This is the only online assessment development and validation study found with educational design research as the research design, using mixed methods, content expert reviews, personal interviews with forty-eight learners participating and further personal interviews with seven teachers regarding the effectiveness of the curriculum product. Over 500 learners and teachers representing four colleges and universities participated in the full pilot study.

- The hierarchical structure of Hattie, Myers, and Sweeney's 103-item 17-factor exploratory empirical study of wellness is built around five constructs, three of which had four sub-constructs, and one five sub-constructs. Research reports of this similarly formatted hierarchical construct confirmed the choice for 4-6 items per construct for the GDI (Hattie, et al., 2004). Findings from these studies are referenced in Chapter 4, in the analysis of findings in this educational design research.

3.3.3.1 Theoretical Foundations for Evaluation of GDI Validity

"Validation is empirical evaluation of the meaning and consequences of measurement" (Messick, 1994, p. 23). In this study, all four research questions (cf. 1.4.1, 3.2.2, Table 3.2) examine the extent to which evidence exists for *construct validity* (cf. 4.4), with questions two and four addressing the six broader aspects of Messick's theory of validity or *trustworthiness* (cf. 3.3.2, Table 3.4), and questions one and three utilizing psychometric validation methods, as well as qualitative data.

Construct validity is considered the overarching category of evidence for the validity of assessments of various forms. It examines whether what was created to assess a theoretical hypothesis or psychological construct adequately does what it was intended to do (J. D. Brown, 2000; Fiske, 2002; Hopkins, 1998). Although construct validity may be variously defined and grouped (Babbie, 2008; Brualdi, 1999; Clark, 1995; Messick, 1989; Trochim, 2006), it includes both *content/face validity* and *criterion-related validity*. The following paragraphs briefly define the forms of validity selected for this educational design research.

"*Content validity* evidence focuses on the match between items or tasks in the assessment and the content domain to which generalization is sought" (Hoyt, Warbasse, & Chu, 2006, p. 774). During the development phase of this study, the GDI items were checked against the curriculum to which it is aligned, the GD curriculum framework (cf. 2.5.2), to determine curricular and content validity (cf. 4.2), as follows:

- The first cycle of expert reviewers responded to two questions: "Are the items appropriate for adolescents?" with a response scale "Yes; No; Yes-reworded", and "Is this item a measure of the specific commitment listed in the coloured text above the section?" with an agreement response scale. Responses to these overarching questions provided evidence of face validity, and initial suggestions regarding content validity.
- The second cycle of expert reviews provided further evidence of content validity through in-depth commenting and suggested rewordings, as well as the agreement scale feedback on fit or alignment. Both qualitative and quantitative feedback guided further refinement prior to piloting the GDI with adolescents.

As a curriculum-aligned assessment, the GDI is criterion-referenced rather than norm-referenced. Depending on the research design, evidence for criterion-related validity may include *predictive, concurrent, convergent* or *discriminant* validity.   A study of convergent (cf. 4.4.3) and discriminant validity   (cf. 4.4.4) were included, appropriate to this curriculum-aligned or criterion-referenced assessment development research.

Convergent validity examines the extent to which scores or results gathered independently on measures or assessments developed for other purposes or by other methods are similar or converge (Trochim, 2006). High correlations between scores on the diverse assessments would provide evidence of convergent validity. In structural equation modelling, a "set of variables presumed to measure the same construct shows convergent validity if their intercorrelations are at least moderate" (R. B. Kline, 2005, p. 60). Comparison of the GDI results with ValueGenesis results, and examination of intercorrelations provide convergent validity evidence for this study (as reported in 4.4.3).

Discriminant validity examines whether intercorrelations between factors that are not supposed to be related are not too high (R. B. Kline, 2005). In other words, discriminant validity shows that measures (for example inter-factor correlations) that should not be related are truly not related (Trochim, 2006). Using psychometric methods, discriminant validity can be studied by observing whether correlations are higher *within* factors that should be related (for example the four, five or six commitments within each of the four GD processes) than *between* variables across different factors. Structural equation modelling and correlational analysis were used to examine discriminant validity (cf. 4.4.4) in this study.

Hoyt et al (2006, p. 779) noted that where research aids understanding rather than predicting, as is true of the GDI, construct validity is central to validation studies. Factor analysis and structural equation modelling address construct validity questions, both of which provide rich data on the validity and reliability of constructed measures or assessment. Gorsuch (1983) noted that "a prime use of factor analysis has been the development of both the operational constructs for an area and the operational representatives for the theoretical constructs" (p. 350). Factor analysis examines a set of variables to determine if they can be explained in terms of a much smaller number of variables called factors. Developed by Charles Spearman, seeking one underlying factor

of general intelligence, factor analysis is the oldest form of multivariate analysis (Darlington, n.d.; B. Thompson, 2004, pp. 3-4).

Factors are unseen, hypothetical constructs which psychologists (and educators) frequently view as the "underlying reasons that individuals attain the scores they do on the measured variables" (Kahn, 2006, p. 686). With modern statistical analysis software, factor analysis is increasingly used to explore relationships (exploratory factor analysis) and more recently, to confirm constructs (confirmatory factor analysis). In this self-assessment, the four processes with twenty-one commitments (as the hypothetical constructs or factors) were analyzed using confirmatory factor analysis to test the fit of the factor models in structural equation modelling (B. Thompson, 2004, p. 6).

As one of the most inclusive statistical procedures used within the behavioural sciences with both non-experimental and experimental designs, structural equation modelling handles observed and latent variables, as well as hierarchical models with higher abstractions, such as the GD curriculum framework. Structural equation modelling, alternately referred to as covariance structure analysis, covariance structure modelling, analysis of covariance structures, or causal modelling (R. B. Kline, 2005, p. 9), assumes a model has been defined - in this study, the GD curriculum framework (cf. Table 2.1).

3.3.3.2 Theoretical Foundations for Evaluation of GDI Reliability

Considering criterion-referenced self-assessment, Swezey (1981, p. 144) notes that an assessment that is unreliable is inappropriate for use, as reliability or trustworthiness involves the consistency of information obtained from an assessment. So validity is dependent on first ascertaining reliability, or the "degree scores are free from random measurement error" (R. B. Kline, 2005, p. 59).

Internal consistency, stability and *equivalence* are three common forms of reliability, each with strengths suited to some conditions and types of research more than others. *Internal consistency* measures the extent to which responses to items on the same scales are consistent or fit together (L. W. Anderson & Bourke, 2000, pp. 86-87). The better the fit, the higher the correlation between this subset of items is expected to be. Evidence of internal consistency within the GDI will be examined by calculating Cronbach's (1951)

alpha for each latent variables or factor which are part of the twenty-one commitments within the four processes of the GD curriculum framework (cf. Table 2.1 and Section 2.5.2). Alphas of .4 and above are acceptable in factor analysis in educational research, with higher numerical values better estimates of reliability (Pett, Lackey, & Sullivan, 2003). Coefficient alpha has advantages over split-half reliability techniques in that "it is not a single estimate of a scale's reliability but rather the average of all possible split-half reliability coefficients that can be obtained from a given set of items in a scale" (p.185).

Stability measures compare scores on multiple test and retesting instances using the same instrument or assessment. Where events, experiences, or affect may daily impact Christian spiritual development, as with affective characteristics, test-retest may provide limited or inconclusive evidence (L. W. Anderson & Bourke, 2000, p. 87), and prove impractical due to cost and scheduling limitations, particularly in early cycles of educational design research. *Equivalence* techniques evaluate correlation of scores on parallel instruments, requiring an inordinate investment in constructing additional measures at this initial stage, for limited additional information. This neither equivalence nor stability studies of reliability were considered suitable to this preliminary validity study. Using SEM, more psychometric measures than the criticized, albeit frequently used alpha coefficient (Revelle & Zinbarg, 2009; Sijtsma, 2008, 2009) can be included in the evaluation of both reliability and validity. Structural equation modeling makes it possible to evaluate a model (e.g. the GD curriculum) as a whole, bringing a higher-level perspective to the analysis.

3.3.3.3 Theoretical Foundations for Evaluation of GDI Utility

Research questions one and three are answered by examining the GDI's *internal validity*. Reliability, content and construct validity evaluations provide information on the quality of the GDI's construction. The second and fourth research questions focus on consequential evidence for the relevance and utility of the GDI, considerations for establishing the *external validity* of an assessment (Babbie, 2008, p. 254). This relates to Messick's (1989, 1994) broader approach to validity (as discussed in Section 3.3.3.1 above), including a consequential basis of assessment interpretation and use. The second research question analyzes learner and educator perceptions of the GDI's utility, which includes ease of use of the GDI and understanding of individual reports by the target audience. Such qualitative

findings provide perceptions essential to determining the practical value or utility of any curriculum product. The fourth research question focuses on generalizability and value implications, as an initial estimate of how relevant this self-assessment is to the international population of adolescents attending Adventist schools. Validation phase learner data was analyzed to determine whether GDI covariance and correlation coefficients were significantly different for subgroups based on background information collected, such as learner gender, country or residence, and personal Christian commitment (cf. 4.4.4).

Although Woolley (1996) questions the practicality of measuring social consequences as Messick (1989, 1994) recommends, mixed methods research enables a level of qualitative data analysis not possible with purely quantitative methods. Questions about perceptions of the utility, relevance and value of the GDI were included in the pilot study protocol and the short GDI exit survey for learners. Teachers answered questions regarding their perceptions of learner participation and the social consequences of this curriculum tool. Learner responses to the GDI exit survey provided another layer of qualitative data. Using a mixed methods approach, qualitative results were triangulated with quantitative results for preliminary estimates of the value implications of using the GDI as a self-assessment of Christian spiritual development for adolescents attending Christian schools.

3.4 SUMMARY

Considering the purpose of this study -- the development and validation of the *Growing Disciples Inventory* (GDI) as a curriculum-aligned self-assessment for Christian education -- and the literature framing the research as reviewed, Chapter 3 described educational design research as the research design selected for this empirical mixed methods curriculum study.

Section 3.3.2 described the methodology for the first phase, which focused on designing and developing the online self-assessment. The process of expert review was selected to provide evidence for curricular or content validity of the GDI and the individual online report. Two cycles of usability testing were planned using a pilot sample of 16 learners. Individual 45-minute interviews following a think-aloud protocol provided quantitative and qualitative data to refine the online format and content of the GDI.

Section 3.3.3 outlined the methodology for the second phase, which focused on the preliminary investigation of the validity of the GDI. Literature review provided the theoretical underpinnings for *why* and *how* to evaluate the GDI's reliability and validity. On this foundation, the methods described in this chapter outline how a total of 606 learners and nine teachers in eight schools on three continents would be included in the validation phase, providing both quantitative and qualitative data to determine the extent to which the GDI was a trustworthy assessment of adolescent spiritual growth, aligned to the selected GD curriculum framework (cf. 2.5.2*)*.

The mixed methods research design is evident in the simultaneous collection of qualitative and quantitative data in both phases as Table 3.1 documented. Qualitative data collected from expert reviewers, educators administering the GDI to their learners in participating schools, and adolescent learners, would be triangulated, to (a) study the validity of the GDI using traditional psychometric statistics, and to (b) explore the value implications and potential social consequences of using this self-assessment in adolescent Christian education.

Based on the research design outlined in this chapter, and the conceptual framework built in Chapter 2, the results of data collected in both phases are presented in Chapter 4.

4   CHAPTER 4

EVALUATION OF THE GROWING DISCIPLES INVENTORY

4.1   INTRODUCTION

Guided by the design presented in Chapter 3, this study was conducted through 2009 and early 2010. The results from both the development and validation phases of this mixed methods educational design research are presented in this chapter. To fulfill the purpose of developing and validating a curriculum-aligned self-assessment for Christian education, each section answers one of the four research questions (cf. 3.2.2 & Table 3.2):

- Section 4.2 reports on expert reviews used to evaluate the alignment of the *Growing Disciples Inventory* (GDI) to the *Growing Disciples* (GD) curriculum framework, focusing on the development phase.

- Section 4.3 examines the extent to which (a) the GDI*'s* design format online is intuitive, (b) GDI items are easy to understand, (c) the assessment length is appropriate, and (d) individual reports self-explanatory. These are all essential elements for validation of assessment relevance and utility.

- Section 4.4 analyzes quantitative data using structural equation modeling (4.4.2), internal consistency (4.4.1) and correlations to evaluate preliminary reliability and construct validity results for the GDI.

- Section 4.5 presents findings regarding the extent to which the GDI possesses discriminant validity (4.4.4), is appropriate for wider use (4.5.1), and reviews learner and teacher reflections for preliminary insights into potential value implications and social consequences using the GDI as a self-assessment of Christian spiritual development in Seventh-day Adventist (Adventist) schools (4.5.2).

In Chapter 3, the research design outlined the population and sampling methods (3.3.1), as well as the methodology for both the development (3.3.2) and validation (3.3.3) phases. The demographics of each group of participants and a brief report on data cleaning paint the back drop to which the findings in each of the sections thereafter are added.

4.1.1 PARTICIPANT DEMOGRAPHICS

Quantitative and qualitative data were collected from several groups of participants in either the development or validation phase. Participants included:

- nineteen experts whose reviews refined the GDI in early stages of the development phase;
- seventeen learners who piloted two early versions of the GDI in the development phase;
- 606 learners who completed the final GDI online, 529 of whom also completed the short GDI exit survey; and
- nine educators whose phone or emailed interviews provided qualitative data about the supervision of their 606 learners participating in the GDI and GDI exit survey; and eight principals whose written permission was gained to conduct this study in their schools.

4.1.1.1 Expert Reviewer Participation

A snowballing sample (cf. 3.3.1.2) of 19 expert reviewers (40% of 48 invited) from three continents provided valuable feedback to one or more iterative cycles of GDI development represented all four areas of expertise desired:

1. four (21%) were faculty with qualifications in religious education and/or Christian discipleship;
2. four (21%) were high school teachers with specialization in religious and spiritual development, currently teaching classes in Christian spiritual development in one or more classes of adolescents attending an Adventist school;
3. five (26%) were curriculum experts, with masters or doctoral degrees, and with practical experience at several levels of curriculum development and evaluation in Christian education; and
4. six (32%) were regional education directors in the Adventist education system, recommended for their background in and/or visionary leadership of Christian education curriculum and assessment.

4.1.1.2 Learners Participating in the Development Phase

GDI item wording and online construction were improved through several iterative cycles of pilot testing. For the first round, a convenience quota sample (cf. 3.3.1.2) of nine

adolescents attending Adventist schools represented the range of gender (5 males, 4 females) and age (one 14 year old, two 15 year olds, four 16 year olds, one 18 year old and one 19 year old). All indicated a personal commitment to Christ, and five were baptized Adventist church members. Although all nine had lived four or more years in the USA, two were Malawian, one Kenyan, one Romanian, one Croatian, and only four from families that had lived in the USA for one generation or more thus the range of cultural differences and proficiency in English richly added to the qualitative aspect of this research phase.

Following a number of minor improvements (cf. 4.2 and 4.3), a second round of usability testing was conducted with seven more adolescents. Each provided information about the items and assessment structure by thinking out loud while completing the GDI, reflecting on their individual report, and filling in the short exit survey. This subsample drew on homeschooled adolescents, investigating in a preliminary way the generalizability within the diverse Adventist education system.

Collecting rich data in realistic usability testing scenarios was the focus of both the July and October 2009 usability testing cycles. Although both groups were too small to justify quantitative comparison of data, only a clarifying question about how to treat the option 'school teacher', queried by three home schooled participants, differentiated the response styles of the two groups. No other differences emerged in (a) their ability to complete the GDI online, (b) the quantity or quality of feedback on item stems and response scales, and the GDI exit survey items, or (c) perceptions of the value of this self-assessment based on responses to GDI exit survey items or verbally expressed through the think-aloud protocol.

4.1.1.3 Learners Participating in the Validation Phase

Nine educators and 606 learners from eight schools in the United States of America (USA), South Africa (RSA), and Australia (AUS) participated during the validation phase. Table 4.1 shows the break-down of participants within each school in each country.

After data cleaning (as described in 4.1.2), a total of 595 GDI learners' responses provided a large enough sample for structural equation modeling, which works best with samples of over 200 cases (R. B. Kline, 2005, p. 15). The percentage of responses in all

participating schools but one was high (70%-87% as shown in Table 4.1). Due to 2009 year-end curriculum pressures and other undisclosed reasons, only two classes in one South African school were able to participate. Accepting the offer of a principal (who had served as an expert reviewer) to have their school participate from Australia as a replacement (early 2010) augmented the very limited South African response set to allow preliminary investigation of the transferability of the GDI across regions.

Table 4.1 Learner and Educator Participation in GDI Validation Phase

School Location	Participating Schools (grades)	Learner		Percent Participation	Educator Interviews
		Sample[a]	Participants		
USA	A (9-12)	250	215	86%	1
USA	B (7-8)	60	50	83%	2
USA	C (7-8)	50	40	80%	1
USA	D (9-12)	225	162	72%	1
USA	E (7-10)	30	26	87%	2
RSA	F (7-11)	158	55	35%	1
AUS	G (7-12)	67	47	70%	1
3 countries	8 schools	827	*N*=595	72%	*N*=9

[a]Based on number of participant access codes requested by school

The vast majority of learners (93.9% of 595 usable response sets) answered the question, "Which church do you usually attend?" (cf. Table 4.2). Response options were listed as: *Adventist Christian, Other Protestant Christian, Catholic Christian, Buddhist, Hindu, Jewish, Muslim, Another Religion, I don't attend religious services.* In Table 4.2, results for *Other Protestant* and *Catholic Christian* are combined as *Other Christian*, and results for *Buddhist, Hindu, Jewish, Muslim*, were combined with *Another Religion.* In summary, 95.3% of American, 81.1% of South African, and 68.2% of Australian scholars identified themselves as Christian with the majority noting their affiliation with the Seventh-day Adventist church.

About three quarters (74.2% of 558) of learners answered "yes" to the question, "If you are a Christian, have you made a personal commitment to follow Jesus?" Another 17% were "thinking about it" at the time of participating. Eight (1.4%) answered "not a Christian", nine (1.6%) responded "not interested", and 32 (5.7%) selected "no" in answer to this background information item.

Table 4.2 Learner Location by Religious Affiliation Cross-Tabulation

Participant's School Location		Adventist	Other Christian	Another Religion	Don't Attend	Missing	Total by Country
USA	*n*	458	7	1	5	17	488
		93.9%	1.4%	.2%	1.0%	3.5%	100.0%
RSA	*n*	34	9	3	2	5	53
		64.2%	16.9%	5.7%	3.8%	9.4%	100.0%
AUS	*n*	27	3	0	10	4	44
		61.4%	6.8%	.0%	22.7%	9.1%	100.0%
Total by Affiliation	*n*	519	19	4	17	36	595
		87.2%	3.2%	.6%	2.9%	6.1%	100%

(Religious Affiliation spans the Adventist through Missing columns.)

Learner responses to the question, "Which country are you a citizen of?" indicated that:
- 85% (415, *n*=488) of participants attending USA schools were American citizens
- 83% (44, *n*=53) of RSA participants identified themselves as South African citizens
- 100% of the 44 AUS participants completing this item were Australian citizens

How representative is the validation sample of the population? Background information collected with the GDI provides some indicators of population representation. As noted in 3.3.1.1, the exact size of the population of learners attending Grades 7-12 (called Years 7-12 in Australia) in Adventist schools, using English as a medium of instruction, is unknown. For example, while a cross-tabulation of grade by gender and by country reveals slight gender skewness in the small subsamples for South Africa (56% female,

44% male, *n*=50) and Australia (59% female, 41% male, *n*=39), the distribution in the larger American subsample (51.9% female, 48.1% male, *n*=470), and the full sample, as Table 4.3 shows, is close to normal population gender distribution.

Table 4.3 Learner Grade by Gender Cross-tabulation

Grade	Gender		Total by Grade
	Female (n / %)	Male (n / %)	
7	44	39	83
	53.0%	47.0%	100.0%
8	26	27	53
	49.1%	50.9%	100.0%
9	55	35	90
	61.1%	38.9%	100.0%
10	48	60	108
	44.4%	55.6%	100.0%
11	64	49	113
	56.6%	43.4%	100.0%
12	58	54	112
	51.8%	48.2%	100.0%
Total *n*	303	264	559
Gender %	52.8%	47.2%	100.0%

Further evidence of population representation is provided in examples supporting construct validity (cf. 4.4.2.2). Additional characteristics of the validation sample of learners are described as pertinent to the presentation of findings (4.2-4.5) hereafter.

4.1.1.4 Educator Participation

A teacher or principal at each participating school completed a short phone or email interview after administering the GDI and GDI exit survey online to their learners. The principals of three small schools were very interested in the study, two of these actively

teaching Bible or Christian spiritual development classes. Three interviewees were elementary-certified teachers responsible for most of the teaching of their grade 7 or 8 classes; three interviewees were high school teachers certified in specific content areas, including religious education. All nine were Seventh-day Adventist Christians. Three described their school spiritual climate as fair or average; three believed their school had a strong focus on spirituality over the past few years, and as a result, a very positive spiritual climate.

The quality of educator participation impacted the quality of learner data. A principal who completed the GDI prior to administering it observed, "I did not have questions about the wording or instructions. I was fairly explicit in giving directions however." The two who took the GDI themselves (recommended by the researcher) provided the most valuable feedback. Their greater interest in the project and attention to detail reduced the amount of learner missing data and evidently impacted learner interest, as their reports included more positive observations of learners during their administration of the GDI and later reflections as they discussed the experience with learners individually or in a class setting.

In order to gain signed consent from sampled schools, presentations were made in person or through phone/webinar to three regional education directors and ten schools. A brief introduction to the online GDI and the three steps teachers and learners would be asked to complete was reviewed with teach participating educator. Principal and leader questions and comments during this orientation provided feedback that informed the next steps in the development phase. Concerns regarding internet survey of adolescents raised by the Institutional Review Board were resolved through discussion with this group of real-world educational leaders across three continents. Letters of consent signed by the school principal and school letterhead were obtained from each school and filed (but not included, respecting confidential participation). A preliminary Teacher's Guide (cf. Appendix D) was improved, and a short list of prompts (cf. Appendix G) created to check during usability testing.

4.1.2 DATA CLEANING

All expert reviews, educator exit interviews and pilot testing data were primarily qualitative. These sources of rich individual data were all valuable components of the full data

analysis. The quantitative full sample testing of the GDI included 606 learners who completed 109 GDI items, and 10 GDI exit survey items. Eleven data sets (GDI and corresponding GDI exit survey entries) were discarded because (a) more than a third of items were missing responses or (b) an unrealistic sequence of twenty or more "I don't understand" responses were found. A total of 595 valid learner responses were usable data sets.

Two controls were included (and checked) as indicators of the veracity of student responses:

1. Learners selected their age (12, 13, 14, 15, 16, 17, 18, 19, adult, child) in the first background information item (shown on the last page of Appendix A). The last background item asked them to type in their year of birth. Responses to these two fields were compared. If either was missing, the one field was compared with the grade entered, and if plausible, the age field missing data was filled in for use in data analysis.

2. Learners were asked to fill in their school name. As each school was assigned a block of access codes, this learner school field entry was compared with the school table of values. If the school name was recognizable in any abbreviated version as a match, the learner entry school name was replaced with a standard format enabling data analysis. Where the grade-birth year test matched, and less than 20 of the 100 GDI items were missing, any missing school name fields were entered by the researcher referencing the access code table.

All response sets with access codes given to experts or educators for review purposes, or used during piloting were deleted from the final learner response set for validity evaluation. Data sets with fewer than 20 GDI items missing were kept even if the learner failed to complete the GDI exit survey, as the largest possible number of full GDI data sets was needed for structural equation modeling. Although linked, each data set was analyzed separately to answer different research questions. Entries from the two separate sets were matched with a data key table that listed the learner access code, GDI entry number, and GDI exit survey entry number. Responses were securely stored online until downloaded into Microsoft Excel software, where most of the data cleaning took place. Qualitative GDI exit survey items 8-10 were analyzed using excel spreadsheets, and the quantitative data (GDI items 1-100, background fields 1-9, and GDI exit survey

items 1-7) imported into PASW Statistics 18 and Amos 18 (http://www.ssps.com), software selected for statistical analysis.

GDI exit survey qualitative responses to items 8, 9 and 10, were examined first for emerging themes by the researcher and an independent reviewer. With 453 responses to item 8 (cf. Table 4.15), 440 responses to item 9 (cf. Table 4.16), and 446 to item 10 (cf. Table 4.5), this took time, but provided rich data which either supported quantitative findings, or prompted further analysis of both quantitative and qualitative data sets as further questions arose through analyzing patterns and individual learner responses. To a lesser extent, think aloud protocol results and GDI exit survey responses from the piloting sample, as well as expert reviewer emails and educator exit interviews, were sifted and sorted to analyze emerging themes to improve on in further cycles of development and validation of the GDI.

4.2 EVIDENCE FOR GDI ALIGNMENT: CONTENT VALIDITY

Preliminary validation began with evaluation of *content or curricular validity* as evidence for the alignment of the GDI to the GD curriculum (cf. 2.5.2 and Table 2.1). Drawing on the literature reviewed (Chapter 2) and the methodology selected (Chapter 3), the GDI was developed as a criterion-referenced assessment of Christian spiritual development (cf. 2.4.5). The results from cycles of expert review of content relevance and structural representativeness are presented in this section.

Experts on five continents were invited to evaluate the proposed GDI (cf. 3.3.1.2). All expert review data were collected electronically via email attachments. In the first cycle, five of six experts selected for their experience in curriculum development and teaching in Christian secondary or tertiary education, carefully reviewed 166 proposed item stems and scales. For each item, experts:
- indicated if the wording was appropriate for adolescents on a three point scale (yes, no, with revision);
- marked any rewording suggestions or questions regarding clarity in the item text field; and

- decided if the item measured the specific commitment listed in the colored text above each section, responding on a four-point agreement scale (strongly disagree, disagree, agree, strongly agree).

In both cycles of expert review, a range of 5 to 12 suggested items were organized under the full statement of each of the 21 commitments, color coded within the four processes of the GD curriculum framework (cf. Tables 2.1 and 2.2) for easy referencing. After careful analysis of the first cycle of responses:

- 28 of the 166 items with poor alignment ratings were dropped (cf. Appendix H),
- items noted as redundant were compared and the poorer example deleted,
- complex wording was revised considering divergent feedback, and
- the scale measuring appropriateness of wording for adolescents was dropped as text edits provided more in-depth feedback.

In the second cycle, expert reviewers answered the question, "Is this item a measure of the specific commitment listed in the colored text above this section?" using the same four-point agreement scale for each of 139 improved items. Fourteen documents with more than 200 comments, questions or suggestions provided rich qualitative data, complemented by the agreement scale's quantitative data. Agreement scale responses (n=12), on the continuum of strongly disagree to strongly agree (scored 1-4), ranged from one to three values for each of the 139 items (cf. Appendix I). Item means varied from a low of 3.0 to a high of 3.92, and a mode of 4 on 122 of 139 items (87.8%) indicated that all 12 reviewers *strongly agreed* that these items were aligned to the GD curriculum framework. Items with a mode of 2 or 3 (12.2%) included questions, comments or rewording suggestions which were considered along with items with higher scored in the selection of the final 100 items.

Although the quantitative evidence provided by the agreement scale supported the content validity of the GDI, qualitative comments regarding individual items provided a fuller picture of expert reviewer's evaluation. The number of comments (cf. Appendix I) ranged from none on 38 items to 3 comments on 18 items, 4 comments on 8 items, 5 comments on item 4, and 7 comments on item 59. Considering the means and mode from the agreement scale and the qualitative comments, 47 items were deleted, 7 new items were added, and 84 items improved for a final set of 100 GDI items. Item improvements

ranged from minor word replacements or grammatical changes, to seven or more reviews of rewritings of several items. Deeper literature review and dialogue with several expert reviewers as well as additional theological and curriculum experts, guided the decision making process. Some items that had a low agreement scale score, and multiple comments, were kept (with revision) due to their centrality to a construct based on the theoretical framework; other items which had no comments and a higher acceptance score, were deleted in sections where too many 'good' items remained, in order to reduce the number of items from 139 to 100. Some items with many comments had several expert reviewers noting the same issue, which prioritized action. Other items with several comments expressed a diffuse range of personal preference rather than theological or conceptual issues, which proved the item was to be avoided or reworded to remove the distracting components. Professional judgment was thus required in careful analysis of data in conjunction with the theoretical framework, a triangle of input influencing decisions on item selection and GDI structure. The final refining cycle occurred during piloting with the target population – adolescents.

The following expert reviewer quotes provide examples of the types of refinement done and qualitatively support the more than 70-hour iterative refinement process. During this refinement process, the best fit wording for constructs defined by the curriculum was weighed against expert reviews, considering the real-world context of adolescents today, and addressing online design parameters:

- Some comments *complemented the agreement scale*, regarding alignment or construct validity, such as: "delete this item – already covered", "seems redundant", "this is HUGE [i.e. important in this section]!", "I like it!", "separate into two items", "include an item about faith in this section?", "how does this relate to this section?", "no item on understanding death?"

- Most comments *proposed alternative wording*, which some experts had clearly given considerable thought and time to, on a long 139-item review. Negative comments usually represented disagreement with wording, not the inclusion of the item, so it was important to analyze along with the expert's agreement scale response for the same item. The range included: "No – artificial!", "too vague - reword", "probably should read [rewording supplied]", "need one on aligning our conversations and humour with God's principles", "much better now that you've taken out the part that was asking something else", "I think the word *gifts* should

follow *which* to make it clearer and more grammatically correct", "will they understand the word *mentor*?" Some of these comments were elaborated on, and included cultural contextual understandings of words, e.g. "some out our way think of ….". This multi-continent input was vital to wording items for cross-national use of the GDI.

- Most experts included *general comments on the design*, validation process, and utility of the final *GDI*, adding general face validity to the more specific content validity data. This helpful qualitative data from experts in discipleship and curriculum, one experienced large-scale survey researcher, and one educational testing specialist, will be addressed in the following sections.

The first research question in this educational design research was: "To what extent are inventory items GD curriculum-aligned?" (cf. 1.4.1 and Table 3.2). Both qualitative and quantitative evidence through expert reviews reported in this section support the content validity of the GDI, affirming its alignment to the GD curriculum (cf. Table 2.1), as a criterion-referenced self-assessment of Christian spiritual development for adolescents attending Christian schools.

4.3 EVIDENCE FOR GDI DESIGN, RELEVANCE AND UTILITY

The second research question (cf. 1.4.1 and Table 3.2), "To what extent is the GDI design appropriate as an adolescent self-assessment?" addresses the relevance and utility of the developed self-assessment. This section presents findings from pilot or usability testing during the development phase, and both learner and educator feedback in the validation phase that provide answers to four more specific questions:

1. To what extent is the length appropriate for adolescent use?
2. To what extent is the GDI'*s* online format intuitive to use?
3. To what extent are GDI items easy to answer?
4. To what extent is the GDI individual report easy to understand?

Data collected during the development phase from usability testing participants is analyzed first, followed by findings from both learners and educators who participated in the validation phase.

4.3.1 DEVELOPMENT PHASE RESULTS

Table 4.4 summarizes findings from usability testing regarding GDI construction and actions taken through two iterative cycles (Pilot A and Pilot B). All notes and audio recordings from pilot testing sessions were reviewed, prioritizing changes according to frequency of comments relating to wording, online design, instructions or anything else adolescents commented on, without prompting. Ranging from 3 to 19 comments with a mean of 9.1 comments per learner, the total of 145 comments included one comment each on 29 items, 2 on 19 items, 3 on 13 items, 4 on 2 items and 5 (clarifying questions) on 1 item. Two noted the one spelling error. Several thought aloud about the wording on one or more items, and even made suggestions for improvements. One 14, 15 and 16 year old (3 of 13 responses to GDI exit survey 8) each felt they did not learn anything new and 6 (of 12 responses to GDI exit survey 10) felt the GDI design was fine.

Table 4.4 GDI Item Construction Record

No. of Comments Per Item	Number of Items Commented On	GDI Item Commented on During Piloting and Revised[b] in Final Inventory
1	29	1,8,11,14,18,19,21,29,31,41,43,45,46,52,53,55,56,58,62,63,67,**69**,76,77,89,90,92,95,96
2	19	2,6,9,12,**20**,23,**33**,37,42,44,49,59,**61**,73,78,79,82,87,91
3	13	**5**,**13**,**17**,24,**26**,39,57,68,72,**81**,**93**,99,100
4	2	7,**80**
5	1	85
6	4[a]	**88-100**,**GDI**, **Reports**, **GDI exit survey**

[a]These comments related to scale options, structural components of the GDI, the report format and the *GDI exit survey*, not individual GDI items.
[b]Item numbers showing in bold were revised, based on pilot data.

The length of time taken to complete the GDI varied from 15 to 32 minutes with an average of 23 minutes across the 16 pilot participants. Duration was unrelated to gender or pilot group (A or B). The shortest times were taken by the 18- and 19-year-old, but this

seemed related to reading competency, interest in the Inventory, and other personality factors not measured in this study, rather than age. An educator who administered the final GDI to 7th- and 8th-graders in America corroborated the impact of reading competency by noting that "if they struggled in reading, they took longer." Two (of 12 responses to GDI exit survey 10) suggested shortening the GDI, but no verbal comments were made about length, and no signs of fatigue or frustration were noted. As a cross-check for fatigue and reading accuracy, all but one (93.8% of 16) pilot participant had correctly comprehended the last two GDI exit survey agreement scale items requiring opposite responses (cf. Table 4.7) to be consistent (if they agreed with one, they should disagree with the other, and *vice versa*).

Observation of pilot participants' use of the computer provided another level of data regarding online format utility. Clicking through the pages with GDI items presented no problems to any of this usability testing sample. However, from the initial individual report graph, three quarters of these learners were unclear what else was available, or where next to click. They did not notice the instruction line below the graph until prompted by the researcher, and then upon clicking on one circle sector, most eagerly repeated this action to view all four bar graphs. Despite this one observed issue, 93.8% (15 or 16) disagreed or strongly disagreed that their report was hard to understand or confusing.

More than half the learners piloting the GDI made one or more observations indicating the items had stimulated personal reflection on their spiritual identity and life direction. These verbal comments while completing the GDI were complemented by nine written responses each to both GDI exit survey item 8 (*what did you learn about yourself by completing the GDI*?) and item 9 (*how might this experience help you grow spiritually*?). Their self-assessment responses noted increased spiritual self-awareness prompting action or new directions to explore as would be needed for self-directed lifelong Christian spiritual development. Three comments sum these preliminary findings:

- "Taking this survey kind of let me know where I stand [spiritually]…"
- "This experience will bring me closer to God in knowing what He plans for me to become and do."
- "It will give me ideas and suggestions on how to develop and grow …."

Four types of improvements were made following Pilot A for retesting in Pilot B, in the interests of providing an intuitive online format, of appropriate length, with clear wording, and self-explanatory reports:

1. *Item improvements*. Minor wording changes were made to clarify items (underlined in Table 4.4), based on the think-aloud protocols in which learners questioned or commented on items they were unclear about. Wording was reviewed for most of the 64 items for which piloting feedback was received. Positive reflections or observations prompted by items recorded were considered confirming of the item as constructed. One spelling error was corrected in item 82.

2. *Instruction updates*. One sentence in the introductory paragraph was updated for clarity, and a prompt added to items 88 and 89 to alert learners who skipped reading the directions to 'check ALL that apply' at the top of the page starting Section 4, differing from selecting one best fitting option through Sections 1-3.

3. *Scale adjustment*. A missing option added to item 39's scale, and an option 'one or more other family members' was added to the scale for items 88-98, as a format update.

4. *Structural improvements*. An early revision to the scale for most items regarding the Understanding process resulted in a display error in the Report during Pilot A. Although learners in Pilot A were informed that their graphs were inaccurate in that section, they were able to respond to their report in all other areas in the GDI exit survey and clicking through every part of the online GDI, reports, and GDI exit survey, revealed three more programming adjustments to improve report utility and GDI reliability. Between Pilot A and B, all components of the programming of the GDI, data storage, and report generation were reviewed and retested, by both the researcher and the contracted programmer.

The changes made as a result of usability testing addressed the design goals of producing a self-assessment that was intuitive for adolescents to use online, with self-explanatory individual reports that fostered self-awareness of spiritual identity and gave direction for spiritual growth planning. Although more interaction with educators was planned, interviews with nine educators following their administration of the GDI to their learners, as well as conversations when demonstrating the GDI and report, provided a preliminary sense of both relevance and utility for the intended audience, more fully discussed in the following section under specific questions.

4.3.2 VALIDATION PHASE RESULTS

Results from data gathered in the validation phase are presented (for the most part) as answers to the four more specific sub-questions regarding research question two which focuses on GDI design relevance and utility:

1. To what extent is the length appropriate for adolescent use?
2. To what extent is the GDI's online format intuitive to use?
3. To what extent are GDI items easy to answer?
4. To what extent is the GDI individual report easy to understand?

4.3.2.1 GDI Length

The first part of research question two answered the more specific question: *To what extent is the GDI's length appropriate for adolescent use?* Compared to the convenience piloting sample where learners with a high interest or level of faith maturity were more likely to consent to participate, the validation sample included the full spectrum of learners enrolled in the eight participating schools.   Perceptions differed most between learners and educators, as well as between the pilot and full sample groups, regarding the length of the GDI (cf. Table 4.7). Eight of the nine educators (88.9%) interviewed felt the GDI's length was appropriate, reporting learner completion in 15-35 minutes, which practically fitted within one class period in all settings. The ninth educator recommended shortening the GDI, observing her seventh graders found 100 items too long. Seventh and eighth graders completed the GDI in 30 minutes on average, with high school learners reportedly taking 20 minutes on average. Notably, even the slowest readers could complete the GDI within a regular class period. Time spent reviewing the reports and taking the GDI exit survey varied depending on scheduling and educator interest in the project.

While piloting and educator interviews, as well as the depth of reporting planned and validation research methodology supported the 100-item GDI length, nearly one third (147 of 446) of the 446 learners who completed the last open-ended GDI exit survey item (*What changes would make the GDI better?*) recommended shortening the GDI, as Table 4.5 shows. The number of comments suggesting shortening the GDI (cf. Table 4.5) varied from 3.6% of 55 South African learners to 10.6% of 47 Australian learners, and from 23.5% of 162 American Grade 9-12 learners at one school to 37.5% of 40 American 7th- and 8th-Graders in another school. No difference in the number of suggestions to shorten

the GDI was found between male and female learners within any school. However, the ratio of "shorten" suggestions shifted from one quarter (23-28%) of learners in Grades 9 through 12 to one-third (36-37%) of learners in Grades 7 and 8 in the United States, indicating that length was perceived as an issue more often with younger participants. This qualitative data corroborates the quantitative response to GDI exit survey item 2, where nearly half of learners (48.1%) in the full sample agreed or strongly agreed that the GDI "has too many questions/was too long".

4.3.2.2 GDI Format

The second part of question two asked: *To what extent is the GDI's online format intuitive to use?* Qualitative learner responses to GDI exit survey open-ended items support the quantitative findings regarding learner perceptions of the GDI*'s* utility as a form of assessment. Four out of five (80.7%) of the 595 learners had no problem understanding GDI items, selecting the "I don't understand" option 0-2 times in all 100 items. Of the 595 valid cases, 84.2% had no data. Of those with missing data, 99% omitted at most 4 of the 100 GDI items, for a low 0.3% (183 of 59,500 responses) missing out of the complete data set. With a low 15.2% of items 1-87 with "I don't understand" answers correlated to the number of missing responses for the same items (Pearson's correlation of .39, 2-tailed t test, $p<.001$), and the very low 0.3% missing responses all together, missing data is assumed to be missing at random rather than for any specific known reason.

Clearly, the online format worked smoothly from a technical standpoint, with just 8 suggesting more visuals or attractive internet pages (Table 4.5), and 3 boarding school participants (where network difficulties were experienced) listing "fixing the problem" as priority. Only 20 of 446 (4.48%) learners suggested making questions (item wording) easier to understand, and even fewer (2.69% of 446) suggested minor changes to results displayed online. A few more (6.28%) suggested additional/alternate options on response scales or item wording. Seven percent (32 of 446) felt it was fine or made specific positive comments about the current format, and 16.8% (75 of 446) felt no change was needed.

Table 4.5 Learner Suggestions for Improving the *GDI* Design

Emerging Themes (*n*=446)	Frequency	Percent	Totals
negative attitude	16	3.59%	
don't know	42	9.42%	
unclear comments or continued answers to 8&9	35	7.85%	20.85%
more attractive webpages, more visuals	8	1.79%	
make results/reports easier to understand	12	2.69%	
make questions easier to understand	20	4.48%	
longer, add deeper/detailed items, scenarios	23	5.16%	
more options on response scales & item wording	28	6.28%	
it's fine, very good as is	32	7.17%	
nothing - no change needed or neutral re value	75	16.82%	
shorten	147	32.96%	85.20%

Learner perceptions of GDI item clarity were explored by examining responses to 87 of the 100 items which included the option "I don't understand" (Table 4.6)   Overall, a low 1.4% of learners selected the "I don't understand" response (721 total misunderstood out of 87 items x 595 learners). Even the item most frequently mis-understood, with 51 "I don't understand" responses, represented only 8.6% of the 592 learners who responded to item 80. Examining the frequency of "I don't understand" responses (Table 4.6), compared to ValueGenesis studies (cf. 4.4.2.2 and Table 4.10), suggests that "I don't understand" responses was due to a lack of understanding of the underlying concepts, more than confusion over item wording. Data collected for this study does not allow for closer analysis of this aspect.

Although all nine reverse scored items (e.g. 7r, 11r) were misunderstood by two or more (mode of 4) learners, all but one (57r) concerned 1% or fewer participants, and frequencies for this item showed that the majority who had no problem understanding, answered the reverse scored items in keeping with their response patterns on other similar items. The five most frequently misunderstood items (42, 81, 72, 57 and 80) were carefully evaluated for reliability, and for possible omission in a shorter version. These are further discussed in section 4.4.

Table 4.6 GDI Items with *Don't Understand* Responses

Number of *Don't Understand* Responses	GDI Items with Number of *Don't Understand* Responses
1	2,19,38,41,53,62,67,73,84
2	16,25,32,35,43,49r
3	3,8,10,11r,27,29,30,36,37,39,47,50
4	1,4,9r,14r,15,21r,24r,31,34,40,55,61,63,77,83
5	5,51r,54,71
6	13,44,66,82
7	6,7r,23,46,58,60,69,85
8	26,86
9	45
10	52
11	28
12	74,87
14	12,20,64,75,76
15	17,65,70,78
16	33
17	59,79
19	22,56
20	68
(4.0%, *n*=594) 24	42,81
(5.3%, *n*=590) 31	72
(7.6%, *n*=592) 45	57r
(8.6%, *n*=592) 51	80

Note. 'r' items were reverse scored.

Education exit interview answers to two open-ended questions regarding the GDI and report design triangulated with learner responses to the GDI exit survey item inviting suggested changes (Table 4.5). Educator perceptions, after observing learners complete the GDI and view their individual reports, focused on several themes, two of which pertain to GDI design:

1. *GDI format* was considered "very clear and easy to follow", "very practical". "Some had to think about items, but kept moving."   "It's a friendly tool", "easy for administer," "relatively simple even for our youngest class". In a class discussion following GDI participation, some South African 7th graders commented that "the

layout of the questions was boring, too similar", while others in the same group "said it was easy to read, easy to understand", and the "computer format is great, instant reports nice".

2. *No technical glitches were encountered* in the management of individual access codes, or the functioning of the GDI or report online. "In this day of many online learning options, the kids just took to it like ducks to water," commented the Australian educator. One USA Grade 7 and 8 teacher reported that handing out assigned codes and getting learners started took about ten minutes in their computer lab. A USA school had several computers with internet access issues, which slowed several participants, but no problem was experienced with accessing the GDI or completing all three steps online. A boarding school where learners participated during computer lab hours outside of class time experienced a firewall issue that shut them out of the research website part-way through completing the GDI. Despite this frustration for some and the optional participation, 72% of the learners successfully completed the GDI and GDI exit survey for the extra credit offered by teachers as a reward/motivator.

4.3.2.3 GDI Wording

The third part of research question two addressed the question: *To what extent are GDI items clearly worded/easy to answer?* Table 4.7 compares pilot and validation sample learner responses to the seven GDI exit survey agreement scale items.

All sixteen learners who participated in usability testing and 91.2% (344 of 377) of the validation sample of learner participants agreed or strongly agreed that the GDI item statements were easy to answer. This wording was carefully chosen and refined through cycles of expert review to preclude any difficulty or confusion in reading instructions, item stems and/or response options. Most educators commented that their learners had no trouble completing the GDI on their own. For example, one teacher reflecting on his class of 7th Grade participants, commented that "a few asked questions about wording occasionally, but all enjoyed seeing results."

Table 4.7 GDI Exit Survey Learner Responses for Pilot and Validation Samples

GDI Exit Survey Item Stems 1-7	Pilot Sample (n / %)		Full Sample (n / %)	
Scale[a]: SD - D – A – SA - Don't Understand	SA/A	D/SD	SA/A	D/SD
The Inventory statements were easy to answer.	16	0	344	33
	100%	0%	91.2%	8.8%
The Inventory had too many questions/was too long.[b]	2	14	185	200
	12.5%	87.5%	48.1%	51.9%
My report was hard to understand or confusing.[b]	1	15	115	277
	6.2%	93.8%	29.3%	70.7%
My report confirmed what I already knew about my spiritual growth.	13	3	269	147
	81.3%	18.7%	64.7%	35.3%
My report helped me understand myself in a new way.	12	4	255	137
	75%	25%	65.1%	34.9%
I don't think this is an accurate picture of where I am in my spiritual journey now.[b]	2	14	130	269
	12.5%	87.5%	32.6%	67.4%
This report accurately identifies my strengths and growth points.	14	2	317	92
	87.5%	12.5%	77.5%	22.5%

[a]SD=strongly disagree, D=disagree, A=agree, SA=strongly agree. [b] Reverse scored items.

4.3.2.4 GDI Report

The fourth part of research question two addressed the question: *To what extent is the GDI online individual report self-explanatory?* Educator exit interviews included observations regarding learner interaction with individual reports. One teacher observed, "The majority clicked on their circle graph to see more detail. Not many continued to scroll down and check the meaning of the graph labels. They were definitely intrigued by the colorful circle graph and what happened when you went to each area." A high school educator (who had not completed the GDI) reported that "scrolling down was a problem; links were expected." This comment reflected a similar observation during usability testing (see discussion in Section 4.3.1). An 8th grade teacher recalled learners calling out to each other, curious about their friends' reports, and then animatedly talking about this experience in the halls and when invited to share in a class later that week. Overall, educators believed most learners found their reports intriguing and self-explanatory.

Supporting educator observations is the finding that 70.7% of learners (*n*=392) disagreed or strongly disagreed with the GDI exit survey item statement, "My report was hard to understand or confusing." Further, two-thirds of the learners felt their report helped them understand themselves in a new way (255 of 392) and portrayed an accurate picture of their perceived spiritual identity at this time (269 of 399). Confirmed in another way, three quarters (317 of 409) agreed that their report accurately identified their spiritual strengths and growth points currently (Table 4.7). Evidently, GDI reports were easy enough to understand online and sufficiently self-explanatory to respond positively to these four GDI exit survey items.

The circle and bar graphs in Figure 4.1 provide a visual summary of the GDI'*s* result for the full validation sample, while its format demonstrates what the online individual report looks like (without navigational links and prompts). This composite report (*N*=595) displays the means for each of the constructs validated, within the four processes (factors) of discipleship or Christian spiritual development (cf. 2.4.5, 2.5.2 and Table 2.1): *Connecting, Understanding, Ministering* and *Equipping.* Each commitment within the four processes is a construct calculated as the mean of its 3-8 indicators (individual items). The circle graph represents the means for each of the constructs within that process or factor. Learner reports online are interactive, and no scores are displayed. The highest scores were in the *Understanding* process, followed by *Connecting, Ministering* and *Equipping* at decreasing levels. These findings are supported by similar studies (see Section 2.3.3.1 and Dudley & Gillespie, 1992; Gillespie, et al., 2003; Rohrer, 2000) in which cognitive (knowing) dimensions are more strongly present (in youth and adults alike) than the affective (being) and behavioral (doing) dimensions of holistic spiritual development.

Online reports included prompts to click on the circle graph to see four more detailed bar graph reports. The report was interactively explored from this circle. Four bar graphs (Figure 4.1) compared learner scores in each of the commitments (indicator variables) within the four processes (factors). Learner reports showed no numeric values. Information was available for those who wished to learn more about any graph label, prompting personal planning, with tools to help with next steps (see http://inventory.growingdisciples.info/youth/).

Circle sectors and bar graphs (in Figure 4.1) represent means of the validation sample, for each construct (*N*=595). Values assigned item responses for *Connecting, Understanding* and *Ministering* ranged from 1 (most negative) to 5 (most positive response); values for *Equipping* items ranged from .5 to 5.5. Standard deviations varied .58 to 1.17 with greatest variance in *Equipping* item responses.

Figure 4.1 My Growing Disciples Report: Example with Full Sample Means

The Big Picture

Four Ways of Growing Spiritually

Ministering
3.38

Connecting
3.77

Equipping
2.89

Understanding
4.42
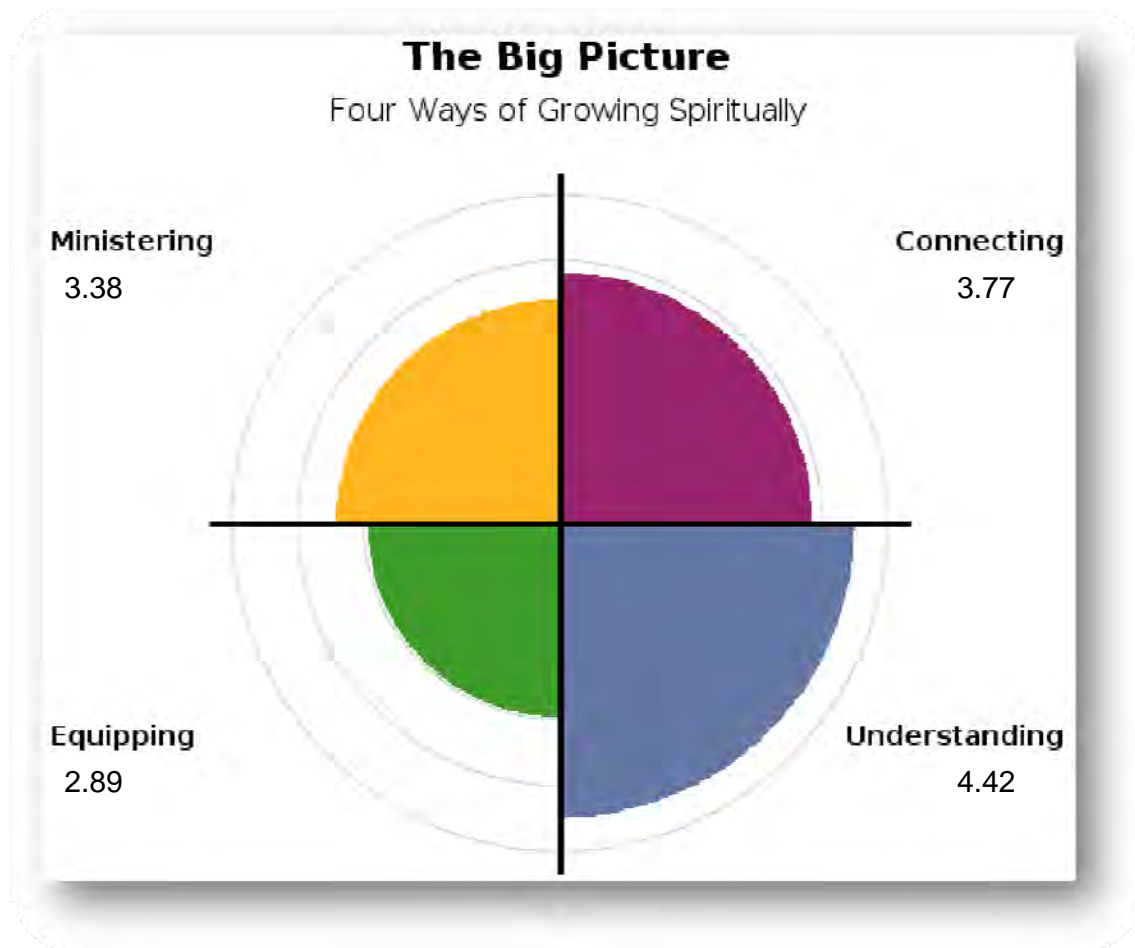
Note. No numeric values are displayed in individual online reports. Clicking on each circle sector opened a website pop-up window displaying the bar graph for that GD process, as illustrated below.

CONNECTING

Growing in relationship with God, self, and others

- C5 With Others
- C4 With Church
- C3 With Family
- C2 With Self
- C1 With God

2.5 2.75 3 3.25 3.5 3.75 4 4.25 4.5

UNDERSTANDING

Growing through knowledge of Jesus and His teachings

- U5 Restoration
- U4 Redemption
- U3 Sin & Suffering
- U2 God

2.5 2.75 3 3.25 3.5 3.75 4 4.25 4.5

MINISTERING

Growing by participating in God's mission to reveal and restore

- M5 Share Faith
- M4 Stewardship
- M3 Community Service
- M2 Discipling Others
- M1 Personal Vocation

2.5 2.75 3 3.25 3.5 3.75 4 4.25 4.5

EQUIPPING

Growing the body of Christ by discipling one another

- E6 Using Spiritual Gifts
- E5 Doing God's Will
- E4 Christian Lifestyle
- E3 Bible Study
- E2 Christ-like Relationships
- E1 Devotional Life

2.5 2.75 3 3.25 3.5 3.75 4 4.25 4.5

4.3.2.5 Relevance and Utility Summary

Mixed methods research enabled evaluation of the GDI design and development by comparing and contrasting qualitative and quantitative results from three sources through iterative cycles of usability testing during the development phase, and educator interview and learner GDI testing in the validation phase. Although piloting and educator feedback indicated the 100-item length was appropriate, one third or more of learners participating felt shortening the GDI would be an improvement. The majority of learners and educators indicated that the GDI's online format was intuitive, and both GDI wording and individual reports were easy to understand for most. Qualitative responses to GDI exit survey items reported in Section 4.5.2 further support the evidential basis for GDI use (i.e. utility) presented in Section 4.3.

4.4 EVIDENCE FOR GDI RELIABILITY AND VALIDITY

The third research question was stated in Sections 1.4.1 and 3.2.2. as follows: *To what extent is the GDI a reliable and valid self-assessment of adolescent Christian spiritual growth as outlined in the GD curriculum framework?* This was answered by conducting two studies each of reliability (cf. 4.4.1), construct validity (cf. 4.4.2), convergent validity (cf. 4.4.3), and discriminant validity (cf. 4.4.4).   Findings for each of these studies are presented below.

4.4.1 RELIABILITY

Evidence for the reliability of the GDI was gathered in two ways. Using SPSS 18 software, coefficients of internal consistency (coefficient alpha) were calculated for each of the 21 GD curriculum commitments. In statistical analysis, these are interchangeably termed *scales,* calculated as the mean of several items or indicators, or *factors* in factor analysis, and *constructs* in educational psychological terminology.   Although 100 items were included to maximize reliability and validity testing (4-9 for each scale), analysis of the correlation of individual items within each scale informed a decision to reduce the number of items wherever the removal of an item increased or held the Cronbach's alpha score the same. Table 4.8 shows the initial alphas used for item analysis, and the adjusted values if nine items are removed, and four moved.

Table 4.8 Reliability of GDI Factors - Cronbach's Alpha

GDI Scales (*N*=595)	GDI Item Numbers (Item wording in Appendix A)	Alpha 1[a]	Items Added (+) & Deleted (-)	Alpha 2[a]
CONNECTING	C1-C5	.84		**.857**
C1 with God	2,3,83,84,85	.62	+53+56-85	.740
C2 with self	1,4,5,6,7	.72	-7	.785
C3 with family	8,9,76,86,87	.53	-9	.577
C4 with church	10,11,12,13	.53		
C5 with others	14,15,16,17,18	.52	-14	.624
UNDERSTANDING	U1-U5	.90	U2-U5	**.917**
U1 spiritual growth	52,53,54,55,56	.80	Moved to C1,M1	
U2 the nature of God	60,61,62,63**	.85		
U3 the nature of man	64,65,66,67	.74		
U4 redemption	57,58,68,69,70,71,72,73,74**	.75	-57	.812
U5 restoration	59,75,78,79,80,81,82**	.81	-59	.814
MINISTERING	M1-M5	.85		**.855**
M1 thru personal vocation	31,32,33,34	.71	-34+52+55	.796
M2 thru discipling others	35,36,37,38	.74		
M3 thru community service	39,40,41,42,43	.70		
M4 thru stewardship	44,45,46,47	.68		
M5 thru evangelism	48,49,50,51,77	.67		
EQUIPPING	E1-E6	.94		**.943**
E1 devotional life	19,20,88,89	.68		
E2 Christ-like relationships	21,22,90,91	.53	-21	.639
E3 Bible study	23,24,92,93	.69		
E4 practical Christian living	25,26,94,95,96	.75	-26	.774
E5 discerning God's will	27,28,97,99	.69		
E6 using spiritual gifts	29,30,98,100	.69		

Note. Removing Adventist belief item 63, U2's α=.826; removing Adventist belief items 71 and 72, U4's α=.782; and removing Adventist belief items 78 and 80, U5's α=.780
[a]Cronbach's alpha includes all 100 items in column 1, and reflects the additions/deletions (in 2).

Cronbach's alpha scores for the GDI's 21 processes demonstrate internal consistency by measuring the degree of relationship or correlation among items that are intended to assess the same latent (or unobservable psychological) construct. On their own, these intercorrelations do not imply cause-and-effect linkages between the variables, but give an idea of the strength of the relationship.

Generally, alphas of .80 or above (with 1.0 maximum) provide evidence for high reliability of items measuring the particular construct on this scale. In human research, alphas of .4 to .8 may indicate fair reliability when considered in conjunction with other estimates of reliability and validity. Three scales (C3, C4, C5) in the *Connecting* process and one in the *Equipping* process (E2) had moderate alphas of .52 or .53. However, all four composite scales had high alphas, indicating good internal consistency: *Connecting* (.857), *Understanding* (.917), *Ministering* (.855), and *Equipping* (.943). In the interests of parsimony, and in response to learner suggestions to shorten the GDI, all items which did not contribute positively to the internal consistency of the observed variables were removed from the trimmed GDI, increasing each of the four factor's alphas further (cf. Table 4.8).

Although preliminary validation of the GDI has been conducted within one Christian school system, the larger network of Protestant schools was considered during design and validation. The Assessment of Catechesis/Religious Education (NCEA ACRE, http://www.ncea.org/Assessment/) is provided by the National Catholic Educational Association for educators in church and school settings. Local diocese may add a few items to the validated ACRE to contextualize the assessment. With this design concept in mind, the impact of removing distinctly Adventist belief items on the internal consistency of the GDI was investigated. Removing item 63 from U2 reduces its alpha from .85 to .83; removing items 71 and 72 decreases U4's alpha from .812 to .782; removing items 78 and 80 decreases U5's alpha from .81 to .78 (cf. Table 4.8). These three changes indicate that an alternate form of the GDI could be made available, without significantly changing the reliability established through this study.

Using AMOS 18 software, structural equation modeling reports provided estimates of covariance, and correlation coefficients. The correlation coefficients and the standard error estimates are included in Figure 4.2. Examining the errors and covariances using

structural equation modeling tools in iterative exploratory factor analysis cycles led to the best model fits with item changes listed in Table 4.8. A few more items could have been omitted based on the model fitting cycles of exploratory analysis, but were not supported by the theoretical framework. Albeit calculated by totally differently theoretically-based algorithms, both the coefficient alphas in Table 4.8 and the correlation coefficients shown in Figure 4.1 provide strong evidence for the reliability of the GDI items in assessing the constructs of the GD curriculum to which this self-assessment is aligned.

Correlations between the indicators (e.g. C1, M2) of the four factors are shown in bold font in Table 4.9; all other correlations between variables across all other factors are included in normal font as evidence of discriminant validity (discussed in 4.4.4). Correlations *within* the *Understanding* factor (between observed variables U2, U3, U4 and U5) were moderately high (.762 to .836). Correlations *within* the *Ministering* factor were moderate (.338 to .661), similar to correlations *within* the *Connecting* factor (.461 to .654). Notably, correlations *between* indicators of *Ministering* and those of the *Connecting* factor (i.e. across factors) are similar to correlations *within* each process. The inter-relatedness of these two factors or constructs is supported by the theoretical framework, in that both the *Connecting* and *Ministering* processes are relationally oriented, serving (the focus of *Ministering*) in response to a growing relationship with Christ, self and others (the focus of *Connecting*). This correlational evidence corroborates the covariance of the indicators or observed variables (e.g. C2, M3) and their error variances across latent variables (or factors) *Connecting* and *Ministering* in structural equation modeling. Although a good model fit was obtained for each latent variable and its observed variables separately (cf. Table 4.10), the strength of the full GD model was impacted by the presence of numerous inter-correlations between observed variables within *Connecting* and *Ministering*, in particular.

The correlations between the observed variables across factors, while weaker than within-factor correlations for the other factors, further reflect the theoretical framework of four cyclical process of lifelong Christian spiritual growth. The GDI seeks to confirm facets of a complex whole, identified in the GD curriculum as four cyclical, inter-connected processes of discipleship. From this theoretical framework, the limitations of empirical research to separate the inter-related components of Christian spiritual development are recognized, and reflected in the inter-correlated structural model identified through structural equation

modeling. No causal paths for a structural model were identified through exploratory factor analysis, in keeping with the theoretical framework (cf. 2.5.2.2)

Noting the weaker correlations between the observed variables C1 through C5 of *Connecting,* exploratory factor analysis using structural equation modeling revealed that when C3, C4 and C5 are grouped as a single variable reflecting *Connecting* with others (C0), correlation coefficients increase to .668 (C1-C2), .711 (C1-C0), and .680 (C2-C0). Grouping the three areas (connecting with home/family, with church family, and with those in wider community) as one 'connecting with others' latent variable fits within the broader theoretical model as 'Growing in relationship with God, self and others'. Including items to assess each of the three subsets ensures balance in assessment of the fuller range of this factor that would otherwise be nebulous if treated as a single 'other' observed variable. Thus the three parts of the 'other' observed variable were retained as designed. However, it should be noted that the additional evaluation of findings, drawing on correlational evidence and exploratory factor analysis, provided further evidence in support of the reliability of items included to assess the *Connecting* process.

4.4.2 CONSTRUCT VALIDITY

Construct validity concerns the degree of fit of a measure and its interpretation with its underlying explanatory concepts, theoretical rationales, or foundations (cf. 3.3.3.1). Validation is "the process of determining the appropriateness, meaningfulness, and usefulness of … an assessment …and of the inferences made from the results" (http://www.wmich.edu/evalctr/ess/glossary/glossary.htm).

Traditionally, validity studies have examined content, criterion and construct validity. Messick argued that construct validity was all-encompassing (discussed in 3.3.3). From this perspective, construct validity is supported by evidence already reported, regarding content/curricular validity (cf. 4.2), GDI utility (cf. 4.3) and reliability (cf. 4.4.1). In this section, confirmatory factor analysis using structural equation modeling is used to examine the GD model fit for further evidence of construct validity.

Table 4.9 Correlations Within and Between *GDI* Factors[a]

	C1	C2	C3	C4	C5	U2	U3	U4	U5	M1	M2	M3	M4	M5	EQ1	EQ2	EQ3	EQ4	EQ5
Connecting																			
C2	**.654**																		
C3	**.591**	**.530**																	
C4	**.588**	**.558**	**.461**																
C5	**.546**	**.586**	**.499**	**.543**															
Understanding																			
U2	.594	.667	.504	.394	.520														
U3	.512	.569	.472	.389	.470	**.762**													
U4	.591	.630	.538	.440	.534	**.796**	**.836**												
U5	.600	.648	.584	.449	.564	**.788**	**.767**	**.831**											
Ministering																			
M1	.687	.621	.585	.549	.593	.510	.437	.509	.537										
M2	.603	.538	.495	.588	.556	.458	.416	.486	.504	**.661**									
M3	.336	.233	.361	.369	.384	.246	.203	.264	.279	**.414**	**.509**								
M4	.601	.590	.561	.500	.488	.438	.405	.484	.490	**.640**	**.634**	**.512**							
M5	.615	.599	.533	.501	.525	.516	.456	.550	.555	**.598**	**.608**	**.338**	**.562**						
Equipping																			
EQ1	.547	.495	.479	.500	.441	.395	.397	.468	.422	.482	.566	.325	.519	.521					
EQ2	.435	.425	.405	.409	.390	.342	.322	.389	.359	.425	.471	.325	.379	.423	**.775**				
EQ3	.513	.503	.479	.484	.439	.419	.375	.429	.467	.520	.567	.350	.514	.542	**.776**	**.751**			
EQ4	.462	.438	.452	.429	.440	.417	.384	.446	.438	.449	.492	.330	.435	.460	**.757**	**.745**	**.762**		
EQ5	.591	.518	.497	.509	.471	.461	.415	.488	.468	.528	.579	.371	.530	.532	**.752**	**.701**	**.741**	**.741**	
EQ6	.538	.459	.484	.505	.464	.437	.380	.464	.432	.536	.608	.445	.520	.518	**.711**	**.680**	**.702**	**.722**	**.775**

Note. For all correlations, $p < 0.01$, 2-tailed with $N = 595$ (0.3% missing values replaced by median of nearby points). Correlations within each factor are shown in bold font; correlations across other processes are shown in normal font. See variable definitions in Appendix A.
[a]Reflects U1 moved to C1 and M1, as noted in Table 4.8.

Confirmatory factor analysis was conducted using structural equation modelling with AMOS software to further evaluate the extent to which the GDI was a reliable and valid assessment aligned to the GD curriculum. Notably, the purpose of this study did not include testing or validating the GD curriculum framework as a model. Confirmatory factor analysis confirmed the covariance of the four processes (*Connecting, Understanding, Ministering* and *Equipping*) as latent variables (constructs that are not directly observable) composed of 4, 5 or 6 observed or endogenous variables. Additional exploratory factor analyses were undertaken to investigate which adjustments to the measurement and structural parts of the GD model would improve the model fit.

For the purpose of this study, correlation coefficients support reliability of the assessment measuring each commitment (as a separate scale or factor) in the GD curriculum in its current format. But further exploratory factor analysis is necessary if the best model fit is desired, focusing on the GD curriculum, and not the validation of the GDI. Such an investigation is beyond the scope of the current study. Figure 4.2 provides evidence for the reliability and (construct) validity of the GDI, aligned to the GD model as specified in Section 2.5.2 (cf. Figure 2.6 and Table 2.1).

Guided by the GD framework or model, the 100 GDI items were grouped within 21 commitments (observed variables calculated as mean structures of several item scores) and four processes (latent variables or factors) in this study. With the measurement model clearly identified, confirmatory factor analysis of the full GDI model as specified and identified was conducted. Results are shown in the first row of Table 4.10. Structural equation modelling estimates of variance and covariance are best evaluated by examining multiple indexes of model fit, considering the complexity of model, sample size and other constraints requiring researcher judgment. The initial results for the full GDI model indicated a less-than-adequate model fit, with a RMSEA of .088 (where p<.05 is best, and p<.10 is acceptable), and a high LO90 (90% confidence interval) of .083 (where p<.05 is desired). Next, as comparison, the *Growing Disciples in Community* model (Beagles, 2009) was tested (cf. Figure 2.7 and Table 2.2), as a variant of the GD model. Its fit using the GDI data was worse on each of the key indexes of model fit (see 2nd row in Table 4.10) than the full GD model. Further path analysis achieved no better fitting models. This suggested that further investigation of each of the factors individually would provide clues to covariances and correlations across factors.

As Cronbach's alpha scores provided strong evidence of reliability, each factor was treated as a separate model in order to examine covariances. Negative skewness and positive kurtosis on four *Understanding* variables (U2-U5), and C2 in the *Connecting* factor prompted investigation of possible non-normal distribution. Several transformations recommended for distributions that differ moderately to severely from normal (Mertler & Vannatta, 2005) were tried (square root of score, reflecting and subtracting from one more than the largest score, and log of score). Making little difference to the model fit, normal distribution was assumed for further confirmatory analysis. Re-assigning observed variable U1's items to C1, C3 and M1 based on original alpha scores and covariance estimates of U1's disturbance (or variance attributable to other unknown factors) within the *Understanding* factor and correlated with variables in other factors (*Ministering* and *Connecting*), was theoretically sound. This change increased alpha scores and improved several model fit indexes, shown as the GD trimmed model in Table 4.10. Although the error covariances (listed in the column with heading *Error Covar* in Table 4.10) were set for the confirmatory factor analysis of each factor on its own, estimates and fit indexes for the trimmed GD model were obtained without correlating any error variances.

Many indexes are available to report the goodness-of-fit or appropriateness of models using structural equation modelling, each with strengths and weaknesses, and more appropriate to some conditions than others. Although the literature recommends considering multiple indexes, two are currently preferred over others (cf. Figure 4.2):

- The *comparative fit index* (CFI) "is one of a class of fit statistics known as *incremental or comparative fit indexes*, which are among the most widely used in structural equation modelling. All these assess the relative improvement in fit of the researcher's model compared with a *baseline model*" (R. B. Kline, 2005, p. 140). Values ≥ .90 may indicate reasonably good model fit, but it is best to consider several indexes in making a decision about a model's fit.

- The *root mean square error approximation* (RMSEA) is a "*parsimony-adjusted index* in that its formula includes a built-in correction for model complexity. This means that given two models with similar overall explanatory power for the same data, the simpler model will be favored" (R. B. Kline, 2005, p. 137). As the RMSEA does not approximate a central chi-squared distribution, but measures the error of approximation (the lack of fit of a researcher's model to the population covariance matrix), and the error of estimation (the difference between the fit of the model to

the sample covariance model fit and to the population covariance matrix), it is considered a fit index worth referencing and citing. In contrast to the CFI as a *goodness-of-fit* index, the RMSEA is a *badness-of-fit* index in that RMSEA values ≤.05 indicate close approximate fit, values between .05 and .08 suggest reasonable error of approximation, and RMSEA ≥.10 indicate poor fit according to Browne & Cudeck (1993, cited in R. B. Kline, 2005, p. 139).

Table 4.10 Model Fit Indexes for GD Models

Models Tested (*N*=595)	X^2	df	p	Error Covar [a]	CFI[b]	RM-SEA [b]	RMSEA 90%CI[b]		P-CLOSE SE[b]
							LO90	HI90	
GD Model	1031.83	183	.000	-	.911	.088*	.083*	.094	.000*
GD in Community	1193.79	187	.000	-	.894*	.095*	.090*	.100*	.000*
Connecting[c]	4.845	4	.304	C1-C5	.999	.019	.000	.067	.817
Understanding[c]	1.957	1	.162	U3-U4	.999	.040	.000	.125*	.433
Ministering[c]	7.896	3	.048	M3-M4	.996	.052	.004	.099	.390
				M3-M5					
Equipping[c]	12.299	8	.102	E5-E6	.998	.033	.000	.064	.787
GD Trimmed[c]	606.032	164	.000	-	.952	.067	.062*	.073	.000*

[a]Variances not explained by the latent variable, allowed to covary across 2 observed variables to improve model fit.
[b]CI=confidence interval for p<.05; CFI=comparative-fit-index; RMSEA=root-mean-square-error-of-approximation; PCLOSE=probability of RMSEA being a close fit (with fixed cutoff set to p<.05)
[c]Mean structures (observed variables) adjusted by additions and deletions shown in Table 4.8
＊Out of recognized limits. Further analysis, data transformation or model trimming is needed for a better model fit.

The best model found, listed as *GD Trimmed* in Table 4.10, is diagrammed in Figure 4.2. Several observations are worth noting as this model is reviewed:

- The correlation estimates in this best fitting model corroborate internal consistency evidence presented with Cronbach's alpha scores listed in Table 4.8, all moderately to highly positive, even though calculated quite differently.

- Part of the variance - and covariance - of endogenous (i.e. caused or dependent) variables is due to other factors not identified in the model. For all observed variables in Figure 4.2, more of the variance is attributed to the factor identified than

to extraneous sources (error estimates shown on small arrows from small ovals to squares).
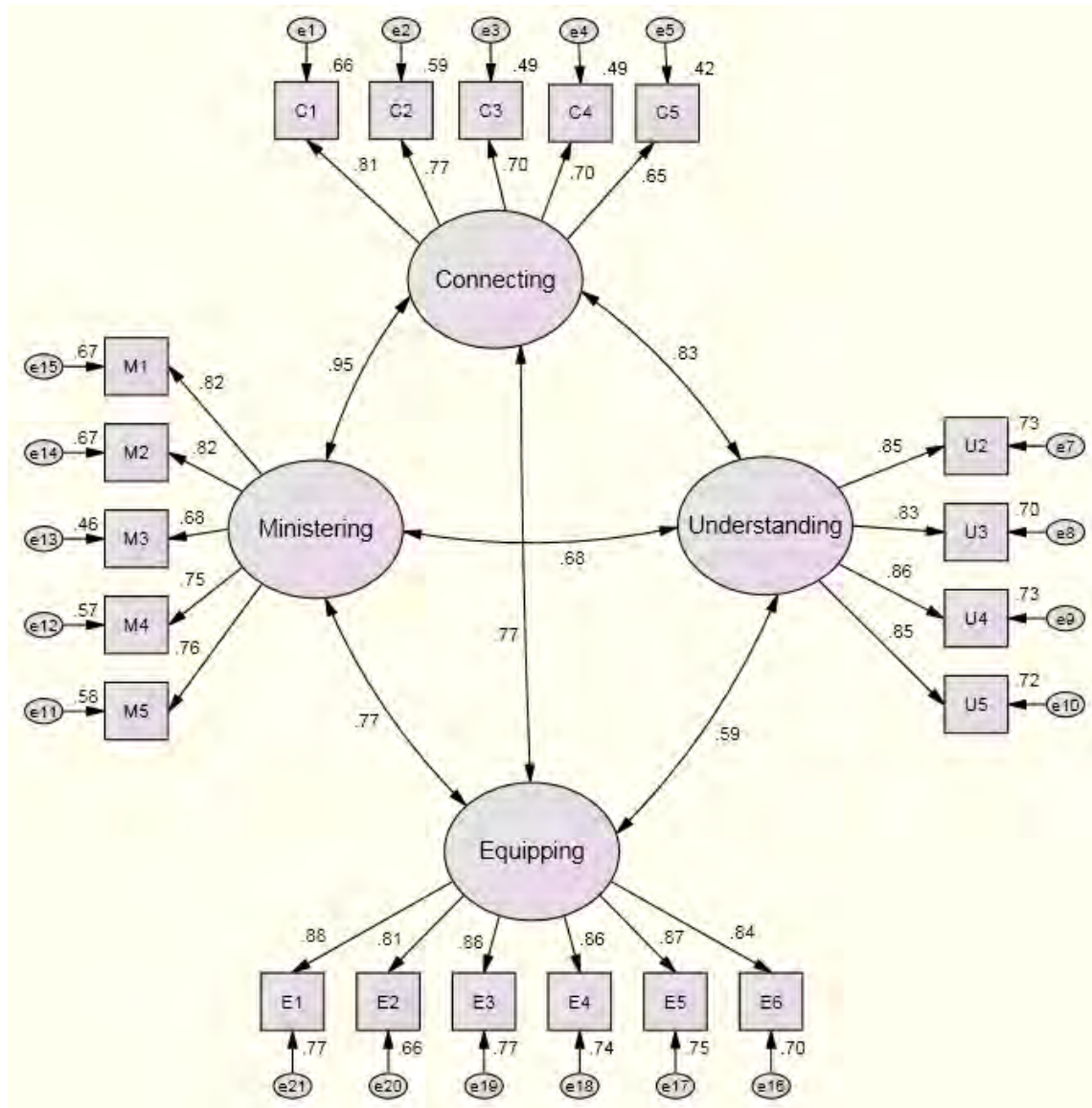
Figure 4.2 Trimmed GDI[a] Structural and Measurement Model

Model Fit: X^2(164, N=595) = 606.032, p=.000; CFI (comparative-fit-index) =.952; RMSEA (root-mean-square-error-of-approximation) =.067 with 90% confidence interval (LO=.062, HI=.073).
[a]Model calculated after deleting 9 items and moving U1 items based on Cronbach's alpha 2, as shown in Table 4.8
*p ≤ .001 for (a) all standard estimates within factors or latent variables, are shown on arrows between observed variables (squares) and latent variables (circles), for (b) all correlation estimates between the 4 latent variables, and for (c) all error estimates shown on arrows from small ovals.

- Correlations between the four GD processes vary between a moderate .59 (*Understanding ↔ Equipping)* to a high of .95 (*Connecting ↔ Ministering*). The interconnectedness of all four processes reflects, and further supports, the underlying theoretical GD model (cf. 2.5.2) to which the GDI was aligned.

For the data available through the full learner sample in the validation phase, the best fit model demonstrates adequate fit on several of the most frequently used structural equation modelling indices. Considering each of the following selected indexes provides fuller evidence of the GDI's construct validity as aligned to an adequate GD model:

- For a medium-size sample of 595, a ratio of X^2/df = 3.695, relatively near 1, is a positive indication of an adequate fit model (Blunch, 2008, p. 113)
- A root mean square residual of RMR = .028 is fair value for this absolute fit measure, where a good model fit is near 0 on the interval bounded by 0 and 1 (R. B. Kline, 2005, p. 141)
- Three relative fit measures with interval bounds 0 and 1, suggest a model is acceptable as it is in the range .90 to .95, with values above .95 ideal. The trimmed GDI model has a norm-fit-index value of NFI = .935, a Tucker Lewis Index value of TLI=.944, and a comparative-fit-index value of CFI = .952. Although the NFI and TLI suggest an adequate fit, the CFI suggests a good model fit (Blunch, 2008; R. B. Kline, 2005)
- A root-mean-square-error-of-approximation value of RMSEA = .067 is higher than the value of .05 considered a cut-off in much of the literature regarding this fit measure based on the non-central chi-square distribution (although studies show that fixed cut-off points do not fit all research). But it is within the range .05 to .10 for an adequate fit (Chen, Curran, Bollen, Kirby, & Paxton, 2008; Kenny, 2003). The lower value of the RMSEA 90% confidence interval (.062) indicates room for improvement of model, in order to reduce this to below the preferred limit of p<.05. However, the upper limit of the 90% confidence interval (.073) is below .10, and better, below .08, which suggests a good fit (Kenny, 2003). A PCLOSE of p= .000, which is less than .05, indicates that the model may be an adequate but not a close fit, and bears further analysis with a larger sample focused on exploratory factor analysis of the GD model itself.
- Although the RMSEA-LO90 and PCLOSE values suggest model refinement for an improved model fit (which is beyond the scope of this study), all other indicators

suggest a good or adequate model fit, which is sufficient for the purpose of evaluating the GDI's alignment to the current GD model.

Structural equation modelling was used as a statistical method to gain richer evidence for the reliability (correlation estimates compared favourably with Cronbach alphas) and validity (measurement and structural model as specified and identified provided estimates of adequate model fit). Further evidence for construct validity is examined in comparison to results from other studies in the following section.

4.4.3 CONVERGENT VALIDITY

One source of validity evidence is a study of the correlations between observed variables within constructs. In the GD curriculum, there are four, five or six commitments or observed variables within each of the four GD processes or factors. When intercorrelations are at least moderate (R. B. Kline, 2005), as shown in bold in Table 4.9, *convergent validity* is established.

Another form of evidence for convergent validity is a comparison of GDI results with findings from other studies. Learner responses to GDI items were very similar to those reported by several comparable studies of adolescent Christian spiritual development. Selected examples demonstrate convergent validity, or the extent to which results from the assessment developed correlate with results on similar measures (see 3.3.3.1 and Trochim, 2006).

Comparing learner responses on items regarding distinctive Adventist beliefs included in the GDI, with adolescent responses to the American and Australian ValueGenesis studies (Gillespie, et al., 2003, pp. 156-159; *ValueGenesis: Study 1 core report*, 1993, pp. 22-26) further supports population representation. Examining items where learners most frequently answered "I don't understand" (Table 4.6) reveals three similarities:

- In both ValueGenesis 1 & 2, American Grade 6-12 learners answered "I definitely believe this" least frequently for the Adventist belief regarding the investigative judgment. The highest percentage of "I don't know" responses (37%) was recorded for a similarly worded item in the Australian ValueGenesis study. Similarly, the highest percentage (albeit only 8.6% of 592 responses) of "I don't understand"

responses to a GDI item was on item 80 regarding the same belief, even though this item was carefully considered and revised through at least 5 iterations of expert reviewing (possibly explaining the decrease from 37% to 8.6% selecting 'don't understand').

- The Australian ValueGenesis belief item measuring understanding the ultimate fate of sinners had the second highest percentage of misunderstandings (21% responded "I don't know"). A comparable item on the GDI had the third highest number of "I don't understand" responses (item 72, with 5.3% of 590).

- Examining the frequencies of learner responses on an item assessing understanding of the biblical concept of millennium revealed that 53% of ValueGenesis 2 participants "definitely believed" (Gillespie, et al., 2003, p. 163), and 52.3% of GDI validation sample participants "strongly believed" an item worded slightly differently.

Table 4.11 A Comparison of ValueGenesis 2 and GDI Responses on Identical Items

ValueGenesis 2 (*GDI*) Item Number & Belief Summary	ValueGenesis 2 Tend to Believe & Definitely Believe	GDI-USA Believe & Strongly Believe
76 (64) great controversy theme	88.0% (*n*=11,442)	91.9% (*n*=479)
75 (65) human nature & sin	89.8% (*n*=11,452)	91.2% (*n*=477)
65 (71) state of dead	94.0% (*n*=11,445)	92.7% (*n*=479)
79 (74) communion service	74.4% (*n*=11,416)	85.0% (*n*=478)
77 (75) church as God's family	87.5% (*n*=11,426)	87.8% (*n*=475)

Five GDI items used wording from the ValueGenesis 2 beliefs scale in order to facilitate evaluation of discriminant validity (cf. 4.4.4). As the ValueGenesis 2 survey was distributed to over 21,000 students attending Grade 6-12 classes in North American Adventist schools, this study was a census of the USA Adventist school learner population rather than a sample. Although the item stems were worded alike in all 5 items shown in Table 4.11, the wording on the ValueGenesis 2 five-point response scale differed slightly from the GDI five-point scale. Comparing the combined responses for the two positive options on both scales (Table 4.11) demonstrates that the GDI validation sample participants

attending schools in the USA were a representative sample of the USA population of adolescence attending Adventist schools, assuming no significant changes in population since the ValueGenesis 2 study in 2000.

Analyzing data from thousands of adolescents who participated in two waves of the *USA National Study of Youth and Religion* (http://www.youthandreligion.org/), Smith et al (Regnerus, Smith, & Fritsch, 2003; C. Smith & Denton, 2005) highlight the strongest single factor in various regression analyses of adolescent religious and spiritual development as the religious beliefs and practices of parents. These findings corroborate those of other studies such as ValueGenesis (Gillespie, et al., 2003; *ValueGenesis: Study 1 core report*, 1993). Table 4.12 shows GDI findings that concur with this literature regarding parental influence on spiritual development.

Table 4.12 Correlation of Equipping Groups to Learner Scores on 3 Processes

Who is helping you to [grow spiritually][a]?	Connecting	Understanding	Ministering
1 one or more parents	.466	.440	.428
2 one or more other family members	.284	.266	.281
3 one or more school teachers	.242	.207	.216
4 one or more adults in my church	.289	.271	.281
5 one or more friends	.283	.208	.264

Note. See item wording in Appendix A. For this correlation, a scale was created as the sum of the number of times learners checked each of the 6 options (in Items 88-98). All Pearson correlations shown are significant at p<.01, 2-tailed.
[a]Items 88-98 each assessed a different aspect of being equipped by others, with the item stem in the form of a question, most beginning with the phrase 'Who is helping you to…'.

For each of the six *Equipping* constructs, at least two items were questions asking adolescents who helped them develop in the individual GD processes of *Connecting, Understanding*, or *Ministering*. Learners checked all options that applied from a list of six response options, five of which are shown in Table 4.12. The sixth option (others) was never used by 43% of participants, and selected by about a quarter (mean of 11 items at 24.7%) of participants on each of items 88-98. Correlations with learner composite process scores were statistically insignificant for the 'other' option. A scale was created for each of the five specific groups (parents, family members, teachers, adults in church,

and friends), and correlated with participant mean scores for the *Connecting, Understanding* and *Ministering* factors. The number of participants *(N*=595) selecting parents ranged from 52.9% (on item 95) to 72.3% (on item 88), with a mean of 62.2% over all 11 items. Learners selected school teachers as equipping them with similar frequency (mean of 62.1%), a tribute to the positive influence of Christian teachers on adolescents attending Christian schools. Learners selected adults in their church an average of 42% of items 88-98, friends 38.4%, and other family members (grandparents, siblings, etc.) 35.6%. Although a moderately positive correlation (.428 to .466) was found between the choice of parents as equipping or helping the learner grow spiritually and the learner's scores, there was little difference between the weak positive correlations (approximately 50% of the influence of parents) for school teachers, adults in church, friends and other family members, even though school teachers were selected as often as parents. The significant influence of parents on spiritual development is supported by recent studies, including the *USA National Study on Youth and Religion* (C. Smith & Denton, 2005) and ValueGenesis studies (Gillespie, et al., 2003; 2005).

Some Christian families prioritize spending time together regularly at home for Bible (and other devotional) reading, prayer, sharing of life experiences and support for one another. Studies reviewed noted the positive influence of adolescent active involvement in family worship with the level of faith maturity (Gillespie, et al., 2003; J. W. Lee, Rice, & Gillespie, 1997). GDI participants responded on a frequency scale (one or more times per week, about once a week, about once a month, seldom or never) to the item stem, "I willingly read the Bible or pray for family worship." Responses correlated positively at a moderate level with scores in the processes *Connecting* (.47), *Understanding* (.371) and *Ministering* (.405).

Each of these comparisons of GDI results with those of other studies of adolescent religious and spiritual development provides further positive evidence for construct and convergent validity for the GDI.

4.4.4 DISCIMINANT VALIDITY

Several correlations between variables recording background information and learner scores on the four GD processes (cf. Table 4.14) adds evidence for convergent and

discriminant validity of the GDI. In reviewing Table 4.14, it should be remembered that a negative correlation indicates that as the numeric values increase for one variable (e.g. this study assigned gender values as female=1 and male=2) the numeric values on the compared variable decrease in a correlated way. For example, the very weak negative correlation between grade level and learner scores, albeit insignificant statistically, is in line with literature reviewed (Denton, et al., 2008; C. Smith & Denton, 2005). This negative correlation shows that as the grade level increases (the value 7 assigned to Grade 7, etc.), learner scores in the four GD processes decrease slightly. It is of interest that Denton et al (2008) did not find dramatic drops in religiosity as some expect to be the case as adolescents mature. However, the researchers were surprised by the seeming disparity between the majority of self-reported increases in religiosity which seemed at odds with results from comparisons of identical measures of religiosity on the surveys of these youth in 2002 and 2005. A possible explanation, the researchers suggest based on the full spectrum of their findings in this large and continuing mixed methods study of adolescent religious and spiritual development, is that youths may "place more emphasis on the aspects of religiosity that changed the least – belief in God, the importance of religion in daily life, and closeness to God – when evaluating changes in their religiosity as a whole" (Denton, et al., 2008).

A very weak correlation between gender and learner scores in the four GD processes (cf. Table 4.14) indicates that females (assigned the value of 1) score higher than males (assigned the value of 2) on the GDI. This differentiation between the two gender subgroups, known to differ on measures of religiosity and spirituality (Bradshaw & Ellison, 2009; Regnerus, et al., 2003; C. Smith & Denton, 2005; Stark, 2002; Wallace, Forman, Caldwell, & Willis, 2003), could be considered as further evidence that the GDI possesses fair *discriminant validity* - i.e. the GDI discriminates between male and female learners known to differ in that females regularly achieve higher spirituality scores than males. Notably, the weakness of this correlation is also evidence in favour of the generalizability as discussed in Section 4.5.1.

Learners reported their church or religious affiliation by selecting one of the following options from a pull-down list (with values assigned for statistical analysis as shown in brackets): *Adventist Christian* (1), *Other Protestant Christian* (2), *Catholic Christian* (3), *Buddhist* (4), *Hindu* (5), *Jewish* (6), *Muslim* (7), *Another Religion* (8) and *I don't attend*

religious services (9). Church affiliation was significantly correlated with learner scores, with Christian learners scoring highest and those self-reporting no faith at all scoring lowest. Why this relationship was so weak may be partially attributable to the impact of the Christian education environment on learners affiliated with other faith communities, but further research with a larger sample including world regions where world religions other than Christianity are prevalent, is recommended. Nevertheless, the correlation between affiliation and learner scores is evidence in favour of the GDI's ability to discriminate between groups expected to differ in some way.

In response to the background question *If you are a Christian, have you made a personal commitment to follow Jesus?* learners could select from the following options (with values assigned for analysis purposes in brackets): *yes* (1), *thinking about it* (2), *not interested* (3), *not a Christian* (4), or *no* (5). Christian commitment values were moderately and significantly negatively correlated with learner scores (cf. Table 4.14), indicating that learners who answered *yes* on the Christian commitment scale item had the highest scores in the 4 GD processes. As the Christian commitment value increased, learner score values decreased. This correlation was the only one of the background items to be moderately and significantly correlated, which is of note as it reflects an individual, personal decision that the GDI fairly discriminated. Thus this correlation increases evidence for discriminant validity.

Additional evidence for discriminant validity (as discussed in 3.3.3.1) is provided through the correlations of the observed variables within each of the four GD processes (cf. Table 2.1). Correlations between variables *across* factors (normal font in Table 4.9) are predominantly lower than correlations between variables *within* factors (bold font in Table 4.9). The higher intercorrelations *across* factors *Connecting* and *Ministering* have a theoretical basis (as discussed in 4.4.1), and all other intercorrelations are lower by comparison. Based on this data analysis, it can thus be concluded that the GDI items demonstrate discriminant validity in that they are (a) consistent or reliable in their assessment of core constructs, and (b) discriminate between variables loading on different factors as defined by the GD curriculum (cf. 2.5.2.2).

Evidence for the validity of the GDI is strong on all studies undertaken with regards to reliability or trustworthiness, construct, convergent and discriminant validity. Such positive outcomes robustly support the broader construct validity of the GDI.

4.5 CONSEQUENTIAL EVIDENCE FOR THE GDI

Messick's (1994) comprehensive theory of validity addresses the meaning of assessment results for practical use (i.e. the evidential basis for validity) as well as the value implications and social consequences (i.e. a consequential basis for validity) of test or assessment interpretation and use (as discussed in Section 3.3.3 and Table 3.4). Once the evidential basis for validity is confirmed, as the validity studies presented in previous sections (4.2, 4.3, and 4.4) demonstrate, the impact of assessment use can be evaluated. In this section, findings from educator interviews and learner GDI exit surveys regarding the generalizability of the GDI (cf. 4.5.1), and the value implications for use with the intended audience (cf. 4.5.2) are presented.

4.5.1 GENERALIZABILITY

A test or assessment may be considered transferable when evidence supports its applicability and utility across groups known to differ in one or more ways, such as gender, age, grade/year in school, religious affiliation, and the country and local community within which the learner is situated. Although the sample for this study drew from a limited number of schools and regions, examining the extent to which participants responded similarly provides initial indications of the appropriateness of using the GDI beyond the specific context it was tested in.

Structured equation modelling makes it possible to consider the invariance (or equality) of parameters across populations (Lomax, 2010). By examining how consistently an assessment scores two groups known to differ on one or more characteristics, an estimate of generalizability, transferability or transportability of a curriculum or assessment can be made. Comparing the model fit for different subgroups (gender, grade level and country) provided evidence to consider the generalizability of the GDI across the global Adventist education system.

With the moderate sample size of 595 useable responses, structural equation modelling estimates would likely be compromised for smaller subsamples (Kenny, 2003; R. B. Kline, 2005). Thus the preliminary evidence in Table 4.13 should be considered tentative at best, and results triangulated with other studies and findings in this research. All CFI values are very similar, as are RMSEA values. RMSEA indexes in the range .05 and .08 indicate adequate model fit, with little difference between the two gender subgroups (all male and female learners), and between lower (Grades 7, 8 and 9) and upper (Grades 10, 11 and 12) grade subgroups. These findings (values shown in Table 4.13) seem to suggest that grade level, and possibly gender, do not unduly affect the GDI model fit.

Because the South African and Australian subgroups together (cf. Table 4.13) included a total of less than 200 participants, the international (RSA & AUS) inadequate model fit (RMSEA=.082) may be attributable to significant differences between countries or more likley to the small subsample in this data. Thus further study with a larger international sample is recommended for a structural equation model fit to be considered as evidence for or against the transferability of this formative assessment tool cross-nationally.

Table 4.13 Model Fit for Subsamples by Demographic Characteristics

Parameter	N	X^2	CFI	RMSEA	AIC	ECVI
Trimmed GDI	595	606.032	.952	.067	698.032	1.175
Gender						
Females	304	441.870	.944	.075	533.870	1.762
Males	273	370.535	.956	.068	462.535	1.700
Country						
USA	489	497.733	.955	.065	589.733	1.208
RSA & AUS	97	269.901	.948	.082	361.901	3.770
Level						
Grades 7-9	228	339.461	.952	.069	431.461	1.901
Grades 10-12	333	430.498	.954	.070	552.498	1.574

Note. df=164 and p=.000 for all models using the trimmed GDI structural model;
GFI=comparative-fit-index; RMSEA=root-mean-square-error-of-approximation;
AIC=Akaike Information Criterion; ECVI=Expected cross-validation index;
RSA=South Africa; AUS=Australia

The structural equation model fit results for the international subsample corroborate a weak but significant correlation between country and learner scores in the four GD processes, as shown in Table 4.14. However, educator interviews and learner responses on the GDI exit survey provided qualitative data that strongly supported the relevance of the GDI as a self-assessment of Christian spiritual development in each country. This seems to indicate that responses may differ from one country to another. However, country-by-country comparisons were not the purpose of the GDI. Rather, the strong reliability evidence the GDI provides, along with qualitative data from learners and educators in all three regions included in this study, seems to indicate that the GDI would be valid for re-use and comparison of individual scores against their own previous scores in any country.

Table 4.14 Correlation of Learner Groups with Scores

Characteristic		Connecting	Understanding	Ministering	Equipping
Year of Birth (n=566)	r	.022	.054	.001	-.024
	p	.599	.198	.983	.569
Grade (n=561)	r	-.030	-.045	-.012	.054
	p	.480	.286	.778	.205
Gender (n=577)	r	-.108**	-.090*	-.137**	-.062
	p	.009	.031	.001	.134
Country (n=585)	r	-.148**	-.128**	-.223**	-.179**
	p	.000	.002	.000	.000
Church (n=559)	r	-.288**	-.271**	-.369**	-.207**
	p	.000	.000	.000	.000
Christian (n=558)	r	-.504**	-.447**	-.468**	-.371**
	p	.000	.000	.000	.000

*Pearson correlation (r) is significant at the p<0.05 level (2-tailed)

**Pearson correlation (r) is significant at the p<0.01 level (2-tailed)

No correlation of any significance was found between learner age (using the date of birth entered) or grade (or year) in school, and their scores on the four GD processes (cf. Table 4.14). This finding suggests that the GDI is equally appropriate across the adolescent years, supported by literature documenting the rich diversity of spiritual development previously thought limited by stages of human (predominantly cognitive) development (for example Coles, 1990).

Considering the triangulated qualitative data and quantitative data from correlations and structural equation modelling, it seems that the GDI is appropriate for the full range of Grades 7-12, across both genders (see discussion in Section 4.4.4), and is likely useful cross-nationally based on qualitative data, pending further study to clarify quantitative findings.

4.5.2 VALUE IMPLICATIONS

Evaluating the validity of a test or assessment, according to Messick (1989), extends beyond demonstrating construct validity, relevance to applied purposes and utility within intended settings (cf. Table 3.4). Preceding sections in this chapter have focused on the evidential basis for validation. The consequential basis for validity further addresses value implications and over time, the social consequences of constructed assessments or tests. This last section of Chapter 4 examines evidence regarding the value implications and social consequences of using the GDI as a curriculum-aligned self-assessment of adolescents participating in Christian education.

4.5.2.1 Learner Perceptions

To what extent did learner responses indicate that the GDI served as a formative assessment of Christian spiritual development? After completing the GDI, and reviewing their individual online report, learners completed the ten-item GDI exit survey gathering data about their perceptions of the relevance and utility of the GDI. Two questions invited reflective answers:

- *What did you learn about yourself by completing the Growing Disciples Inventory?* was asked to gauge whether the reports had any practical use to a young adolescent at all (cf. Table 4.15).

- *How might this experience help you grow spiritually?* intentionally prompted reflection about the potential relevance to ongoing Christian spiritual development (cf. Table 4.16).

Answers to both items were reviewed to discover emerging themes. Sorted by these themes, patterns noted are reported quantitatively with exemplar quote excerpts adding to the evidential basis for construct validity (cf. 4.4.2). The qualitative comments also provide preliminary consequential evidence for the value implications of test interpretation (Messick, 1994).

Table 4.15 What Students Learned about Themselves through GDI Completion

Emerging Themes (*n*=453)	Frequency	Percent	Totals
negative attitude	11	2.43%	
don't know	13	2.87%	
not much or nothing new	76	16.78%	22.08%
general positive observations	103	22.74%	
self-awareness: spiritual identity/strengths	94	20.75%	
self-awareness: spiritual weak/growth areas	175	38.63%	82.12%

Of the 453 who commented on learning through this assessment exercise, one fifth were neutral (2.87%) or expressed a negative attitude (2.43%), or responded "not much" or "nothing new" (16.78%). Four fifths (82.12%) of comments were positive, and appeared to be organized in three themes (cf. Table 4.15):

1. *One hundred and three (22.74%) comments were general observations.* Even though none of these addressed the question directly, each provided insights into adolescent first impressions of this formative self-assessment. A few did not fit in other categories, although they showed insights into learning some concept rather than self-awareness. For example, an 11th grader wrote that the GDI helped him learn "by introducing different ways to minister". Rather than learning something about himself, his response noted increased awareness of Christian living through serving and ministering to others. Several noted confirmation of what they already knew, as this 10th grade non-Adventist Christian wrote, "All I learned was that which I already knew, but it was good to reinforce the facts."

2. *Ninety-four (20.75%) expressed learning that increased awareness of spiritual identity and strengths shown in their report.* The following are examples of this category, with the quality of comments spanning the age range:

- "I learned that I'm still growing in my spiritual journey", an 8th grader wrote.
- A 12th-grade male noted, "I learned that I know more about the nature of God than about growing spiritually."
- An 8th grader said, "It confirmed that I am strong in knowledge, building (others up), and leading. A special thanks to the maker of this survey. It has built me up spiritually."
- "I learned to look deeper into what I am strong in or not. Not just looking broadly," reflected an 11th-grade young woman.
- "I learned more about myself and where I am in life with Christ Jesus… I think this survey was a good spiritual thing for me and my life," wrote a 7th-grade female.

3. *One hundred and seventy-five (38.63%) commented on increased awareness of spiritual growth points identified by their report.*

- A 7th grade male reflected, "I know that I do understand most Bible truths like why Jesus had to die, but … this survey pointed me right to my weaknesses and it helps me to exactly know what needs improvement, such as *Ministering, Equipping*, and *Connecting*."
- "I learned that I need to spend more time with God and get to know Him better. I also need to show Him more in my daily life," stated a 9th grade female.
- A 10th grader observed, "I learned a few ways I can improve my spiritual walk. It was really useful. I sent it to my email, so I'll be able to review it whenever I want."

Of the 440 who responded to question nine on how this experience might have helped them grow spiritually, 22.73% were negative or neutral responses, as shown in Table 4.16. Of these 100 comments, 10 (2.27%) reflected a negative attitude; 14 (3.18%) were unclear fragments, hardly a response at all; 38 (8.64%) typed some form of "I don't know", and another 38 responded with variations of "I don't think it will help me", "probably not", or "it won't". Thus less than one fifth indicated this self-assessment was meaningless to them.

Table 4.16 How Completing the GDI May Help Learners Grow Spiritually

Emerging Themes (*n*=440)	Frequency	Percent	Totals
negative attitude	10	2.27%	
I don't think it will help me, probably not, it won't	38	8.64%	
don't know	38	8.64%	
unclear comments	14	3.18%	22.73%
general positive spiritual growth observations	32	7.27%	
experience gives direction	35	7.95%	
increase of self-awareness of spiritual identity	44	10.00%	
specific growth areas & strengths identified	52	11.82%	
challenges, inspires, facilitates change	177	40.23%	77.27%

The ninth question in the GDI exit survey probed for direction resulting from formative assessment. Many responses expanded on the ideas shared in answer to question 8, focusing on what was learned. Five themes emerged by which the 77% positive responses were classified, with nearly equal numbers of male and female learners responding, as noted in Table 4.16:

- *Thirty-two (7.27%) were positive growth observations, some more general identity- than spiritually- oriented.*
    - An 8th grader said, "It gives me some tips on how to grow closer to God."
    - "It helps you get a better understanding of yourself so you know what to do."
    - "By applying what I learned to my life", is an example of a common generality.
- *Thirty-five (7.95%) described the experience as giving new spiritual direction to their life.*
    - A 10th grader reflected, "It made me think of my relationship with God in a new way, and showed me more about the things that He has done for me."
    - Another 10th grader stated, "Now I know what I need to work on with God's help…"
- *Forty-four (10%) felt that completing the GDI had increased their awareness of their spiritual identity in some way.*
    - A 7th grader said, "It showed me where I am in my spiritual life."

- "I can see where I am right now in my walk with God," a 12th grader reflected.

- *Fifty-two (11.82%) felt this experience had helped them discover strengths and growth points.*

  - A 12th grader wrote, "It will help me to think about specific areas in my life that I can improve on."

  - "I can see aspects where I could improve and [it] helps me see areas where I can further help others," an 11th grader noted.

  - A 10th grader mused, "It will help me because I can focus on certain aspects of my spiritual growth specifically, instead of trying to be an all around better person".

- *One hundred and seventy-seven (40.23%) comments identified this experience as challenging or inspiring them to grow spiritually, facilitating change in general or specifically named areas, prompted by their individual reports.*

  - A 12th grader answered, "Seeing the results in front of your face makes it harder to ignore them."

  - "It helped me to want to change my life for God", a younger male shared.

  - "It helped me not to be so down on myself because I am growing I just need to keep a constant positive attitude."

Think-aloud protocols during piloting captured more data that triangulates with the fuller sample findings discussed in this section. Two-thirds of pilot participants spontaneously shared insights gained as they reflected on their reports or asked questions indicating curiosity peaked through increased self-awareness. One Pilot B male returned to clarify his circle graph report, clearly processing newly discovered aspects to his spiritual identity, as this response to the GDI exit survey question, "How might this experience help you grow spiritually?" illustrates: "Taking this survey kind of let me know where I stand. It has shown me where I can become better." Another Pilot A 16-year-old male, noting the scale for Section 4 items after completing several, reflected, "Four years ago, I would have been checking 'no one' for all of these. I was suicidal you know…. checking these [supported by parents, friends, teachers, church members, or others…] reminds me how much I've changed with all these people to support me."

Quantitative and qualitative learner responses, educator interviews and pilot testing provide four data sources, all of which contributed evidence for the relevance, utility and value implications of the GDI's online format, content, and instantly generated graphical reports.   The depth of learner responses suggests that adolescents felt free to confidentially participate in this experiential learning tool which helped them answer the core developmental question of adolescence: "Who am I?".   Their interest was piqued through visually presenting a holistic overview of Christian spiritual development personalized with their GDI scores. With no numerical values and no requirement to submit this assessment for grading, the social consequences for the learner were low. The formative assessment value is clearly evident in the findings through cycles of development and validation to date.

4.5.2.2 Educator Perceptions

To what extent did educators perceive the GDI as a valuable assessment too for Christian education? Data regarding utility or ease of use was gained through frequent first impression comments (reported in 4.3.2), and positive feedback to several interview questions. Educators who took the GDI themselves, or met with the researcher (online or in person for demonstration/orientation) before administering it to their learners, were the most positive about the value of this assessment tool.

One aspect of the social consequences of using the GDI as an assessment tool in classes with increasingly diverse religious and cultural heritages was explored through a question in the educator exit interview. When asked how often they would use the GDI if it were freely available to all schools, educators indicated most likely once or twice a year. Of the six responses, three felt it would be a useful tool in a "Bible class on discipleship" whenever that was taught, and three would like to use the GDI at the beginning and end of each year. Respecting non-Christian learners who attend Adventist Christian schools, educators were asked whether they assigned the GDI as a class activity or allowed learners to opt out. Educators felt that the GDI format, setting up privacy and not requiring responses be shared for any grade purpose, respected individual learners while providing each with a self-assessment experience to facilitate intentional spiritual reflection and personal Christian spiritual development.   In one class of 19 Australian learners, only 9 were from Christian homes, but all were invited to 'give it a good go', and select "I don't understand" for any items that made no sense to them. A South African seventh-grade

educator noted some were unsure about how to answer items about uniquely Adventist beliefs, but "everyone participated freely". In 1,339 open-ended responses to GDI exit survey items 8, 9 and 10, only one tenth grader included a reflection about how not being an Adventist Christian affected his report: "Apparently I know many Bible facts, but I don't know how to use them. I wonder if I got negative points for not being an Adventist?" Five (of seven) educator responses indicated that all their learners were very comfortable participating with their privacy respected, so no accommodations were needed. Only five (5% of 100) items reflect uniquely Adventist beliefs, with the focus on formative assessment of holistic Christian spiritual development, not a test of factual biblical knowledge or specific denominational beliefs.

Probing for possible value implications of using the GDI, educators were asked about adding anonymous class reports. Creating a summary of learner results by class or entire school could be easily done online with the same dataset. This future development was rated "of significant value" by four of six responding educators. One observed that in their school such summary information was gained qualitatively through a weekly discussion time in which learners questions, anonymously submitted, were answered. Another felt that while such reports would be valuable in conveying trends, "there is nothing like spending time with individuals to really find out where they are at". Reports generated for educators could be valuable as a complementary source of information for planning teaching for Christian spiritual development.

Commenting on the GDI's utility and value, one principal-teacher's reflection is representative of the small sample of educators interviewed: "*I think it's a very good tool to track spiritual growth and maturity in young people…..and older people*".

4.6 SUMMARY

This chapter reported on data gathered via email, phone, online, and in person, from educators and learners on four continents. Responses from expert reviewers (cf. 4.1.1.1), pilot participants (cf. 4.1.1.2), and a full sample of learners (cf. 4.1.1.3) and their educators (cf. 4.1.1.4) were analyzed during the development and/or validation phases of this study. Documentation of iterative cycles of exploratory and confirmatory mixed methods research provided procedural information of value to further educational design research curriculum

studies. Triangulating quantitative and qualitative empirical data enabled multiple studies of the reliability (cf. 4.4.1) and validity (cf. 4.2, 4.3, 4.4 and 4.5) of the GDI as a curriculum-aligned self-assessment of Christian spiritual development for adolescents participating in Christian education.

Findings were shared as they related to each of the four research questions (cf. 1.4.1 and 3.2.2). In the development phase, experts in the fields of curriculum, assessment, Christian education and/or discipleship evaluated the extent to which proposed items were aligned to the Growing Disciples curriculum framework, and were appropriate to adolescent learners participating in Christian education (cf. 4.2). At least four items were included for each of 21 scales or specific constructs, four, five or six for each of the four Growing Disciples curriculum processes or factors (cf. Table 2.1). The final 100-item GDI was refined through two further development cycles of pilot or usability testing with adolescents (cf. 4.3). Using a think-aloud protocol, a proportional quota convenience sample of 16 learners completed the GDI online, reviewed their instantly-generated, secure, online, individual reports, and did the 10-item exit survey. Minor refinements to online format, item stems and response sets were made with the data from these 45-minute individual interviews (as shown in Appendix A, G, H & I).

During the second phase, evidence for the validity of the GDI was evaluated with data collected from a purposive sample of nine educators and 606 Grade 7 through 12 students in eight American, South African, and Australian schools (cf. 4.1.1.3, 4.1.1.4, 4.3 and 4.5.2). High reliability was found for all four factors in terms of internal consistency (Cronbach's alphas of .855 to .943) and structural equation modelling (standardized correlation coefficients of .59 to .95) for the four cyclical and lifelong Christian spiritual development processes of *Connecting, Understanding, Ministering*, and *Equipping* (cf. 4.4.1). Confirmatory factor analysis through structural equation modelling provided evidence of construct validity with an adequate model fit (cf. 4.4.2). Findings similar to other comparable studies of adolescent spirituality provide evidence of convergent validity (cf. 4.4.3). Moderate inter-factor correlations compared to higher correlations within factors provided initial evidence of discriminant validity (cf. 4.4.4). Learner agreement scale responses to seven GDI exit survey items further supported the GDI's design and ease-of-use online (cf. 4.3). Answers to three open-ended GDI exit survey questions supplied rich qualitative data that corroborated quantitative responses, and added perceptions of the

utility and relevance of the GDI as a formative self-assessment tool to facilitate exploration of Christian spiritual development strengths and growth points through reflection and metacognition (cf. 4.5.2.1). The majority of educator exit interview responses indicated favourable perceptions of the GDI's utility, relevance, and generalizability within their sphere of the global Seventh-day Adventist education system (cf. 4.5.2.2).

Structural equation model fit evaluation and correlation analysis provide evidence that the GDI is a consistent self-assessment across gender and grade level (cf. 4.5.1 and Table 4.13). Although a weak but significant correlation between country and learner scores was found (cf. Table 4.14), qualitative data supports the relevance of the GDI in each country (discussed in 4.5.1). Further validation testing is recommended with larger samples as subsamples from South Africa and Australia were too small to adequately demonstrate generalizability through analysis of structural equation model fit indexes. Analysis of emerging themes in the validation sample learner responses corroborated quantitative findings, triangulating evidence for learner engagement and the positive potential for the GDI's use to facilitate Christian spiritual development. Each study of reliability and validity undertaken in this mixed methods curriculum study added moderate to strong evidence in support of the validity of the *Growing Disciples Inventory* as a curriculum-aligned self-assessment for adolescents participating in Christian education.

5   CHAPTER 5
RESEARCH DISCUSSION AND RECOMMENDATIONS

5.1   INTRODUCTION

The discussion of this study's results is framed by a review of its purpose (5.2, cf. 1.4), the four research questions (5.3, cf. 1.4.1 and 3.2.2), the research design and methodology (5.3, cf. 3.3), and a summary of findings presented in Chapter 4. The scope and sequence of the study is evident in the summary (5.4) which is organized around the four research questions that guided iterative cycles of data collection and analysis. These develop-test-refine cycles operated through both development and validation phases of this mixed methods educational design research focusing on curriculum-aligned self-assessment in the field of Christian education during the adolescent years.

Reflecting on findings presented in Chapter 4 and summarized in Section 5.3.1, as they relate to the theoretical and conceptual framework created through Chapters 2 and 3, recommendations for implementation of findings are made (cf. 5.6). Observations about possible limitations and lacunae are included with suggestions for further research to address issues that could be improved or changed, and new directions based on questions this study raised (cf. 5.7).

In the conclusion, the three outputs characteristic of educational design research (discussed in Section 3.2.1.1) are revisited, culminating this dissertation with a reflective review of:

1. the principles of design and development research learned (cf. 5.8.1);
2. the professional development aspect of this study (cf. 5.8.2); and
3. the value of the *Growing Disciples Inventory* (GDI) as the curriculum product developed (cf. 5.8.3)

5.2 PURPOSE OF STUDY

The purpose of this curriculum study (as defined in Section 1.3) was to develop a self-assessment of Christian spiritual development (in Phase 1), and to conduct preliminary validation studies (in Phase 2) with adolescents participating in Christian education in private Protestant Christian school settings. The goal was to build a formative assessment tool that was criterion- rather than norm-referenced, simple enough for Grade 7 learners to complete with ease yet complex enough to produce meaningful and useful reports for Grade 12 learners. Technology was used to construct a concise, learner-oriented, instantly-available online report that increased spiritual identity awareness and prompted self-directed lifelong Christian spiritual growth rather than fostering score-driven competition. Although numerous assessments, inventories, and profiles measuring aspects of religiosity and spirituality are available, most are norm-referenced, validated for adults, and focused on summative evaluation rather than formative assessment (cf. 2.3.3). No curriculum-aligned self-assessment of holistic Christian spiritual development geared to adolescents was discovered. Thus this empirical study addressed a lacuna in curriculum and assessment for Christian schools.

5.3 METHODOLOGY

The purpose of the study framed the four research questions that spanned both the development and validation phases. To answer research questions, mixed research methods were used, as summarized relating to each research question below.

Phase 1: Design & Development Research Questions
1. *To what extent is the GDI aligned to the GD curriculum framework?* This question was foundational to the design and development of a reliable and valid assessment. General expert review comments provided evidence of face validity. Two cycles of expert review, including (a) an agreement scale to determine fit of items within each of the GD curriculum commitments, and (b) qualitative feedback about wording or new items core to the curricular component being measured, provided evidence of content (or curricular) validity. During this development-review-refine process, 169 initial items were pared down to the final 100 GDI items,

some of which were reworked with up to seven cycles of expert input (cf. Table 2.1, Section 4.2 and Appendixes A, H & I).

2. *To what extent is the GDI design appropriate as an adolescent self-assessment?* Beyond the alignment of content, the structure of the developed assessment and the functionality of technology used were crucial to the relevance and utility of both the assessment and the online reports. Audio recordings and researcher notes provided data from two cycles of usability testing or piloting using a think-aloud protocol. The qualitative and quantitative data gained through usability testing was used to improve technical structure, item structure, and reporting formats in the development phase (cf. Tables 4.6 and 4.7; and Section 4.3).

Phase 2: Validation Research Questions

3. *To what extent is the GDI a reliable and valid self-assessment of adolescent Christian spiritual growth as outlined in the GD curriculum framework?* Grounded in theory and cycles of development phase research, quantitative data collected from a larger sample provided evidence to evaluate the reliability and construct validity of the GDI. Two studies of reliability were conducted. First, internal consistency analysis of alpha scores (cf. Table 4.8) as a measure of correlations within each of the GDI's 25 factors or constructs (21 commitments and 4 processes) was conducted using SPSS 18 software. Confirmatory factor analysis, using structural equation modelling aided by Amos 18 software, provided further reliability evidence through correlation coefficients (cf. 4.4.1) as part of a full-model review of the GDI's fit to the pre-defined GD curriculum framework. In addition to content/curricular and discriminant validity evaluated in other sections (cf. 4.2, 4.4.4), the structural equation modelling measurement model was used to evaluate the broader construct validity (cf. 4.4.2).

4. *To what extent is the GDI appropriate for international use in Christian education?* This question studied the transferability of the GDI (cf. 4.5.1) and the value implications perceived by learners and educators, as an initial estimate of the consequential basis for GDI use (cf. 4.5.2). The structural equation model derived for the full sample was tested for three sub-groups (gender, country, grade) to examine the extent to which the model was stable over demographic differences. Correlations between background information fields (gender, grade, country, school) and learner scores in the four GDI processes were analyzed for further

evidence in support of the generalizability of the GDI within the context of private evangelical Protestant Christian schools. Qualitative data from the full sample of learners and their educators was reviewed to consider the value implications of GDI use.

5.4 SUMMARY OF FINDINGS

A review of the main findings presented in Chapter 4 sets the stage for discussion of results and recommendations for implementation and future research. Using the four research questions as the guiding structure for reporting results through the cycles of educational design research in the development and validation phases, the four subsections below highlight key findings regarding GDI alignment (5.4.1.1), relevance (5.4.1.2), reliability and construct validity (5.4.1.3), generalizability and value implications (5.4.1.4). All four questions evaluate aspects of the extent to which the GDI can be considered a valid curriculum-aligned self-assessment of Christian spiritual development, fitting to use with adolescents participating in Christian education.

5.4.1 GDI ALIGNMENT

The first research question examined content or curricular validity (see Table 3.2 and Section 4.2). A review of existing assessments of spirituality, religiosity and Christian spiritual development (cf. 1.2, 2.3.3); curriculum assessment, models of instructional design (cf. 2.2.3), adolescent development (cf. 2.4), and Christian spirituality (cf. 2.4.2 to 2.4.5) guided the construction of 166 proposed GDI items. In the first cycle of expert reviews, data from five experts in discipleship, curriculum, and religious and spiritual education of adolescents from a Christian worldview, pared the item pool down to 139 improved items. Fifteen reviews in the second cycle included a wealth of comments, questions and suggestions, which were analyzed in the process of selecting and forming the 100 final items (cf. discussion in 4.2). Twelve of these fifteen experts completed an agreement scale. Responses indicated strong agreement that 87.8% of the items were clearly aligned with the GD curriculum framework as presented (cf. Appendix H & I). Items within this approved group, as well as those with lower ratings, were considered for inclusion in the final GDI (cf. Appendix A), balancing the qualitative comments with the

quantitative ratings, as well as professional judgment on the part of the researcher based on literature reviewed (Chapter 2).

5.4.2 GDI RELEVANCE

The second research question focused on the utility of the GDI (cf. Table 3.2). Learner and educator perceptions of relevance and utility were reported (cf. Section 4.3 and Table 4.5) through GD exit survey items relating to the design. Nine adolescents attending Adventist schools in the first cycle and seven home schooled Adventist adolescents participated in the second cycle of usability testing. These learners a) completed the 100 GDI items and nine background items, b) reviewed their online report, and c) filled in the ten GDI exit survey items. In individual interviews, each learner was asked to think aloud, sharing any questions or comments that entered their head as they proceeded through each of the three sections designed for full sample testing of the GDI. Minor wording adjustments were made to GDI instructions, item stems and item response sets using the data from 145 comments, questions, or suggestions. Pilot participants completed the GDI in 15 to 32 minutes, with variations related to reading proficiency rather than age or grade level. Observing mouse movements and clicks along with GDI exit survey results provided further evidence regarding the format and appropriateness of both the GDI and individual reports online.

Learners who completed the GDI exit survey during the validation phase (N=527) evaluated the GDI they had just completed, and their individual report viewed online (cf. Table 4.7). Three hundred and forty-four learners (91.2% of 377 answering this item) agreed that the GDI items were "easy to answer", but 51.9% (200 of 385) felt the GDI was too long. Reports scored as "not hard to understand" (70.7% of 392), confirming "what I already knew about my spiritual growth" (64.7% of 416), helpful in understanding self in a new way (65.1% of 392), a fair picture of their current Christian spiritual development (67.5% of 399), and an accurate report of perceived spiritual strengths and growth points (77.5% of 409).

Qualitative responses to the last three open-ended GDI exit survey items corroborated spontaneous verbal comments and responses to occasional researcher questions. All this data indicated that engaging in this formative self-assessment (a) prompted reflection on

spiritual identity, (b) increased understanding of Christian spiritual development components (as outlined by the GD model), and (c) heightened self-awareness of strengths and potential growth areas. No significant relationships were identified between the depth of insights shared in open-ended responses and self-reported age, grade level, country, and Christian denominational affiliation. No requirements were made of prior learning, suggesting that the GDI is a flexible self-assessment tool, of value to any level of adolescent Christian education. Ease of use and relevance to Christian schools was further affirmed through positive educator exit interview responses.

5.4.3 GDI VALIDITY

Although all four research questions investigated the extent to which evidence supported the reliability and validity of the GDI, the third question focused on psychometric analysis of reliability (cf. 4.4.1), construct validity (cf. 4.4.2), convergent (cf. 4.4.3) and discriminant validity (see Section 4.4.4 and Table 3.2).

High internal consistency, as evidence for reliability or trustworthiness, was indicated by coefficient alphas ranging from .857 (*Connecting*) to .943 (*Equipping*) for the four GD processes (latent variables), and moderate to high alphas for each of the 21 commitments (observed variables), ranging from .53 to .814 for the trimmed version of the GDI (cf. Table 4.8). These findings corroborate correlation coefficients determined through confirmatory factor analysis using structural equation modelling (see Section 4.4 and Table 4.10). With an RMSEA of 0.88 ($X^2_{(183,\ N=595)}$=1031.83, p=.000) and CFI of .911, the best fit for the GD model using the GDI 595-response data set was below an adequate model fit limit of RMSEA=.08. Appendix B notes the 9 items deleted and items from U1 (i.e. the GD curriculum Understanding process' first commitment) moved to observed variables C1 and M1 based on correlation coefficients, factor analysis, and supporting theory. An adequate fit was achieved for this trimmed model with an RMSEA of .067 ($X^2_{(164,\ N=595)}$=606.032, p=.000), and CFI of .952. Evidence from reliability studies using internal consistency and structural equation modelling methods confirmed the structure of the GD curriculum or model to which the GDI is aligned. Although the trimmed GD model better supports the construct validity based on the data available through this study, further analysis of the GD model to improve model fit is recommended (cf. 4.4.2 and 5.5).

Similar frequencies and distributions for GDI results comparable with selected findings from international Valuegenesis studies of Adventist adolescents (Gillespie, et al., 2003; *ValueGenesis: Study 1 core report*, 1993), and the (USA) *National Study of Youth and Religion* (http://www.youthandreligion.org/) provided one source of evidence for convergent validity. Moderate to high intercorrelations between observed variables within latent variables (cf. Table 4.9) added further evidence for convergent validity for the GDI.

Evidence for discriminant validity was gained through analysis of correlations (cf. Table 4.9). Correlations between variables *within* factors were higher than correlations between variables across factors, but for a few higher correlations between *Connecting* and *Ministering* variables, which were supported by the underlying theoretical framework. Further, the weak but significant correlation between gender and learner scores on the four GD processes as shown in Table 4.14 and supported by literature, further supports the GDI's ability to discriminate between groups that are known to differ in some way.

Each study of reliability, construct validity, convergent validity, and discriminant validity (cf. 4.4) provided clear evidence in favour of the GDI's robust construction through multiple iterative cycles of design and development. These findings, together with curricular and content validity results (cf. 4.2), provide the evidential basis for validity, as outlined by Messick (1989). They are foundational to determining the consequential basis for validity, which focuses on user perceptions of the value and social implications of assessment use (cf. Table 3.4, Section 3.3.3 and 4.5.2).

5.4.4 GDI VALUE IMPLICATIONS

The fourth research question focused on the consequential basis of GDI use. The extent to which the GDI was relevant internationally was examined. Value implications were considered, analysing qualitative data triangulated with quantitative data.

Confirmatory factor analysis of subsamples indicated that the GDI is appropriate across the span of Grades 7-12 and both genders. It is also potentially generalizable across English-speaking world regions (cf. 4.5.1), given further study with a larger international sample of Adventist schools globally, and potentially other evangelical Protestant Christian schools. Small subsamples (less than 200 learners) of South African and Australian

learners may explain the inadequate structural equation model fit for the international subsample (cf. Table 4.10). Weak to moderately significant correlations of country and learner scores (cf. Table 4.14) seems to indicate that a difference does exist between learner outcomes using the GDI, which would matter if comparing results as in norm-referenced studies. However, results would be consistent for an individual in any country comparing their own score over repeated assessments (for example if taking the GDI at the beginning and end of a school year) due to strong reliability evidence in favour of this criterion-referenced assessment. By contrast, qualitative data from educator interviews and learner GDI exit survey responses provided strong support for the relevance and utility of the GDI in each country. Thus it seems that while differences exist in score levels between country samples, the value implications are positive for individual use in any country. Further research with larger national samples is recommended to clarify the extent to which the GDI is transferable or valid cross-nationally.

Educator and learner qualitative data were evaluated regarding the value implications of using the GDI as a self-assessment of Christian spiritual development in the global Adventist education system. The large number of learner responses to the GDI exit survey's three open-ended items were organized by emerging themes (see Tables 4.5, 4.15 4.16). Reflecting on what they'd learned, nearly two fifths of respondents (38.63% of 453) felt that completing the GDI and viewing their report had increased their awareness of specific areas for spiritual growth; one fifth (20.75%) shared increased awareness of spiritual identity or strengths; another fifth (22.74%) wrote general positive observations; and less than one fifth (16.78%) felt they had not learned much through this experience. Four out of five students reported learning more about their spiritual identity and Christian spiritual growth processes, confirming the potential for the GDI to serve as a formative self-assessment.

Most responses to GDI exit survey item 9 (asking how this experience might help them continue to grow spiritually) elaborated on answers regarding what they'd learned from the GDI reports. Two in five (40.23% of 440) participants indicated that the experience had challenged or inspired them to take specific action(s) as noted. More than three quarters (77.27%) of learners wrote positive responses regarding completing the GDI and reflecting on their report. They perceived the experience as facilitating change through increased self-awareness of spiritual identity or specific areas of Christian spiritual development. The

length and depth of comments from a variety of grade levels and schools indicated engagement with the topic, and metacognitive levels of learning and spiritual transformation. These responses provided initial evidence for the positive value implications of using the GDI as a self-assessment of Christian spiritual development.

Educator exit interviews probed for perceptions of GDI relevance, utility, value implications and social consequences, while recognizing their limited exposure through administering the GDI once for research purposes. Evidence for trustworthiness included positive votes for ease of use, appropriate length and content for adolescents. All responded that if this were freely available to their school, they would use it at some level (in a discipleship course, or once or twice a year with all classes). All eight educators interviewed felt their learners from different faith backgrounds were comfortable participating as the self-assessment was private and non-graded. They perceived the social consequences for using the GDI were appropriately respectful of individual choice while facilitating metacognitive reflection on Christian spiritual development.

Triangulated, findings from qualitative and quantitative data analysis support the use of the GDI as a self-assessment of Christian spiritual development in private Christian education settings with adolescent learners.

5.5 DISCUSSION OF RESULTS

Considering this study's findings (presented in Chapter 4 and summarized in Section 5.4) in light of literature reviewed (cf. Chapter 2) and the real-world context for which the product was designed (cf. 1.3), several aspects bear further discussion. Although results supported previous research where comparable (cf. 4.4.3), and confirmed informal hypotheses about current trends observed regarding adolescent Christian spiritual development, some findings raise questions for further analysis of this data and/or future research.

5.5.1 QUALITATIVE LEARNER RESPONSES CONFIRM AND EXTEND FINDINGS

Learner responses to open-ended GDI exit survey items were both more numerous and more insightful than anticipated, considering that participants had no prior exposure to the

GD model (cf. 2.5.2) as such, and no requirements for completing any particular Christian education curriculum. Learners were simply asked a) to answer the GDI items honestly, b) to review their personal report online, and c) to complete a short GDI exit survey for the purpose of research, using a secure and confidential internet login (cf. 3.3.2.5(ii)). Personal risk and gain were negligible. Of the 595 GDI responses included in the data analysis, 527 (88.6%) completed the GDI exit survey.

Besides filling in answers to the seven GDI exit survey agreement scale items, fully three quarters (73%-76%) answered the three open-ended items, even though this exit survey was optional. The majority of these learners wrote freely. They expressed curiosity about their own results. They were interested in discovering more about their spiritual identity. They questioned the meaning of their results. They reflected on new levels of awareness of spiritual strengths and areas for growth. And they suggested changes or pondered improvements to the GDI at a level of maturity beyond expectation. They seemed very comfortable with the online technology used, typing common abbreviations used in emails and chat rooms, apparently feeling open to sharing their thoughts in this mode of communication. Thus the mode of delivery (online) positively contributed to the level of reflection and engagement, prompting the use of metacognitive tools.

On all three open-ended GDI exit survey items, less than 20% of comments were unintelligible, expressed a negative attitude or were disengaged (I don't know, I don't care, etc.), far lower than anticipated with no preparation or expectations of performance (cf. Tables 4.15 and 4.16), and likely near the end of the time allowed for participation. This qualitative data proved more valuable than anticipated, as a source to triangulate with quantitative findings from both learners and educators, and with researcher observations during piloting.

The quality of the data analyzed in chapter 4 regarding several research questions, was enhanced by the quality and quantity of qualitative data. For example, qualitative data aided analysis of the weakly significant correlation between country and learner scores on the four GD processes, as discussed in Chapter 4, Section 4.5.1 (cf. Table 4.14). This finding seems to corroborate the inadequate structural equation model fit for the international subsample (cf. Table 4.13). However, the weakness of the correlation and inadequate structural equation model fit were likely inconclusive with the small

international participation in the validation phase. Examining the qualitative data revealed another perspective: both learner responses to the GDI exit survey and teacher interviews indicated positive perceptions of the relevance and utility of the GDI in all three regions. The value implication from this initial feedback was thus strongly positive, contradicting the weak negative correlation and inadequate structural equation model fit. Triangulating data thus suggests that further study with a larger sample is necessary to clarify *how appropriate* it is to use the GDI cross-nationally in the global Adventist education system.

Another example of the impact of the qualitative data on understanding quantitative findings was in the analysis of the negatively skewed data in the *Understanding* process items (most agreed or strongly agreed with statements of belief, see Figure 4.1). One explanation is that education traditionally focuses more on learning about religion, which includes an understanding of Christian beliefs, so responses could be expected to be consistently higher than the average score in the predominantly cognitive-based belief-centred *Understanding* process. Whether learners seriously read each item or just clicked the same response in a series is always open to question. However, considering the high percentage of open-ended item responses noting increased self-awareness and observations about beliefs, attitudes and behaviours, a high level of honest reflection in GDI completion was evident. The skewed data was thus deemed to be appropriately positive responses for a sample where 91.2% of learners self-reported having (a) made a personal commitment to Christ (74.2%), or (b) were thinking about it (17%); and were attending schools where the Christian faith was an integral part of teaching and learning experiences. As several educators reported, their learners took the online GDI seriously and set to work with few questions (see quotes in 4.3 and 4.5.2).

Reflecting on the quality and quantity of the learner qualitative responses to the GDI exit survey prompted further observations at a broader level than any one research question, albeit pertinent to the central question of the relevance of the GDI as a curriculum assessment tool for the population and context.

- The level of learner engagement in the GDI exit survey's open-ended items seems to support the value of self-assessment (as discussed in Section 2.3.1) in education which aims to facilitate transformative lifelong Christian spiritual development (cf. 2.4.5 and 2.5.1) in schools, as well as (pending further study) other settings.

- Cross-examination of qualitative comments by age and grade indicated little observable difference in the depth and breadth of responses. This suggests that a developmental systems approach (as discussed in Section 2.4.1.3) to understanding adolescent development would be recommendable for educators seeking to best facilitate self-directed learning based on formative assessments such as the GDI.

5.5.2   DIFFERENT RESPONSE SETS MAY IMPACT RESPONSES

Reflecting on the finding that learners scored higher on items regarding attitudes and beliefs than on items assessing actions and behaviour (see Figure 4.1 and Appendix A and B), it seems worth considering that response set variations in the four sections of the GDI may impact scores:

- Most items assessing the *Understanding* constructs (U1-U5) used a 5-point agreement scale, ranging from *I don't believe this* (1) to I strongly believe this (5). Responses of *I believe this* (4) and *I strongly believe this* (5) are likely for most Christian learners, so means of between 4 and 5 are accurate. As teaching traditionally focuses on knowledge transmission, higher than average scores are reasonable when assessing knowledge and understanding.

- From a holistic perspective on Christian spiritual development, and human development in general, life involves knowing, being and doing. Thus the *Connecting* and *Ministering* processes were assessed with a mix of items addressing all three aspects: cognitive, affective and behavioural. Fifty-nine items used a 5-point agreement scale, ranging from 1 (*Never true for me*) to 5 (*Always true for me*). Items 83 through 87 used variations on a 4-point frequency scale, with items included in the *Connecting* process. In both these sections, means ranged from two to five with fair standard deviations for a 5-point scale.

- Reflecting the theoretical framework for the *Equipping* process, half the items assessed learner actions in helping others grow spiritually (equipping others), while the other half assessed how well the learner was being equipped or mentored in the processes of *Connecting, Understanding* and *Ministering*. Items assessing how learners were equipping others used the 5-point agreement scale (*Never true* to *Always true*). But for items 88-98 (cf. Appendix A), learners were to select ALL options that applied, with the score as the sum of checks, rather than the value

assigned to the one answer on the agreement or frequency scales in other sections. Learner understanding of the difference in response style was carefully checked during piloting, and several commented on these items in the GDI exit survey, as if suddenly aware of the network they had (or absence thereof). Thus items 88-98 were deemed appropriate for assessing the mentoring aspect of *Equipping*.

So, while confusion about the instructions was unlikely (supported by usability testing as reported in Section 4.3), and item stems were carefully crafted to match the response set deemed best to measure the indicator (supported by expert reviews as reported in Section 4.2 and Appendix I), is it possible that the difference in response mode had a negative impact on the *Equipping* scores? Further research using alternate item format, or larger numbers of diverse samples, may clarify this.

5.5.3 LIMITATIONS

The small learner samples in South Africa and Australia was one limitation to full validation of the GDI. Including only learners attending Adventist schools also limits direct transferability. Thus further research with an inter-denominational sample and alternate forms of the GDI would be needed to probe the validity for evangelical Christian schools. Analysis of the GDI's internal consistency (cf. 4.2) showed that removing five uniquely Adventist belief items decreased alpha scores insignificantly for the three constructs U2, U4 and U5 (cf. Table 4.8 and compare Appendix A and B). From this preliminary study, it appears that the GDI*s* construction could hold for a broader context, given interest, and alternate forms could be created using the GDI's (improved) items with the option to include a few items tailored to specific contexts (see discussion in Section 4.4.1).

The strength of educational design research is that it is situated in real-world settings (cf. 3.2). Interaction between the users (educators and learners in this study) and the researcher as partners in refining an intervention strategy, product or tool, increases the utility of results. The disadvantage of this design is its dependence on a complex array of real-world issues. For example, the number of schools that participated was far lower than hoped for (cf. 3.3.1). Although reasons were not given or requested, apparently academic scheduling pressures left little flexibility for including any additional options. However, it

was observed that where school leaders viewed the GDI as a tool of potential value, they inspired teachers to participate with their classes. Every teacher interviewed after administering the GDI to their students provided helpful quantitative and qualitative data that improved the product. Where regional leaders or school principals deferred a decision about participation to a deputy or teacher, participation did not materialize.

Despite fewer validation sample participants than planned for, delays in gaining Institutional Review Board approval due to online assessment of minors, and the complexities of working with schools spanning three continents, this study's findings paint a positive picture of a robust, well-constructed, self-assessment of Christian spiritual development for adolescents participating in Adventist education, rated as relevant and useful by real Christian educators in real Christian schools.

5.6 RECOMMENDATIONS FOR IMPLEMENTATION OF RESULTS

The GDI is intended to be used as a formative self-assessment tool to help learners participating in Christian spiritual development to better understand their spiritual strengths and areas to plan for growth. For example, through choice of classes, optional extra-curricular school, family, church or community activities or personal devotional experiences (cf. 1.3). With whole-person development as a core goal (cf. 2.5.1), Christian educators teach, model and mentor from a Christian perspective, but confession of faith is respected as a personal choice. The GDI could facilitate metacognitive learning (as discussed in 2.3.2) through reflection on holistic Christian spiritual development in the form of individual reports (cf. Figure 4.1). Based on the findings regarding its validity, the GDI can be confidently recommended as a tool that will foster formative self-assessment of adolescents participating in or nurtured through Christian education.

However, it should be noted that the GDI is neither intended as a standardized assessment of individual progress nor a Christian school evaluation. The primary focus is on individual formative assessment. But with the same data collected, it is possible to add anonymous, summative by-class or by-school reports of current learner perceptions of their Christian spiritual development. Such additional reports could be useful to school evaluation reports. Anonymous class reports could assist teachers in curriculum and

course planning; where aggregated school reports could assist extra-curricular service learning and religious activity planning.

Designed for adolescents and tested in formal Christian education settings, the GDI will be useful to Christian schools in the middle and high school years. Data from (a) expert reviews (cf. 3.3.2.4, 4.1.1.1, 4.2), (b) home schooled learners in one of the cycles of usability testing (cf. 3.3.1.2, 4.1.1.2, 4.3), (c) educator interviews (cf. 4.1.1.4, 4.5.2.2), and (d) subsequent (outside this study's parameters) reviews of the GDI by a seminary youth ministry class, all provide preliminary evidence that the GDI will also be useful for adolescents and adults in informal Christian education settings (church ministries and home schooling). Wording on a few items or instructions will be slightly adjusted to facilitate this flexibility, and further research is recommended to study the validity of the GDI with adults and with adolescents in settings other than Christian schools.

The GDI will be useful to educators for whom nurturing spiritual growth is their overarching goal. It will be most useful to those interested in Christian spiritual development as articulated in the Growing Disciples model (cf. 2.5.2), or who take the time to consider this model and how it compares to their frame of reference. An introductory teachers' guide that explains the GDI*'s* purpose, demonstrates its flexibility, ease of use, and alignment with goals for nurturing Christian spiritual development is planned to facilitate use, and will be available online (through http://growingfruitfuldisciples.com/).

To facilitate practical implementation, programming components are to be added (some of which are discussed in 5.7.3) to make the GDI freely available with secure individual login codes and additional reporting available for groups (by class, school or church). The planned guide will include instructions on how to obtain access codes, how to assist a group taking the GDI, and how to manage individual reports online. Supplementary ready-to-use teaching and learning tools, such as a personal spiritual growth plan, and suggestions on how to grow spiritually will increase the usefulness of the GDI without limiting the flexibility of this assessment product to work with different religion curricula in the context of holistic Christian education. Several examples were available during the study for educators who elected to use the learner experience in a class (see http://inventory.growingdisciples.info/youth/). Critique of these is beyond the scope of this

study, but feedback is already available to refine these additional components as part of the larger GD curriculum project (see http://growingfruitfuldisciples.com/).

5.7 RECOMMENDATIONS FOR FURTHER RESEARCH

Findings from the full learner sample and educator interviews in the validation phase indicate overall sound design (as reported in Chapter 4 and summarized in 5.4), with improvements recommendable to several items and response sets. The next step in the larger *Growing Fruitful Disciples* curriculum project would be a refining development cycle to validate the improvements noted through the validation phase of this study (see Appendix B and Section 4.4), and minor technical improvement to facilitate wider use as discussed hereafter.

5.7.1 BROADER VALIDATION RESEARCH

Construct validity (cf. 4.4.2) and results regarding the transferability of the GDI (cf. 4.5.1) were limited by the smaller than desired full learner subsamples from South Africa and Australia (cf. 5.5.3). Thus samples of at least 500 learners for each subgroup for which validity evidence is sought (cf. 3.3.1) are recommended in any further research.

Validating the GDI with a sample of adults would facilitate an exploratory study of the GDI*'s* utility for adults as well as adolescents. Several inquiries regarding the availability of the GDI for adult use indicate further research in this area would be useful, and preliminary findings as discussed in Section 5.6 suggest this to be relevant and feasible. Including adolescents from other settings (youth ministry and home schooling) in further studies is similarly recommended, supported by the evidence presented for convergent (cf. 4.4.3) and discriminant validity (cf. 4.4.4).

This study included a small sample of countries where English was used as a medium of instruction. Use within the global Adventist education system would need wider regional testing with the English version, as well as the development and validation of translated versions. Action or intervention research in countries where the majority of learners attending Christian schools are from non-Christian backgrounds is also recommended.

Such validation studies would begin with a re-examination of items for cultural appropriateness. The methodology for this study could inform such replications.

5.7.2 GROWING DISCIPLES CURRICULUM MODEL RESEARCH

The focus of this curriculum study was the development and validation of the GDI. Through the process of confirmatory and exploratory factor analysis using structural equation modelling (cf. 3.3.3.1 and 4.4), the need for refinements to the GD curriculum framework or model (cf. 2.5.2, Table 2.1) became evident. Thus further research regarding the validity of the GD model is also recommended, building on findings from this study (as discussed in Chapter 4 and summarized in Section 5.4), and Beagle's (2009) *Growing Disciples in Community* model-development research (cf. 2.5.2.2). For example, the following confirmatory factor analysis findings with separate structural equation models for each of the four GD processes reveal covariance between the observed variables connected to the reported error correlations. These findings (which appear to reflect on theoretical factors) were outside the scope of answering this study's four research questions, but are included here to assist further research of the GD model (cf. Table 5.1):

- A model of the *Connecting* process, as a single latent variable with five observed variables (C1-C5, cf. Table 4.8) each a mean structure of 3-5 indicators (cf. Appendix A), indicated good model fix indexes when error variances for C1 and C5 were correlated.

- A model of the *Understanding* process, as a single latent variable with four observed variables (in the trimmed GDI with U2-U5, cf. Table 4.8) each a mean structure of 4-8 indicators (cf. Appendix A), had good model fix indexes when error variances for U4 and U5 were correlated.

- A model of the *Ministering* process, as a single latent variable with five observed variables (M1-M5, cf. Table 4.8) each a mean structure of 4-5 indicators (cf. Appendix A), produced good model fix indexes (cf. Table 5.1) when error variances for M3 and M4, as well as M3 and M5 were correlated.

- A model of the *Equipping* process, as a single latent variable with six observed variables (E1-E6, cf. Table 4.8) each a mean structure of 3-5 indicators (cf. Appendix A), indicated good model fix indexes (cf. Table 5.1) when error variances for E5 and E6 were correlated.

The GD model defines *Connecting, Understanding, Ministering* and *Equipping* as interdependent processes of the cyclical lifelong learning that is Christian spiritual development (cf. 2.5.2). Thus the intercorrelations indicated by covariance between the error terms listed in Table 5.1, are plausible, and beg further investigation. However, this data analysis invites further investigation and clarification of the theoretical framework which may lead to updating indicators within correlated commitments (or observed variables in statistical terms) that could in turn inform future iterative cycles of educational design research in the context of the larger curriculum project this study is a part of (see http://growingfruitfuldisciples.com/).

Table 5.1 Structural Equation Model Fit Indexes for Models of the 4 GD Processes

Models (*N*=595)	X^2	DF	P	Error Cov.[a] (SE)	CFI[b]	RMSEA[c] CI (Lo 90, Hi 90)
Connecting	4.845	4	.304	C1:C5 (-.33)	.999	.019 (.000, .067)
Understanding	1.957	1	.162	U4:U5 (.27)	.999	.040 (.000, .125)
Ministering	7.896	3	.048	M3:M4 (.15)	.996	.052 (.004, .099)
				M3:M5 (-.14)		
Equipping	13.299	8	.102	E5:E6 (.29	.998	.033 (.000, .064)

Notes. A p>.05 indicates that the null hypothesis (that the model is correct) should be accepted;
[a]Standardized estimate (SE) of error covariances between the listed observed variables;
[b] CFI=comparative-fit-index;
[c]RMSEA=root-mean-square-error-of-approximation; CI=confidence interval for p<.05

Intervention research comparing the responses of groups with and without exposure to the GD curriculum framework would be valuable. Action research within one school using different classes for the test and control groups includes the potential to track the impact of increased self-awareness on spiritual direction over several school years with the same group of learners.

5.7.3 TECHNICAL IMPROVEMENTS

Several minor adjustments to the response sets could improve the quality of data for longitudinal analysis (i.e. comparative analysis of changes over multiple stored scores for individuals). These arise from data collected through usability testing, as well as occasional comments on the GDI exit survey, some of which were discussed in Section

4.3, as they related to the research questions. Other improvements were prompted by data analysis and subsequent reconsideration of alternative response options examined through literature review (cf. 2.3.3). The least-change wording update to response sets is shown in Appendix B. Reformatting the response sets for Sections 1 and 2, which both used a five-point adapted Likert agreement scale (cf. 3.3.2.1), would facilitate several improvements. Further cycles of development research are recommended to validate changes envisioned:

- Reduce the amount of reading by naming only the continuum ends (*always true* vs. *never true* for Section 1, and *strongly believe* vs. *do not believe* for Section 2).

- Increase the visual cues of a continuum between the two named opposite ends, with a horizontal line of response circles (rather than the current vertical format).

- As the response set will take fewer vertical lines on a web page, five items (instead of three) could be displayed per page, reducing the number of clicks from 34 to 19 (with the number of items reduced from 100 to 92), possibly adding the perception of being shorter, which learners recommended (cf. 4.3.2.1)

- For consistency, the response sets for Section 3 and 4 can be displayed in the same new horizontal format, while continuing to name each option.

- The greatest value to this improvement is the ability to separate two types of responses needed for each item. In the researched GDI (cf. Appendix A), the option "I don't understand" (as well as "does not apply" for several Section 3 items) was added below the five-point agreement scale in the vertical display. This option will continue, but can be displayed at the extreme right margin on the horizontal line, labelled, and visually separated from the scale. It is an important option for complete and respectful data collection, but separation from the response scale should clarify its function and thus increase accuracy of responses.

To enable repeated use of the GDI, the development and validation of a pool of equivalent items for several parallel versions is recommended. Forms of the GDI could be randomly generated by programming, but all items need initial validation research. Additional assessment management tools for teacher and individual learner use are needed, and will require usability testing in further iterative cycles of design and development research.

A strength and limitation of the GDI is that it requires use of a computer with internet access. Instant online reports make taking the GDI and viewing personal reports a single

learning experience of greater impact than if separated by days/weeks for report preparation. Learners who spend much time on the internet today find the online format appealing, and thus are more likely to be engaged individually if the instantly available reports then prompt them to learn more and take personal action. However, where schools do not have sufficient computers to allow full-class activity, the practicality of this self-assessment is greatly reduced. A shorter version for groups in settings away from computers (outdoor camps, church settings, etc.) would also be valuable. Further research to validate a paper version, already created, and to compare the results of a sample taking both the paper and the online version, is recommended.

5.8 CONCLUSION

Considering this study as one phase in a larger educational design research project, it may be concluded that this is not the end. "It is not even the beginning of the end. But it is, perhaps, the end of the beginning" (Churchill, 1942, http://www.quotationspage.com /quote/24921.html). In the discipline of curriculum studies, a full cycle of literature review, curriculum research, assessment design, development and validation has been completed.

The value of this study is evident through a reflective review of (a) the processes and principles of educational design research (in 5.8.1), (b) the professional development aspect of this study (in 5.8.2), and (c) the significance of the curriculum product developed (in 5.8.3), i.e. the *Growing Disciples Inventory*.

5.8.1 EDUCATIONAL DESIGN RESEARCH PRINCIPLES AND PROCESSES

The *Growing Disciples Inventory* is a product yet in process, a vision yet to be implemented. To the extent that the documentation of the process and the validation of the product are helpful to educators teaching from a Christian perspective, intentionally seeking to nurture lifelong Christian spiritual development, this research will have served its intended purpose.

Time invested in learning the principles of educational design research prior to commencing the development phase was well spent. Understanding the iterative nature

of cycles of design-develop-test-improve-retest spurred progress through numerous setbacks. A clearly outlined research design (Chapter 3) guided the selection of appropriate methods and processes. Working from the model of iterative cycles built in flexibility to adjust to changing sample parameters and educator availability (cf. 4.1.1), programming online for ethical considerations (cf. 3.3.1.4), and mastering statistical tools for best data analysis.

5.8.2 PROFESSIONAL DEVELOPMENT REFLECTIONS

Considering the pros and cons to assessment of Christian spiritual development (cf. 1.2, 2.3.3), this study attempted what some believed impossible and/or inadvisable – developing a validated online self-assessment, aligned to a broad enough curriculum to allow flexibility of teaching and learning in the diverse global Adventist school system, focusing on the adolescent learner.

Challenged by the absence of quality assessments of Christian spiritual development using current technology, personal experience in teaching developmental mathematics to high school and college students using online graphic reports for individual planning, prompted action. Years of mission service as a Christian educator grew the vision to create a formative assessment from a curriculum-as-process perspective (cf. 2.2.1), informed by curriculum research and practice regarding habits of mind (cf. 2.3.2), dimensions of learning (cf. 2.2.3.3), a systems approach to curriculum (cf. 2.3.2.2) aligned with the backward design process (cf. 2.2.3.1), and developmental systems theory of positive human development (cf. 2.4.1).

This three year dissertation research journey has sharpened skills in literature review, research design, and practical curriculum development research. Dealing with the inevitable setbacks in research in real-world settings using emerging technologies required stretching to new levels of proficiency in technology mastery, communication skills, and academic literature critique and writing.

5.8.3 CURRICULUM PRODUCT EVALUATION

In today's information-saturated high-tech world, a curriculum-as-content or curriculum-as-product approach (as discussed in Section 2.2) lends itself to producing learners who

can't see the forest for the trees, speaking idiomatically. Curriculum-as-praxis, as a form of curriculum-as-process, takes place where teacher and learner journey together (cf. 2.2.1). From this contextually-sensitive approach, the bigger picture underlying transformational learning is the focus, rather than the transmission of content. In an article discussing Christian growth in faith, curricularist Huebner (1986) described faith as "a clearing in the midst of our everydayness in which God is sought" (p. 515). From the Christian worldview of those for whom the GDI was designed, this self-assessment provides an opportunity to step out of the forest of everyday learning pressures and into the God-centred clearing where answers to the adolescent quest for identity can be reflected upon.

As pausing to take a compass reading facilitates re-orientation and decision-making for purposeful action, so the GDI has the potential to position a learner and his/her educator in a fruitful moment of spiritual discovery prompting action in a course set towards lifelong Christian spiritual development. The use of current technology minimizes educator preparation and maximizes benefit to learners who see their results instantly in a now-world (cf. 3.3.2.3).

In summary, this study's findings provide strong evidence for the reliability and validity of the GDI, with minor improvements to the structure of the GD model to which the GDI was aligned (cf. 4.4). A validation sample of 595 usable learner response sets (cf. 4.1.2) provided sufficient qualitative and quantitative data for initial investigation using structural equation modelling, but a larger and more diverse sample of the population is recommended for further research of improved and alternate versions of this formative self-assessment tool. Experimenting with an online format resulted in rich qualitative data supporting the purposes of this study and demonstrating the value and utility of online assessments that facilitate metacognition and self-directed learning in holistic Christian spiritual development (cf. 2.4.5). It can thus be concluded that this study contributed a validated and valuable curriculum-aligned self-assessment product relevant to Christian education of adolescents within the context of Adventist schools.

6   REFERENCE LIST

Adler, M. (1984). *The Paideia program: An educational syllabus*. New York: Macmillan.

AdvancEd. (2007). *Accreditation standards for quality schools*. Advancing Excellence in Education Worldwide. Retrieved from http://www.advanc-ed.org/accreditation/standards/advanced_school_standards.pdf

Adventist world education statistics: December 2009. (2010). *Journal of Adventist Education, 72*(5), 2. Retrieved from http://circle.adventist.org/files/jae/JAE_v72#5.pdf

Allen, H. C. (2005). Bringing the generations together: Support from learning theory. *Christian Education Journal, 2*(2), 319-333.

Allen, H. C. (2008). Exploring children's spirituality from a Christian perspective. In H. C. Allen (Ed.), *Nurturing children's spirituality*. Eugene, OR: Cascade.

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.

Amor, A. (2001, November). *The role of religious education in the pursuit of tolerance and non-discrimination.* Paper presented at the UN Commission on Human Rights International Consultative Conference on School Education in relation to Freedom of Religion and Belief, Tolerance and Non-discrimination, Madrid.

Amram, Y., & Dryer, C. (2008). *The development and preliminary validation of the Integrated Spiritual Intelligence Scale (ISIS)*. Paper presented at the 116th Annual Conference of the American Psychological Association, Boston, MA.

Analysis of rules implementing the Children's Online Privacy Protection Act (COPPA). (n.d.). Retrieved from http://www.cdt.org/privacy/cdtanalysisofftc.shtml

Anderson-Levitt, K. M. (2008). Globalization and curriculum. In F. M. Connelly, M. F. He & J. Phillion (Eds.), *The Sage handbook of curriculum and instruction* (pp. 349-368). Los Angeles: Sage.

Anderson, F. (1995). Adolescent development. In J. C. Wilhoit & J. M. Dettoni (Eds.), *Nurture that is Christian*. Wheaton, IL: Victor Books.

Anderson, L. W. (2002). Curricular alignment: A re-examination. *Theory into Practice, 41*(4), 255-260.

Anderson, L. W., & Bourke, S. F. (2000). *Assessing affective characteristics in the schools* (2nd ed.). London: Lawrence Erlbaum.

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

Andrade, H., & Valtcheva, A. (2009). Promoting learning and achievement through self-assessment. *Theory into Practice, 48*(1), 12-19.

Anthony, M. J. (2008). Children's ministry models, learning theory, and spiritual development. In H. C. Allen (Ed.), *Nurturing children's spirituality.* Eugene, OR: Cascade Books.

Anthony, M. J. (Ed.). (2006). *Perspectives on children's spiritual formation.* Nashville, TN: Broadman & Holman.

Apple, M. W. (2008). Curriculum planning: Content, form, and the politics of accountability. In F. M. Connelly, M. F. He & J. Phillion (Eds.), *The Sage handbook of curriculum and instruction.* Los Angeles: Sage.

Association of Christian Schools International. (2009). Student assessment catalog and order forms. Retrieved from http://www.purposefuldesign.com/LinkClick.aspx?fileticket=bYg9LxfN1Ss%3d&tabid=56&mid=1602&language=en-US

Astin, W. A., Banta, T. W., Cross, K. P., El-Khawas, E., Ewell, P. T., Hutchings, P. (1996). 9 principles of good practice for assessing student learning. *The American Association for Higher Education (AAHE).* Retrieved from http://ultibase.rmit.edu.au/Articles/june97/ameri1.htm

Astley, J. (2007). Crossing the divide? In M. Felderhoff, P. Thompson & D. Torevell (Eds.), *Inspiritng faith in schools: Studies in religious education.* Aldershot, England: Ashgate Publishing.

Astley, J., & Francis, L. J. (Eds.). (1992). *Christian perspectives on faith development.* Grand Rapids, MI: Eerdmans.

Babbie, E. R. (2001). *The practice of social research.* Belmont, CA: Wadsworth/Thomson Learning.

Babbie, E. R. (2008). *The basics of social research* (4th ed.). Belmont, CA: Thomson Higher Education.

Baker, D. P., & LeTendre, G. K. (2005). *National differences, global similarities: World culture and the future of mass schooling.* Stanford, CA: Stanford University Press.

Barab, S., & Squire, K. (2004). Design-based research: Putting a stake in the ground. *Journal of the Learning Sciences, 13*(1), 1-14. doi: 10.1207/s15327809jls1301_1

Barber, B. K. (2005). Positive interpersonal and intrapersonal functioning: An assessment of measures among adolescents. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development.* New York: Springer.

Barna, G. (2001). *Growing true disciples: New strategies for producing genuine followers of Christ.* Colorado Springs, CO: WaterBrook.

Barton, P. E. (2010). National education standards: To be or not to be? *Educational Leadership, 67*(7), 22-29.

Bastide, D. (2007). *Teaching religious education 4-11* (2nd ed.). London: Routledge.

Beagles, K. (2009). *The validity of the Growing Disciples in Community model among adolescents in Seventh-day Adventist schools in North America* (Doctoral dissertation, Andrews University). Available from ProQuest Digital Dissertations database.

Beile, P. M. (2005). *Development and validation of the Information Literacy Assessment Scale for Education (ILAS-ED).* Paper presented at the AERA Annual Conference, Montreal.

Bell, P. (2004). On the theoretical breadth of design-based research in education. *Educational Psychologist, 39*(4), 243-253. doi: 10.1207/s15326985ep3904_6

Benson, P. L. (2004). Emerging themes in research on adolescent spiritual and religious development. *Applied Developmental Science, 8*(1), 47-50.

Benson, P. L., & Donahue, M. J. (1990). *ValueGenesis I: A study of the influence of family, church and school on the faith, values and commitment of Adventist youth.* Minneapolis, MN: Search Institute.

Benson, P. L., Donahue, M. J., & Erickson, J. A. (1993). The faith maturity scale: Conceptualization, measurement, and empirical validation. *Journal of Adolescent Research, 4*(2), 125-139.

Benson, P. L., & Eklin, C. (1990). *Effective Christian education: A national study of Protestant congregations. A summary report on faith, loyalty, and congregational life.* Minneapolis, MN: Search Institute.

Benson, P. L., Galbraith, J., & Espeland, P. (1998). *What kids need to succeed: Proven, practical ways to raise good kids.* Minneapolis, MN: Free Spirit Publishing.

Benson, P. L., & Roehlkepartain, E. C. (2008). Spiritual development: A missing priority in youth development. *New Directions for Youth Development, 2008*(118), 13-28.

Benson, P. L., Roehlkepartain, E. C., & Rude, S. P. (2003). Spiritual development in childhood and adolescence: Towards a field of inquiry. *Applied Development Science, 7*(3), 204-213.

Benson, P. L., & Scales, P. C. (2009). The definition and preliminary measurement of thriving in adolescence. *Journal of Positive Psychology, 4*(1), 85-104. doi: 10.1080/17439760802399240

Benson, P. L., Scales, P. C., Sesma, A., & Roehlkepartain, E. C. (2005). Adolescent spirituality. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development.* New York: Springer.

Benson, P. L., Williams, D., Eklin, C., & Schuller, D. (1990). *Effective Christian education: A national study of Protestant congregations: A six-denomination report.* Minneapolis, MN: Search Institute.

Bereiter, C. (2002). Design research for sustained innovation. *Cognitive Studies, Bulletin of the Japanese Cognitive Science Society, 9*(3), 321-327.

Bereiter, C. (2005). Design research: The way forward. *Education Canada, 46*(1), 16-19.

Bigger, S. (2008). Secular spiritual education? *Educationalfutures, 1*(1), 60-70.

Biggs, J. (2003). Aligning teaching and assessment to curriculum objectives. *Learning and Teaching Support Network Generic Center.*

Black, P. (1998). Testing: Friend or foe? London: The Falmer Press.

Black, P. (2003). *Assessment for learning: Putting it into practice.* Maidenhead, England: Open University Press.

Black, P., Harrison, C., Lee, C., Marshall, B., & William, D. (2004). Working inside the black box: Assessment for learning in the classroom. *Phi Delta Kappan, 86*(1), 9-21.

Black, P., & William, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80*(2), 139-148.

Blaylock, N. (2000). Issues in achievement and assessment in religious education in England: Which way should we turn? *British Journal of Religious Education, 23*(1), 45-58.

Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals.* New York: Longmans.

Blunch, N. J. (2008). *Introduction to structural equation modelling using SPSS and AMOS*. London: Sage.

Boa, K. (2001). *Conformed to his image: Biblical and practical approaches to spiritual formation*. Grand Rapids, MI: Zondervan.

Booth, B. S. (1996). *Development of the concept of salvation in Seventh-day Adventist children and adolescents from 7 to 18 years of age who attend public schools* (Doctoral dissertation, Andrews University). Available from ProQuest Digital Dissertations database.

Bosacki, S. L. (2001). "Theory of mind" or "theory of the soul?": The role of spirituality in children's understanding of minds and emotions. In J. Erricker, C. Ota & C. Erricker (Eds.), *Spiritual education: Cultural, religious and social differences - new perspectives for the 21st century* (pp. 156-167). Brighton: Sussex Academic Press.

Bosacki, S. L. (2002). Spirituality and self in preadolescents: Implications for a connected curriculum. *Journal of Beliefs & Values: Studies in Religion & Education, 23*(1), 55-67.

Boyatzis, C. J. (2008). Children's spiritual development: Advancing the field in definition, measurement, and theory. In H. C. Allen (Ed.), *Nurturing children's spirituality* (pp. 43-55). Eugene, OR: Cascade.

Bradfield, G. M. (2007). An Adventist curriculum needs assessment: A global secondary teacher survey. *Journal of Adventist Education, 70*(1), 16-23.

Bradshaw, M., & Ellison, C. G. (2009). The nature-nurture debate is over, and both sides lost! Implications for understanding gender differences in religiosity. *Journal for the Scientific Study of Religion, 48*(2), 241-251.

Brazelton, T. B., Coles, R., Comer, J. P., Insel, T., Kline, K. K., Poussaint, A. (2003). *Hardwired to connect: The new scientific case for authoritative communities*. New York: Institute for Family Values, Commission on Children at Risk. Retrieved from http://www.americanvalues.org/html/hardwired.html

Brochu, B., & Baragar-Brcic, P. (2007). Engaging the young to experience God. *Religious Education, 102*(4), 352-356. doi: 10.1080/00344080701657600

Brookfield, S. (1985). Self-directed learning: A critical review of research. *New Directions for Continuing Education, 25*, 5-16.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *Journal of the Learning Sciences, 2*(2), 141-178.

Brown, J. D. (2000). What is construct validity? *JALT Testing and Evaluation SIG Newsletter, 4*(2), 7-10. Retrieved from http://www.jalt.org/test/bro_8.htm

Brualdi, A. (1999). Traditional and modern concepts of validity. Available from ERIC Clearinghouse on Assessment and Evaluation. (ED435714). Retrieved 2007/12/03, from http://www.ericdigests.org/2000-3/validity.htm

Bruner, J. S. (1977). *The process of education*. Cambridge, MA: Harvard University Press.

Bruner, J. S. (1996). *The culture of education*. Cambridge, MA: Harvard University Press.

Buzzetto-More, N. A., & Alade, A. J. (2006). Best practices in e-assessment. *Journal of Information Technology Education, 5*, 251-269.

Campbell, D., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 54*, 297-312.

Campbell, J. (2006). *Theorising habits of mind as a framework for learning*. Paper presented at the Australian Association for Research in Education Annual Conference, Australia.

Carlson, R. G. (1996). *A comparison of faith maturity and denominational loyalty in Seventh-day Adventist students at public and parochial high schools in the Mid-American Union based on the ValueGenesis study* (Doctoral dissertation, University of Nebraska). Available from ProQuest Digital Dissertations database.

Case, R. (1985). *Intellectual development from birth to adulthood*. Orlando, FL: Academic Press.

Case, R. (1987). Neo-Piagetian theory: Retrospect and prospect. *International Journal of Psychology, 22*(5/6), 773-791.

Case, R. (1992). *The mind's staircase: Exploring the conceptual underpinnings of children's thought and knowledge*. Hillsdale, NJ: Erlbaum.

The Center for Spiritual Development in Childhood & Adolescence. (2008). Retrieved from http://www.spiritualdevelopmentcenter.org/

Chandler, C. K., Holden, J. M., & Kolander, C. A. (1992). Counseling for spiritual wellness: Theory and practice. *Journal of Counseling and Development, 71*(2), 168-175.

Chatterji, M. (2002). Models and methods for examining standards-based reforms and accountability initiatives: Have the tools of inquiry answered pressing questions on improving schools? *Review of Educational Research, 72*(3), 345-386. doi: 10.3102/00346543072003345

Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research, 36*(4), 462-494. doi: 10.1177/0049124108314720

Clark, L. A. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7*(3), 309-319.

Clifton Youth Strengths Explorer. (2009, January 1). Retrieved Jan 1, 2009, from http://strengthsexplorer.com

Clore, V., & Fitzgerald, J. (2002). Intentional faith: An alternative view of faith development. *Journal of Adult Development, 9*(2), 97-107.

Cloud, H., & Townsend, J. (2001). *How people grow: What the Bible reveals about personal growth*. Grand Rapids, MI: Zondervan.

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher, 32*(1), 9-13. doi: 10.3102/0013189X032001009

Cobb, P., & diSessa, A. A. (2004). Ontological innovation and the role of theory in design experiments. *Journal of the Learning Sciences, 13*(1), 77-103. doi: 10.1207/s15327809jls1301_4

Cohen, S. A. (1987). Instructional alignment: Searching for a magic bullet. *Educational Researcher, 16*, 16-19.

Cole, A. (2009). *Research findings on Scriptural engagement, communication with God, and behavior among young believers: Implications for discipleship*. Paper presented at the Children's Spirituality Conference, Christian Perspectives, Chicago, IL.

Coles, R. (1990). *The spiritual life of children*. Boston, MA: Houghton Mifflin.

Collins, A. (Ed.). (1992). *Towards a design science of education*. Berlin: Springer.

Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *Journal of the Learning Sciences, 13*(1), 15-42.

Collins, A. W. (1991). *An assessment of religious literacy among selected groups of secondary students* (Doctoral dissertation, Indiana State University). Available from ProQuest Digital Dissertations database.

Costa, A. L., & Kallick, B. (2000). *Discovering and exploring habits of mind*. Alexandria, VA: ASCD.

Costa, A. L., & Kallick, B. (2001). Habits of mind: A developmental series. Retrieved from http://www.instituteforhabitsofmind.com/

Costa, A. L., & Kallick, B. (2004). *Assessment strategies for self-directed learning*. Thousand Oaks, CA: Corwin.

Council for American Private Education. (2009). CAPE facts and studies. Retrieved from http://www.capenet.org/facts.html

Council for Christian Colleges & Universities. (2006). *Spiritual Transformation Inventory (STI)*: Concentus Assessment Solutions.

Crawford, G. B. (2007). *Brain-based teaching with adolescent learning in mind* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Crawford, G. B. (2008). *Differentiation for the adolescent learner: Accomodating brain development, language, literacy, and special needs.*

Creswell, J. W., & Clark, P. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Curriculum theory and practice. (n.d.). Retrieved from http://www.infed.org/biblio/b-curric.htm

Currie, D. M. (1995). *Adolescent spirituality: Relationships among spiritual growth factors, spiritual well-being and authenticity* (Doctoral dissertation, Trinity Evangelical Divinity School). Available from ProQuest Digital Dissertations database.

Darlington, R. B. (n.d.). Factor analysis. Retrieved from http://www.psych.cornell.edu/Darlington/factor.htm

de Souza, M. (2008). Education for transformation: Meeting students' needs in changing contemporary contexts. *International Journal of Children's Spirituality, 13*(1), 27-37. doi: 10.1080/13644360701834817

de Souza, M., Durka, G., Engelbretson, K., Jackson, R., & McGrady, A. (Eds.). (2006). *International handbook of the religious, moral and spiritual dimensions in education* (Vol. 1 & 2). London: Springer.

Dede, C. (2004). If design-based research is the answer, what is the question? A commentary on Collins, Joseph, and Bielaczyc; diSessa and Cobb; and Fishman, Marx, Blumenthal, Krajcik, and Soloway in the JLS Special Issue on design-based research. *Journal of the Learning Sciences, 13*(1), 105-114. doi: 10.1207/s15327809jls1301_5

Dede, C. (2005). Why design-based research is both important and difficult. *Educational Technology, 45*(1), 13-17.

Demetriou, A., & Kyriakides, L. (2006). The functional and developmental organization of cognitive development. *British Journal of Educational Psychology, 76*(2), 209-242.

Demetriou, A., Mouyi, A., & Spanoudis, G. (2010). The development of mental processing. In R. M. Lerner & W. F. Overton (Eds.), *The Handbook of Life-Span Development, Volume 1, Cognition, Biology, and Methods* New Jersey: Wiley.

Demetriou, A., Spanoudis, G., & Mouyi, A. (2010). A three-level model of the development of the mind: Functional and neuronal substantiation. In M. Ferrari & L. Vuletic (Eds.), *The developmental relations between mind, brain, and education: Essays in honor of Robbie Case*. New York: Springer.

Denscombe, M. (2006). Web-based questionnaires and the mode effect. *Social Science Computer Review, 24*(2), 246-254. doi: 10.1177/0894439305284522

Denton, M. L., Pearce, L. D., & Smith, C. (2008). *Religion and spirituality on the path through adolescence*. University of North Carolina at Chapel Hill: National Study of Youth & Religion. (Number 8)

Denzin, N. K. (1978). The logic of naturalistic inquiry *Sociological methods: A sourcebook*. New York: McGraw-Hill.

Department of Education. (2001). *Curriculum guide: Religion K-12*. Silver Spring, MD: North American Division of Seventh-day Adventists.

Dermo, J. (2009). e-Assessment and the student learning experience: A survey of student perceptions of e-assessment. *British Journal of Educational Technology, 40*(2), 203-214. doi: 10.1111/j.1467-8535.2008.00915.x

Derouen, J. L. (2005). *A study of the difference in Faith Maturity Scale and Tennessee Self Concept Scale scores between adolescents taught a biblical values curriculum by a parent and adolescents taught the curriculum by a non-parent adult leader* (Doctoral dissertation, Southwestern Baptist Theological Seminary). Available from ProQuest Digital Dissertations database.

DES. (1989). *The education (school curriculum and related information) regulations 1989*. London: DES.

Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher, 32*(1), 5-8. doi: 10.3102/0013189X032001005

Dick, W. O., Carey, L., & Carey, J. O. (2004). *The systematic design of instruction* (6th ed.). New York: Allyn & Bacon.

Donahue, M. J. (2002). ValueGenesis 2: Scales and other indices employed in the reports. Retrieved from http://homepage.mac.com/levdtrotsky/.Public/VG2%20codebook.pdf

Donahue, M. J., & Benson, P. L. (1995). Religion and the well-being of adolescents. *Journal of Social Issues, 51*(2), 145.

Donnelly, T. M., Matsuba, M. K., Hart, D., & Atkins, R. (2005). The relationships between spiritual development and civic development. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence*. Thousand Oaks, CA: Sage.

Donofrio, A. (2004). *The relationship between the Five Factor Model of personality and relationally based measures of Judeo-Christian spirituality: A correlational analysis between NEO PI-R facet scores and subscales of the Spiritual Assessment Inventory and Faith Maturity Scale* (Doctoral dissertation, University of Akron). Available from ProQuest Digital Dissertations database.

Donovan, M. S., Bransford, J. D., & Pellegrino, J. W. (1999). *How people learn: Bridging research and practice*. Washington, D.C.: National Academy Press.

Dorman, J. P. (2001). Associations between religious behavior and attitude to Christianity among Australian Catholic adolescents: Scale validation. *Journal of Social Psychology, 141*(5), 629-639.

Dowling, E. M., Gestsdottir, S., Anderson, P. M., Eye, A. V., Almerigi, J., & Lerner, R. M. (2004). Structural relations among spirituality, religiosity, and thriving in adolescence. *Applied Developmental Science, 8*(1), 7-16.

Downs, P. G. (1995). The power of Fowler. In J. C. Wilhoit & J. M. Dettoni (Eds.), *Nurture that is Christian*. Wheaton, IL: Victor Books.

Dowson, M., & McInerney, D. M. (2004). The development and validation of the goal orientation and learning strategies survey (GOALS-S). *Educational and Psychological Measurement, 64*(290).

Drexler, J. L. (2000). *Character in the schoolhouse: A qualitative assessment of the moral education at an independent Christian academy* (Doctoral dissertation, Saint Louis University). Available from ProQuest Digital Dissertations database.

Dudley, R. L. (1978). *Why teenagers reject religion and what to do about it.* Washington, D.C.: Review and Herald.

Dudley, R. L. (1986). *Passing on the torch: How to pass your spiritual values on to your children and teens.* Washington, D.C.: Review and Herald.

Dudley, R. L. (2000). *Why our children leave the church: Personal stories from a 10-year study.* Washington, D.C.: Review and Herald.

Dudley, R. L. (2007). *The complex religion of teens.* Hagerstown, MD: Review & Herald.

Dudley, R. L., & Gillespie, V. B. (1992). *ValueGenesis: Faith in the balance.* Riverside, CA: John Hancock Center for Youth Ministry.

Dudoit Raiche, D. (2000). Assessment of Catholic religious education (ACRE) revision revisited. *Momentum, 31*(4), 60-62.

Dykstra, C. R. (1986a). Faith development and religious education. In C. R. Dykstra & S. Parks (Eds.), *Faith development and Fowler* (pp. 251-271). Birmingham, AL: Religious Education Press.

Dykstra, C. R. (1986b). What is faith? An experiment in the hypothetical mode. In Dykstra (Ed.), *Faith Development and Fowler* (pp. 45-64). Birmingham, AL: Religious Education Press.

Edelson, D. C. (2002). Design research: What we learn when we engage in design. *Journal of the Learning Sciences, 11*(1), 105-121.

Eisner, E. W. (1985). *The art of educational evaluation.* London: The Falmer Press.

Eisner, E. W. (1993). Reshaping assessment in education: Some criteria in search of practice. *Journal of Curriculum Studies, 25*(30), 219-234.

Elkind, D. (1978). *The child's reality: Three developmental themes.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Emmett, J. A. (2008). Spiritual development in faith communities and secular societies. *New Directions for Youth Development, 2008*(118), 45-58.

Erickson, H. L. (2007). *Concept-based curriculum and instruction for the thinking classroom.* Thousand Oaks, CA: Corwin Press.

Ericsson, K., & Simon, H. (1993). *Protocol analysis: Verbal reports as data* (2nd ed.). Boston, USA: MIT Press.

Erikson, E. H. (1950). *Childhood and society.* New York: Norton.

Erikson, E. H. (1968). *Identity, youth, and crisis.* New York: Norton.

Erricker, C. (2006). If you don't know the difference you are living with, how can you learn to live with it? Taking difference seriously in spiritual and religious education. *International Journal of Children's Spirituality, 11*(1), 2006. doi: 10.1080/13644360500504439

Erricker, C. (2007). Children's spirituality and postmodern faith. *International Journal of Children's Spirituality, 12*(1), 51-60. doi: 10.1080/13644360701266143

Erricker, C., & Erricker, J. (2000). *Reconstructing religious, spiritual, and moral education.* London: Routledge.

Estep, J. R., & Kim, J. H. (Eds.). (2009). *Christian formation: Integrating theology and human development:* (in press).

Fancourt, N. (2005). Challenges of self-assessment in religious education. *British Journal of Religious Education 27*(2), 115-125. doi: 10.1080/0141620042000336611

Farias, M., & Hense, E. (2008). Concepts and misconceptions in the scientific study of spirituality. In B. Spalek & A. Imtoual (Eds.), *Religion, spirituality and the social sciences: Challenging marginalisation* (pp. 163-176). Bristol, UK: The Policy Press.

Farrell, J. P. (2008). Community education in developing countries: The quiet revolution in schooling. In F. M. Connelly, M. F. He & J. Phillion (Eds.), *The Sage handbook of curriculum and instruction.* Los Angeles: Sage.

Feldmeier, P. (2007). *The developing Christian: Spiritual growth through the life cycle.* New York: Paulist Press.

Fischer, K. W. (1980). A theory of cognitive development: The control and construction of hierarchies of skills. *Psychological Review, 87*, 477-531.

Fischer, K. W., & Rose, S. P. (1998). How the brain learns: Growth cycles of brain and mind. *Educational Leadership, 56*(3), 56-60.

Fischer, K. W., & van Geert, P. (2009). Dynamic systems and the quest for individual-based models of change and development. In J. P. Spencer, M. S. C. Thomas & J. L. McClelland (Eds.), *Toward a unified theory of development: Connectionism and dynamic systems theory re-considered* (pp. 313-333). New York: Oxford.

Fischer, K. W., Yan, Z., & Stewart, J. (2003). Adult cogntive development: Dynamics in the development web. In J. Valsiner & K. J. Connolly (Eds.), *Handbook of developmental psychology*. London: Sage.

Fiske, D. W. (2002). Validity for what? In H. I. Braun, D. N. Jackson & D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement*. London: Lawrence Erlbaum Associates.

Fleischer, B. J. (2004). From individual to corporate praxis: A systemic re-imagining of religious education. *Religious Education, 99*(3), 2004.

Fowler, J. W. (1987). *Faith development and pastoral care*. Philadelphia, PA: Fortress Press.

Fowler, J. W. (2001). Faith development theory and the postmodern challenges. *International Journal for the Psychology of Religion, 11*(3), 159-172.

Fowler, J. W. (2004). Faith development at 30: Naming the challenges of faith in a new millennium. *Religious Education, 99*(4), 405-420.

Fowler, J. W., Nipkow, K. E., & Schweitzer, F. (Eds.). (1991). *Stages of faith and religious development: Implications for church, education, and society*. New York: Crossroad.

Fowler, S., Van Brummelen, H. W., & Van Dyk, J. (1990). *Christian schooling: Education for freedom*. Potchefstroom University for Christian Higher Education, South Africa: Institute for Reformational Studies.

Frankel, M. S., & Siang, S. (1999). *Ethical and legal aspects of human subjects research on the internet*. Washington, DC: American Association for the Advancement of Science. Retrieved from http://www.aaas.org/spp/sfrl/projects/intres/report.pdf

Freire. (2006/1992). *Pedagogy of hope: Reliving pedagogy of the oppressed*. London: Continuum.

Fullerton, J. T., & Hunsberger, B. (1982). A unidimensional measure of Christian orthodoxy. *Journal for the Scientific Study of Religion, 21*(4), 317-326.

Furrow, J. L., King, P. E., & White, K. (2004). Religion and positive youth development: Identity, meaning, and prosocial concerns. *Applied Developmental Science, 8*(1), 17-26.

Gall, J. P., Gall, M. D., & Borg, W. R. (2005). *Applying educational research: A practical guide* (5th ed.). Boston: Pearson.

Gall, M. D., & Borg, W. R. (1997). *Educational research: An introduction* (2nd ed.). New York: David McKay.

Gane, A. B. (2005). *Youth ministry and beliefs and values among 10- to 19-year-old students in the Seventh-day Adventist school system in North America* (Doctoral dissertation, Andrews University). Available from ProQuest Digital Dissertations database.

Gane, B. (2009). *Loving them back, leading them home*. Hagerstown, MD: Review and Herald.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Praeger.

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.

Gardner, H. (2006). *Multiple intelligences: New horizons*. New York: Basic Books.

General Conference. (2009). Adventist Education World Statistics. Retrieved from http://education.gc.adventist.org/edstats.html

George, E. (1977). Religious education outcomes inventory. *Momentum, 8*(2), 44-48.

Gestalt psychology. *Britannica.* Retrieved April 1, 2009, from http://www.britannica.com/EBchecked/topic/232098/Gestalt-psychology

Gillespie, V. B. (1998). If you can't measure it, it didn't happen: Spiritual assessment in the Adventist school. *Journal of Adventist Education, 60*(4), 5-12.

Gillespie, V. B. (Ed.). (1992). *Teaching values*. Riverside, CA: La Sierra University Press.

Gillespie, V. B., Donahue, M. J., Boyatt, E., & Gane, B. (2003). *Ten years later: A study of two generations*. Riverside, CA: John Hancock Center for Youth Ministry.

Gilligan, C. (1977). In a different voice: Women's conceptions of self and morality. *Harvard Educational Review, 47*(4).

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.

Glasnapp, D., & Pedulla, J. (2001). NCEA ACRE: How development efforts were used to assure quality measurement of knowledge and skills. *Momentum, 32*(4), 52-55.

Glatthorn, A. A. (1999). Curriculum alignment revisited. *Journal of Curriculum & Supervision, 15*(1), 26-35.

Goggin, K., Malcarne, V. L., Murray, T. S., Metcalf, K. A., & Wallston, K. A. (2007). Do religious and control cognitions predict risky behavior? II. Development and validation of the Sexual Risk Behavior-related God Locus of Control Scale for adolescents (SexGLOC-A). *Cognitive Therapy and Research, 31*(1), 123-139. doi: 10.1007/s10608-006-9090-1

Goggin, K., Murray, T. S., Malcarne, V. L., Brown, S. A., & Wallston, K. A. (2007). Do religious and control cognitions predict risky behavior? I. Development and validation of the Alcohol-related God Locus of Control Scale for adolescents (AGLOC-A). *Cognitive Therapy and Research, 31*(1), 111-122. doi: 10.1007/s10608-006-9091-0

Goleman, D. (1995). *Emotional intelligence*. New York: Bantam Books.

Goleman, D. (2006). *Social intelligence: The new science of human relationships*. New York: Bantam Books.

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.

Gorsuch, R. L. (1990). Measurement in psychology of religion revisited. *Journal of Psychology and Christianity, 9*(2), 82-92.

Greene, J. C. (2006). Toward a methodology of mixed methods social inquiry. *Research in the Schools, 13*(1), 93-98.

Greenleaf, F. (2005). Timeline for Seventh-day Adventist education. *Journal of Adventist Education, 67*(05), 10-14.

Groome, T. H. (1980). *Christian religious education: Sharing our story and vision*. San Francisco: Jossey-Bass.

Groome, T. H. (1998). *Educating for life: A spiritual vision for every teacher and parent*. New York: Crossroad Publishing Company.

Growing disciples. (2007). Silver Spring, MD: General Conference of Seventh-day Adventists.

Grundy, S. (1987). *Curriculum: Product or praxis?* Lewes: Falmer Press.

Gruppetta, M. (2008). Inadvertent offence: When 'a little knowledge is a dangerous thing'. In B. Spalek & A. Imtoual (Eds.), *Religion, spirituality and the social sciences: Challenging marginalisation*. Bristol: Policy Press.

Guptill, S. (1998). *Fostering and assessing faith development in the Adventist classroom*. Paper presented at the 22nd International Faith and Learning Seminar, University of Eastern Africa-Baraton.

Habenicht, D. J. (2001). *Religious growth and salvation during childhood and youth: Implications for philosophy of SDA education*. Paper presented at the Conference on Philosophy of Seventh-day Adventist Education, Andrews University.

Habenicht, D. J., Korniejczuk, V. A., Booth, B., & Brown, M. (2003). *How children and adolescents understand the concept of salvation with implications for an integrated approach to spiritual development*. Paper presented at the Conference on Children's Spirituality: Christian Perspective, Concordia University, IL.

Halford, G. S. (1982). *The development of thought*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Halford, G. S. (1993). *Children's understanding: The development of mental models*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Hall, T. W. (1996). *The relationship of spiritual maturity to level of object relations development and God image and the impact of spiritual direction on these variable* (Doctoral dissertation, Biola University). Available from Proquest Digital Dissertations database.

Hall, T. W., & Edwards, K. J. (2002). The Spiritual Assessment Inventory: A theistic model and measure for assessing spiritual development. *Journal for the Scientific Study of Religion, 41*(2), 341-357. doi: 10.1111/1468-5906.00121

Hall, T. W., Reise, S. P., & Haviland, M. G. (2007). An Item Response Theory analysis of the Spiritual Assessment Inventory. *International Journal for the Psychology of Religion, 17*(2), 157-178. doi: 10.1080/10508610701244197

Ham, K., Beemer, B., & Hillard, T. (2009). *Already gone: Why your kids will quit church and what you can do to stop it*. Green Forest, AR: Master Books.

Harris, P. (2006). How do you measure people skills? *Slate*. Retrieved from http://www.slate.com/id/2153385/

Hart, T. (2005). Spiritual experiences and capacities of children and youth. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence* (pp. 163-177). Thousand Oaks: Sage.

Hattie, J. A., Myers, J. E., & Sweeney, T. J. (2004). A factor structure of wellness: Theory, assessment, analysis, and practice. *Journal of Counseling and Development, 82*(3), 354-364.

Hawkins, G. L., & Parkinson, C. (2007). *Reveal: Where are you?* Chicago: Willow Creek Resources.

Hay, D., & Nye, R. (2006). *The spirit of the child* (Revised ed.). London: Harper Collins.

Helm, C. M. (2002). Making the connection: Assessment and accountability. *Momentum, 33*(3), 6.

Helminiak, D. A. (1987). *Spiritual development: An interdisciplinary study.* Chicago: Loyola University Press.

Henning, L. (2007). Forming disciples of Jesus in parish and school. *Momentum*(Sept/Oct), 56-60.

Hewitt, T. W. (2006). *Understanding and shaping curriculum: What we teach and why.* London: Sage Publications.

Hill, P. C., & Hood, R. W. (Eds.). (1999). *Measures of religiosity.* Birmingham, AL: Religious Education Press.

Hlebowitsh, P. S. (2006). John Dewey and the idea of experimentalism. *Education and Culture, 22*(1), 73-76. Retrieved from http://muse.jhu.edu/journals/education_and_culture/v022/22.1hlebowitsh.pdf

Hoadley, C. M. (2004). Methodological alignment in design-based research. *Educational Psychologist, 39*(4), 203-212. doi: 10.1207/s15326985ep3904_2

Hodge, D. R. (2007). The Spiritual Competence Scale: A new instrument for assessing spiritual competence at the programmatic level. *Research on Social Work Practice, 17*(2), 287-294. doi: 10.1177/1049731506296168

Hoge, D. R., Heffernan, E., Hemrick, E. F., Nelsen, H. M., O'Connor, J. P., Philibert, P. J. (1982). Desired outcomes of religious education and youth ministry in six denominations. *Review of Religious Research, 23*(3), 230.

Holmes, A. F. (1977). *All truth is God's truth.* Grand Rapids: Eerdmans.

Holmes, A. F. (1991). *Shaping character: Moral education in the Christian college.* Grand Rapids: William B Eerdmans.

Holmes, U. (1980). *A history of Christian spirituality: An analytical introduction.* San Francisco: Harper & Row.

Holt, B. P. (2005). *Thirsty for God: A brief history of Christian spirituality.* Minneapolis: Fortress Press.

Hopkins, K. D. (1998). *Educational and psychological measurement and evaluation* (8th ed. ed.). Needham Heights, MA: Allyn & Bacon.

Horne, S. (1984). Criterion-referenced testing: Pedagogical implications. *British Educational Research Journal, 10*(2). doi: 10.1080/0141192840100204

Houghton, W. (2004). Constructive alignment - and why it is important to the learning process. In W. Houghton (Ed.), *Learning and teaching theory for engineering academics*. Loughborough: HEA Engineering Subject Center.

How to comply with the Children's Online Privacy Protection Rule. (n.d.). Retrieved from http://www.ftc.gov/bcp/edu/pubs/business/idtheft/bus45.shtm

Hoyt, W. T., Warbasse, R. E., & Chu, E. Y. (2006). Construct validation in counseling psychology research. *The Counseling Psychologist, 34*(6), 806-838. doi: 10.1177/0011000006287389

Huebner, D. E. (1985). Spirituality and knowing. In V. Hillis (Ed.), *The lure of the transcendent: Collected essays by Dwayne E. Huebner*. London: Lawrence Erlbaum.

Huebner, D. E. (1986). Christian growth in faith. *Religious Education, 81*(4), 511-516.

Huebner, D. E. (1987). Religious education: Practicing the presence of God. In V. Hillis (Ed.), *The lure of the transcendent: Collected essays by Dwayne E. Huebner*. London: Lawrence Erlbaum Associates.

Hung, D. W. L., & Der-Thanq, C. (2001). Situated cognition, Vygotskian thought and learning from the communities of practice perspective: Implications for the design of web-based e-learning. *Educational Media International, 38*(1), 3-12.

Hyman, C., & Handal, P. J. (2006). Definitions and evaluation of religion and spirituality items by religious professionals: A pilot study. *Journal of Religion and Health, 45*(7).

Jackson, P. (1980). Curriculum and its discontents. *Curriculum Inquiry, 10*(2), 159-172.

Jackson, R. (2004). *Rethinking religious education and plurality: Issues in diversity and pedagogy*. London: RoutledgeFalmer.

Jansen, J. D., & Christie, P. (1999). *Changing curriculum: Studies on outcomes-based education in South Africa*. Kenwyn, RSA: Juta & Co.

Jantos, M. (2007). Spirituality in the twenty-first century. *Adventist Review*. Retrieved from http://www.adventistreview.org/issue.php?issue=2007-1502&page=8

Ji, C.-H. C. (2004). Faith Maturity and doctrinal orthodoxy: A validity study of the Faith Maturity Scale. *Psychological Reports, 95*(3), 993-998.

Johnson, B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative, and mixed approaches*: Sage.

Johnson, C. N., & Boyatzis, C. J. (2005). Cognitive-cultural foundations of spiritual development. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence.*

Johnson, K. A. (2001). *An international collaboration of young adolescents involving networked technology and faith formation* (Doctoral dissertation, University of St. Thomas). Available from ProQuest Digital Dissertations database.

Jones, B. L., & Maloy, R. W. (1996). *Schools for an information age: Reconstructing foundations for learning and teaching.* Westport, CT: Praeger Publishers.

Jones, J. D. (2006). *Traveling together: A guide for disciple-forming congregations.* Herndon, VA: The Alban Institute.

Joseph, D. (2004). The practice of design-based research: Uncovering the interplay between design and research, and the real-world context. *Educational Psychologist, 39*(4), 235-242. doi: 10.1207/s15326985ep3904_5

Joseph, N. (2006). Strategies for success: Teaching metacognitive skills to adolescent learners. *The NERA Journal, 42*(1), 33-39.

Kadhi, T. (2005). *Online assessment: A study of the validation and implementation of a formative online diagnostic tool in developmental mathematics for college students* (Doctoral dissertation, Texas A&M University). Available from ProQuest Digital Dissertations database.

Kahn, J. H. (2006). Factor analysis in counseling psychology research, training, and practice: Principles, advances, and applications. *The Counseling Psychologist, 34*(5), 685-717. doi: 10.1177/0011000006286347

Kameniar, B. (2007). Shaking religious education: A new look at the literature. *Religious Education, 102*(4), 403-418.

Kelly, A. E. (2004). Design research in education: Yes, but is it methodological? *Journal of the Learning Sciences, 13*(1), 115-128.

Kelly, A. V. (1999). *The curriculum: Theory and practice* (4th ed.). London: Sage.

Kenny, D. A. (2003). Structural equation modeling. Retrieved from http://davidakenny.net/cm/causalm.htm

Kijai, J. (1993). A synopsis of the ValueGenesis study of faith maturity and denominational commitment. *Journal of Research on Christian Education, 2*(1), 81-83.

King, P. E., & Benson, P. L. (2005). Spiritual development and adolescent well-being and thriving. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence*. Thousand Oaks, CA: Sage.

King, P. E., & Boyatzis, C. J. (2004). Exploring adolescent spiritual and religious development: Current and future theoretical and empirical perspectives. *Applied Developmental Science, 8*(1), 2-6.

King, P. E., & Roeser, R. W. (2009). Religion and spirituality in adolescent development. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., Vol. 1). Hoboken, NJ: John Wiley & Sons.

Kline, K. K. (Ed.). (2008). *Authoritative communities: The scientific case for nurturing the whole child*. New York: Springer.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Publications.

Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. Chicago: Follett Publishing.

Kohlberg, L. (1974). Education, moral development and faith. *Journal of Moral Education, 4*(1), 5-16.

Kohlberg, L. (1975). The cognitive-developmental approach to moral education. *Phi Delta Kappan, 56*(10), 670-677.

Kohlberg, L. (1984). *The psychology of moral development :The nature and validity of moral stages*. San Francisco, CA: Harper & Row.

Kohlberg, L., & Lickona, T. (1976). Moral stages and moralization: The cognitive-developmental approach. In L. Kohlberg & T. Lickona (Eds.), *Moral development and behavior: Theory, research and social issues*. Holt, NY: Rinehart and Winston.

Kolb, D. A. (1984). *Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. A., & Kolb, A. (n.d.). Experience based learning systems. Retrieved from http://www.learningfromexperience.com

Korniejczuk, V. A. (1994). *Development of the concept of salvation in Argentinean and Paraguayan Seventh-day Adventist children and adolescents from ages 6 to 17 years* (Doctoral dissertation, Andrews University). Available from ProQuest Digital Dissertations database.

Kourie, C. (2006). The "turn" to spirituality. *Acta Theologica Supplementum 8*, 19-38.

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice, 41*(4).

Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). *Taxonomy of educational objectives, Handbook II: Affective domain*. New York: David McKay.

Kraut, R., Olson, J., Banaji, M. R., Bruckman, A., Cohen, J., & Couper, M. (2004). *Report of Board of Scientific Affair's Advisory Group on the conduct of research on the internet*. Psychological Research Online. Retrieved from http://www-2.cs.cmu.edu/~kraut/RKraut.site.files/articles/kraut04-PsychologicalResearchOnline.pdf

Kreuter, F., Presser, S., & Tourangeau, R. (2008). Social desirability bias in CATI, IVR, and web surveys: The effects of mode and question sensitivity. *Public Opinion Quarterly, 72*(5), 845-865.

Latham, A. M. (1997). Profiling and self-assessment: An evaluation of their contribution to the learning process. In C. Cullingford (Ed.), *Assessment versus evaluation* (pp. 203-227). London: Cassell.

Leak, G. K. (2008). Factorial validity of the Faith Development Scale. *International Journal for the Psychology of Religion, 18*(2), 123-131. doi: 10.1080/10508610701879399

Leak, G. K., & Fish, S. B. (1999). Development and initial validation of a measure of religious maturity. *International Journal for the Psychology of Religion, 9*(2), 83-103.

Lee, J. M. (1988). The blessings of religious pluralism. In N. H. Thompson (Ed.), *Religious pluralism and religious education*. Birmginham, AL: Religious Education Press.

Lee, J. W., Rice, G. T., & Gillespie, V. B. (1997). Family worship patterns and their correlation with adolescent behavior and beliefs. *Journal for the Scientific Study of Religion, 36*(3), 372-381.

Leicester, M., Modgil, C., & Modgil, S. (Eds.). (2000). *Spiritual and religious education*.

Leigh, D. (1998). A brief history of instructional design. Retrieved from http://www.pignc-ispi.com/articles/education/brief%20history.htm

Levinson, D. J. (1978). *The seasons of a man's life*. New York: Ballantine Books.

Lewis, C., & Reiman, J. (1994, 2008). Task-centered user interface design: A practical introduction

Lewis, M. D. (2000). The promise of dynamic systems approaches for an integrated account of human development. *Child Development, 71*(1), 36-43.

Lickona, T. (2004). *Character matters: How to help our children develop good judgment, integrity, and other essential virtues.* New York: Simon & Schuster.

Lickona, T. (Ed.). (1976). *Moral development and behavior: Theory, research, and social issues.* New York: Holt, Rinehart and Winston.

Lifeway Research. (2009). Five signs that discipleship transforms a believer's life. Retrieved from http://www.lifeway.com/discipleship

Loder, J. E. (1989). *The transforming moment* (2nd ed.). Colorado Springs, CO: Helmers & Howard.

Loder, J. E. (1998). *The logic of the spirit: Human development in theological perspective.* San Francisco: Jossey-Bass.

Lomax, R. G. (2010). Structural equation modeling: Multisample covariance and mean structures. In G. R. Hancock & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences.* London: Routledge.

Lonergan, B. J. (1957). *Insight: A study of human understanding.* San Francisco: Harper and Row.

Lonergan, B. J. (1972). *Method in theology.* New York: Seabury.

Lounsbury, J. W., Levy, J. J., Park, S.-H., Gibson, L. W., & Smith, R. (2009). An investigation of the construct validity of the personality trait of self-directed learning. *Learning and Individual Differences, 19*(4), 411-418. doi: 10.1016/j.lindif.2009.03.001

Marzano, J. S., & Marzano, R. J. (2008). *Designing and assessing educational objectives: Applying the new taxonomy.* Thousand Oaks, CA: Corwin Press.

Marzano, R. J., & Kendall, J. S. (2007). *The new taxonomy of educational objectives* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Marzano, R. J., Pickering, D. J., Arredondo, D. E., Blackburn, G. J., Brandt, R. S., & Moffett, C. A. (1992). *Dimensions of learning.* Alexandria, VA: Association for Supervision and Curriculum Development.

Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd ed.). Thousand Oaks, CA: Sage.

McDonald, B., & Boud, D. (2003). The impact of self-assessment on achievement: The effects of self-assessment training on performance in external examinations. *Assessment in Education: Princples, Policy & Practice, 10*(2), 209-221.

McDonald, R., & Van der Horst, H. (2007). Curriculum alignment, globalization, and quality assurance in South African higher education. *Journal of Curriculum Studies, 39*(1), 1-9.

McGehee, J. J., & Griffith, L. K. (2001). Large-scale assessments combined with curriculum alignment: Agents of change. *Theory into Practice, 40*(2), 137-144.

McGinn, B., & Meyendorff, J. (Eds.). (1997). *Christian spirituality: Origins to the twelfth century*. New York: Crossroad.

McKenney, S., Nieveen, N., & Van den Akker, J. (2006). Design research from a curriculum perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational Design Research* (pp. 67-90). London: Routledge.

McMillan, J. H. (2007). *Classroom assessment: Principles and practice for effective standards-based instruction* (4th ed.). Boston: Pearson.

McMinn, M. R., & Hall, T. W. (2001). Christian spirituality: Introduction to special issue - Part 2. *Journal of Psychology and Theology, 29*(1), 3. doi: 0091-6471/410-730

Mednick, F. (2006). Curriculum theories. Retrieved from http://cnx.org/content/m13293/latest/

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult and Continuing Education, 89*(Spring 2001), 3-13.

Mertler, C. A., & Charles, C. M. (2005). *Introduction to educational research* (5th ed.). Boston, USA: Pearson.

Mertler, C. A., & Vannatta, R. A. (2005). *Advanced and multivariate statistical methods: Practical application and interpretation* (3rd ed.). Glendale, CA: Pyrczak Publishing.

Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13-103). New York: Macmillan.

Messick, S. (1994). Validity of psychological assessment: Validation of inferences from person's responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*(9), 741-749.

Miller, P. H. (2002). *Theories of developmental psychology* (4th ed.). New York: Worth Publishers.

Mills, L. B. (2008). Online assessment: Put down your pencils. *School Administrator, 65*(4).

Ministries Committee. (2007). *Growing disciples*. Silver Spring, MD: General Conference of Seventh-day Adventists.

Moberg, D. O. (1984). Subjective measures of spiritual well-being. *Review of Religious Research, 25*(4), 351.

Moberg, D. O. (2002). Assessing and measuring spirituality: Confronting dilemmas of universal and particular evaluative criteria. *Journal of Adult Development, 9*(1), 47-60.

Moore, K. A., & Lippman, L. H. (2005). *What do children need to flourish? Conceptualizing and measuring indicators of positive development*. New York: Springer.

Moran, R. (2005). *Spiritual formation as experiential learning: Exploring the relationship of learning style with spirituality type and spiritual growth on Christian college campuses* (Doctoral dissertation, Regent University). ProQuest Digital Dissertations database.

Muse-Burke, J. L. (2004). *Development and validation of the Inclusive Spirituality Index* (Doctoral dissertation, Lehigh University). Available from ProQuest Digital Dissertations database.

National Catholic Educational Association. (2001). Assessment of catechesis religious education. Retrieved from http://www.ncea.org/Assessment/index.asp

National Catholic Educational Association. (n.d.). Most frequently asked questions. Retrieved from http://www.ncea.org/FAQ/FAQacre-ifg.asp

National Study of Youth and Religion. (2001). Survey instrument. Chapel Hill, NC: University of North Carolina.

NCEA. (2001). *ACRE Interpretation manual*. Washington, D.C.: National Catholic Education Association.

Neal, C. J. (1995). The power of Vygotsky. In J. C. Wilhoit & J. M. Dettoni (Eds.), *Nurture that is Christian* (pp. 123-137). Wheaton, IL: Victor Books.

Newberg, A. B., & Newberg, S. K. (2005). A neuropsychological perspective on spiritual development. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence*. Thousand Oaks, CA: Sage.

Newman, I., & Benz, C. R. (1998). *Qualitative-quantitative research methodology: An interactive continuum*. Carbondale, IL: Southern Illinois University Press.

Newman, I., Ridenour, C., Newman, C., & DeMarco, G. (2003). A typology of research purposes and its relationship to mixed methods. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. *Studies in Higher Education, 31*(2), 199-218.

North American Division Education Department. (2009). What is CognitiveGenesis? Retrieved from http://www.cognitivegenesis.org/article.php?id=2

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). E-research: Ethics, security, design, and control in psychological research on the internet. *Journal of Social Issues, 58*(1), 161-176.

Null, J. W. (2008). Curriculum development in historical perspective. In F. M. Connelly, M. F. He & J. Phillion (Eds.), *The Sage handbook of curriculum and instruction*. Los Angeles: Sage.

O'Donnell, C. L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*(1), 33-84.

O'Neill, S. A., Eccles, J. S., & Wigfield, A. (2005). Ability self-perceptions and subjective task values in adolescents and children. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development* (pp. 237-249). New York: Springer.

OECD. (2002). *Frascati manual*. Paris: Organization for Economic Co-operation and Development. Retrieved from http://browse.oecdbookshop.org/oecd/pdfs/browseit/9202081E.PDF

Ogden, G. (2007). *Discipleship essentials: A guide to building your life in Christ* (Expanded ed.). Downers Grove, IL: InterVarsity Press.

Onwuegbuzie, A. J., & Leech, N. L. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology, 8*(5), 375-387.

Onwuegbuzie, A. J., & Teddlie, C. (2003). A framework for analyzing data in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 351-383). Thousand Oaks, CA: Sage.

Oser, F., & Gmunder, P. (1991). *Religious judgment: A developmental perspective.*

Oser, F., & Scarlett, W. G. (Eds.). (1991). *Religious development in childhood and adolescence*. San Francisco, CA: Jossey-Bass.

Palmer, S. T., & Dudoit Raiche, D. (1998). Assessment in catechesis. *Momentum, 29*(2), 1-2.

Pargament, K. I., & Hill, P. C. (2003). Advances in the conceptualization and measurement of religion and spirituality: Implications for physical and mental health research. *American Psychologist, 58*(1), 64-74.

Park, N., & Peterson, C. (2005). The values in action inventory of character strengths for youth. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development*. New York: Springer.

Pascual-Leone, J. (1970). A mathematical model for the transition rule in Piaget's development stages. *Acta Psychologica, 32*, 301-345.

Pascual-Leone, J., & Goodman, D. (1979). Intelligence and experience: A neopiagetian approach. *Instructional Science, 8*(4), 301-367.

Pearce, M. J., Jones, S. M., Schwab-Stone, M. E., & Ruchkin, V. (2003). The protective effects of religiousness and parent involvement on the development of conduct problems among youth exposed to violence. *Child Development, 74*(6), 1682-1696. doi: 10.1046/j.1467-8624.2003.00631.x

Pellegrino, J. W., Chudowsky, N., & Glaser, R. (Eds.). (2001). *Knowing what students know: The science and design of educational assessment*. Washington, DC: National Academy Press.

Penuel, W., Fishman, B. J., Gallagher, L. P., Korbak, C., & Lopez-Prado, B. (2009). Is alignment enough? Investigating the effects of state policies and professional development on science curriculum implementation. *Science Education, 93*(4), 656-677.

Peterson, E. (1997). *Subversive spirituality*. Grand Rapids: Eerdmans.

Petrina, S. (2004). The politics of curriculum and instructional design/theory/form: Critical problems, projects, units, and modules. *Interchange, 35*(1), 81-126.

Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*. Thousand Oaks, CA: Sage.

Philosophy of Education. (2003). General Conference of Seventh-day Adventists. Retrieved from http://circle.adventist.org/download/PhilStat2003.pdf

Philosophy of education: Policy FE05, 10. (2003). Retrieved from
        http://circle.adventist.org/download/PhilStat2003.pdf

Piaget, J. (1932). *The moral judgment of the child*. London: Kegan Paul, Trench, Trubner
        and Co.

Piaget, J. (1947). *La psychologie de l'intelligence*. Paris: Librarie Armand Colin.

Piaget, J. (1952). *The origins of intelligence in children*. New York: International
        Universities Press.

Piaget, J. (1977). *The development of thought: Equilibration of cognitive structures*. New
        York: Viking Press.

Pinar, W. F. (2008). Curriculum theory since 1950. In F. M. Connelly, M. F. He & J. Phillion
        (Eds.), *The Sage handbook of curriculum and instruction*. Los Angeles: Sage.

Pinar, W. F. (2009). *The test our generation must pass*. Paper presented at the Third
        Triennial Conference of the International Association for the Advancement of
        Curriculum Studies, Cape Town, RSA.

Pinar, W. F. (Ed.). (2003). *International handbook of curriculum research: Studies in
        curriculum theory* Mahwah, NJ: Lawrence Erlbaum.

Pinar, W. F., Reynolds, W. M., Slattery, P., & Taubman, P. M. (2008/1995). *Understanding
        Curriculum*. New York: Peter Lang Publishing.

Pittman, K., Garza, P., Yohalem, N., & Artman, S. (2008). Addressing spiritual
        development in youth development programs and practices: Opportunities and
        challenges. *New Directions for Youth Development, 2008*(118), 16.

Plueddemann, J. E. (1995). The power of Piaget. In J. C. Wilhoit & J. M. Dettoni (Eds.),
        Nurture that is Christian. Wheaton, IL: Victor Books.

Poggio, J. (2002). NCEA ACRE's Performance standards reports move assessment
        beyond percentile rankings. *Momentum, 33*(3), 24-27.

Popham, W. J., & Husek, T. R. (1969). Implications of criterion-referenced measurement.
        Journal of Educational Measurement, 6(1), 1-9.

Poscente, K. R. (2006). Skills of the researcher. Retrieved from
        http://cider.athabascau.ca/CIDERSIGs/DesignBasedSIG/DesignBasedDiscussion/t
        alkback/1145476752

Prensky, M. (2001a). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-5.

248

Prensky, M. (2001b). Digital natives, digital immigrants, part II: Do they really think differently? *On the Horizon, 9*(6).

Prothero, S. R. (2007). *Religious literacy: What every American needs to know - and doesn't* (1st ed.). San Francisco: Harper.

Quinn, J. (2008). Perspectives on spiritual development as part of youth development. *New Directions for Youth Development, 2008*(118), 73-77.

Raaijmakers, Q. A. W., Van Hoof, A., Hart, H. t., Verbogt, T. F. M. A., & Vollebergh, W. A. M. (2000). Adolescents' midpoint responses on Likert-Type Scale items: Neutral or missing values? *International Journal of Public Opinion Research, 12*(2), 208-217.

Ratcliff, D. (2007). "The Spirit of Children Past": A century of children's spirituality research. *Christian Education Journal, 4*(2), 218-237.

Ratcliff, D. (Ed.). (2004). *Children's spirituality: Christian perspectives, research, and applications*. Eugene, OR: Cascade Books.

Reeves, D. B. (2002). *Holistic accountability: Serving students, schools, and community*. Thousand Oaks, CA: Corwin.

Reeves, T. C. (2000, April). *Enhancing the worth of instructional technology research through "Design Experiments" and other development research strategies.* Paper presented at the Symposium re "International Perspectives on Instructional Technology Research for the 21st Century", New Orleans, LA, USA.

Reeves, T. C. (2005). Design-based research in educational technology: Progress made, challenges remain. *Educational Technology, 45*(1), 18-52.

Reeves, T. C., Herrington, J., & Oliver, R. (2005). Design research: A socially responsible approach to instructional technology research in higher education. *Journal of Computing in Higher Education, 16*(2), 97-116.

Regnerus, M. D. (2003). Religion and positive adolescent outcomes: A review of research and theory. *Review of Religious Research, 44*(4), 394-413.

Regnerus, M. D., Smith, C., & Fritsch, M. (2003). *Religion in the lives of American adolescents: A review of the literature*. National Study of Youth and Religion. (Report 3)

Regnerus, M. D., Smith, C., & Smith, B. (2004). Social context in the development of adolescent religiosity. *Applied Developmental Science, 8*(1), 27-38.

Regnerus, M. D., & Uecker, J. E. (2006). Finding faith, losing faith: Prevalence and context of religious transformations during adolescence. *Review of Religious Research, 47*(3), 217-237.

Reichard, R. J. (1999). The effects of computers in surveys. Retrieved from http://clearinghouse.missouriwestern.edu/manuscripts/117.php

Reigeluth, C. M. (1994). The imperative for systemic change. In C. M. Reigeluth & R. J. Garfinkle (Eds.), *Systemic change in education*. Englewood Cliffs, NJ: Educational Technology Publications.

Reigeluth, C. M. (1996). A new paradigm of ISD. *Educational Technology, 36*(3), 13-20.

Reigeluth, C. M. (2006). A vision of an information-age educational system. *TechTrends, 50*(2), 53-54.

Revelle, W., & Zinbarg, R. E. (2009). Coefficients alpha, beta, omega, and the glb: Comments on Sijtsma. *Psychometrika, 74*(1), 145-154.

Rice, G., & Gillespie, V. B. (1992). ValueGenesis: A mega-study of faith maturity and its relationship to variables within the home, school, and church. *Journal of Research on Christian Education, 1*(1), 49--67.

Rice, R. (1997). *Reign of God*. Berrien Springs, MI: Andrews University Press.

Richey, R. C. (2005). Validating instructional design and development models. In J. M. Spector, C. Ohrazda, A. Van Schaack & D. A. Wiley (Eds.), *Innovations in Instructional Technology*.

Richey, R. C., & Klein, J. D. (2007). *Design and development research methods, strategies and issues*. London: Lawrence Erlbaum Associates.

Richey, R. C., Klein, J. D., & Wayne, A. N. (2004). Development research: Studies of instructional design and development. In D. H. Jonassen (Ed.), *Handbook of Research on Educational Communications and Technology* (pp. 1099-1130): Lawrence Erlbaum Associates.

Risko, E. F., Quilty, L. C., & Oakman, J. M. (2006). Socially desirable responding on the web: Investigating the candor hypothesis. *Journal of Personality Assessment, 87*(3), 269-276. doi: 10.1207/s15327752jpa8703_08

Roach, A. T., Niebling, B. C., & Kurz, A. (2008). Evaluating the alignment among curriculum, instruction, and assessments: Implications and applications for research and practice. *Psychology in the Schools, 45*(2), 158-176. doi: 10.1002/pits.20282

Roehlkepartain, E. C., Benson, P. L., King, P. E., & Wagener, L. M. (2006). Spiritual development in childhood and adolescence: Moving to the scientific mainstream. In E. C. Roehlkepartain, P. L. Benson, P. E. King & L. M. Wagener (Eds.), *The handbook of spiritual development in childhood and adolescence* (pp. 1-15). Thousand Oaks, CA: Sage.

Roehlkepartain, E. C., Benson, P. L., Scales, P. C., Kimball, L., & King, P. E. (2008). *With their own voices: A global exploration of how today's young people experience and think about spiritual development.* Minneapolis, MN: Center for Spiritual Development in Childhood and Adolescence/Search Institute. Retrieved from http://www.spiritualdevelopmentcenter.org/Images/mmDocument/PDFs/CSD2008-WithTheirOwnVoices1.pdf

Roehlkepartain, E. C., King, P. E., Wagener, L., & Benson, P. L. (2005). *The handbook of spiritual development in childhood and adolescence.* Thousand Oaks, CA: Sage.

Rohrer, K. L. (2000). *The explicitness of faith development curriculum for adolescents in private Christian schools* (Doctoral dissertation, Baylor University). Available from ProQuest Digital Dissertations database.

Rothman, J., & Thomas, E. J. (1994). *Intervention research: Design and development for human service.* London: Routledge.

Roux, C. (2005). Religion in education, perceptions and practices: International Network for Interreligious and Intercultural Education. *Scriptura : International Journal of Bible, Religion and Theology in Southern Africa, 89*, 293-306.

Roux, C. (2006). Children's spirituality in social context: A South African example. *International Journal of Children's Spirituality, 11*(1), 151-163.

Roy, D. (2009). Christian schools: A world of difference. *Teach, 2*(1), 38-44.

Samra, J. G. (2003). A biblical view of discipleship. *Biblioteca Sacra, 160*(April-June), 219-234.

Sandoval, W. A., & Bell, P. (2004). Design-based research methods for studying learning in context. *Educational Psychologist, 39*(4), 199-201. doi: 10.1207/s15326985ep3904_1

Savage, S., Collins-Mayo, S., Mayo, B., & Cray, G. (2006). *Making sense of generation Y: The world view of 15-25-year-olds.* London: Church House Publishing.

Scarlett, W. G. (2005). Toward a developmental analysis of religious and spiritual development. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence* (pp. 21-33). Thousand Oaks: Sage.

Schubert, W. H. (2008). Inquiring into curriculum. In F. M. Connelly, M. F. He & J. Phillion (Eds.), *The Sage handbook of curriculum and instruction.* Los Angeles: Sage.

Schwadel, P., & Smith, C. (2005). *Portraits of Protestant teens.* National Study of Youth & Religion.

Search Institute. (2009). What kids need: Developmental assets. Retrieved from http://www.search-institute.org/assets/

Sewell, A. (2009). Evoking children's spirituality in the reciprocal relationships of a learning community. *International Journal of Children's Spirituality, 14*(1), 5-16.

Shapiro, S. (1999). *Spiritual education: An assessment of Jewish adolescents* (Doctoral dissertation, Temple University). Available from ProQuest Digital Dissertations database.

Shared Christian praxis learning process. (n.d.). Retrieved from http://www.generationsoffaith.org/labstorage/Lab_6-DesigningPreparationPrograms-SharedChristianPraxis.pdf

Shavelson, R. J., Phillips, D. C., Towne, L., & Feur, M. J. (2003). On the science of education design studies. *Educational Researcher, 32*(1), 25-28. doi: 10.3102/0013189X032001025

Sheldrake, P. (2000). What is spirituality? In K. J. Collins (Ed.), *Exploring Christian Spirituality.* Grand Rapids, MI: Baker Books.

Sherr, M. E., Garland, D. R., & Wolfer, T. A. (2007). The role of community service in the faith development of adolescents. *Journal of Youth Ministry, 6*(1), 43-54.

Shortt, J. (1997). Christian education does mean something. *The CARE Review, 9*(1).

Sijtsma, K. (2008). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika, 74*(1), 107-120.

Sijtsma, K. (2009). Reliability beyond theory and into practice. *Psychometrika, 74*(1), 169-173.

Simonson, M. (2006). Design-based research. *Quarterly Review of Distance Education, 7*(1), vii-viii.

Sire, J. W. (2004). *The universe next door: A basic worldview catalog* (4th ed.). Downers Grove, IL: InterVarsity Press.

Sireci, S. G., & Parker, P. (2006). Validity on trial: Psychometric and legal conceptualizations of validity. *Educational Measurement: Issues and Practice, 25*(3), 27-34. doi: 10.1111/j.1745-3992.2006.00065.x

Slamp, D. A. (1989). *The spirituality factor: A vital dimension of church growth* (Doctoral dissertation, Fuller Theological Seminary). Available from Proquest Digital Dissertations database.

Slamp, D. A. (1997). *Spiritual growth survey*. Elkton, MD: Church Growth Institute.

Smith, C. (2003). Theorizing religious effects among American adolescents. *Journal for the Scientific Study of Religion, 42*, 17-30.

Smith, C., & Denton, M. L. (2005). *Soul searching: The religious and spiritual lives of American teenagers*. New York: Oxford University Press.

Smith, C., & Faris, R. (2002). *Religion and American adolescent delinquency, risk behaviors and constructive social activities*. National Study of Youth and Religion. (Report 1)

Smith, C., & Faris, R. (2002b). *Religion and the life attitudes and self-images of American adolescents*. National Study of Youth and Religion. (Report 2)

Smith, M. K. (1999). The social/situational orientation to learning. *The Encyclopaedia of Informal Education*. Retrieved from http://www.infed.org/biblio/learning-social.htm

Spady, W. (2008). Dis genoeg: Maak 'n einde aan die verwarring oor Uitkomsgerigte Onderwys in Suid-Afrika. *Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie, 27*(1), 17-.

Speak Up 2009. (2010). *Creating our future: Students speak up about their vision for 21st century learning*. Project Tomorrow.

Spencer, J. P., Thomas, M. S. C., & McClelland, J. L. (Eds.). (2009). *Toward a unified theory of development: Connectionism and dynamic systems theory re-considered*. New York: Oxford.

Spilka, B., R, H., & Gorsuch, R. L. (1985). *The psychology of religion: An empirical approach*. Englewood Cliffs, NJ: Prentice-Hall.

Spiritual growth assessment. (2007, November). Retrieved from http://www.lifeway.com/lwc/files/lwcF_PDF_DSC_Spiritual_Growth_Assessment.pdf

Spiritual values assessment. (2009, March 19). Retrieved from http://www.acsi.org/Resources/ReferenceLibrary/tabid/568/itemId/1002/Default.aspx

Squires, D. A. (2005). *Aligning and balancing the standards-based curriculum*. Thousand Oaks: Corwin.

Stanton, H. (1988). Independent study: A matter of confidence. In D. Boud (Ed.), *Developing student autonomy in learning*. New York: Nichols.

Stark, R. (2002). Physiology and faith: Addressing the "universal" gender difference in religious commitment. *Journal for the Scientific Study of Religion, 41*, 495-507.

Steele, L. L. (1995). The power of Erikson. In J. C. Wilhoit & J. M. Dettoni (Eds.), *Nurture that is Christian*. Wheaton, IL: Victor Books.

Stenhouse, L. (1975). *An introduction to curriculum research and development*. Oxford: Heinemann.

Stensland, D. W. (1991). *Development of a Christian Lifestyle Inventory* (Doctoral dissertation, University of Alberta). Available from ProQuest Digital Dissertations database.

Stonehouse, C. (1995). The power of Kohlberg. In J. C. Wilhoit & J. M. Dettoni (Eds.), *Nurture that is Christian*. Wheaton, IL: Victor Books.

Stonehouse, C. (1998). *Joining children on the spiritual journey: Nurturing the life of faith*. Grand Rapids, MI: Baker Book House.

Stonehouse, C., & May, S. (2008). The story and the spiritual formation of children in the church and in the home. In H. C. Allen (Ed.), *Nurturing children's spirituality* (pp. 366-379). Eugene, OR: Cascade.

Strengths-based development. (2009). Retrieved from http://www.gallup.com/consulting/61/Strengths-Development.aspx

Strom, P., Strom, R., Wing, C., & Beckert, T. (2009). Adolescent learning and the internet. *NASSP Bulletin, 93*(2), 111-121.

Swezey, R. W. (1981). *Individual performance assessment: An approach to criterion-referenced test development*. Reston, VA: Reston Publishing.

Taba, H. (1962). *Curriculum development: Theory and practice*. New York: Harcourt.

Taggart, G. (2002). Spiritual literacy and tacit knowledge. *Journal of Beliefs and Values: Studies in Religion & Education, 23*(1), 7-17. doi: 10.1080/13617670220125638

Tamminen, K. (1994). Religious experiences in childhood and adolescence: A viewpoint of religious development between the ages of 7 and 20. *International Journal for the Psychology of Religion, 4*(2), 61-85.

Taras, M. (2005). Assessment - summative and formative - some theoretical reflections. *British Journal of Educational Studies, 53*(4), 466-478.

Taras, M. (2008). Issues of power and equity in two models of self-assessment. *Teaching in Higher Education, 13*(1), 81-92.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Tashakkori, A., & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: SAGE.

Taylor V, J. W. (2000). *A biblical foundation for the integration of faith and learning*. Paper presented at the 27th Institute of Christian Teaching, Mission College, Thailand.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In C. Teddlie & A. Tashakkori (Eds.), *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

Teddlie, C., & Tashakkori, A. (2006). A general typology of research designs featuring mixed methods. *Research in the Schools, 13*(1), 12-28.

Templeton, J. L., & Eccles, J. S. (2005). The relation between spiritual development and identity processes. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence*. Thousand Oaks, CA: Sage.

Terry, J. P. (1983). *Construction and validation of the Peck-Terry-Layton Scale of Religious Values* (Doctoral dissertation, Iowa State University). Available from ProQuest Digital Dissertations database.

Thayer, J. D. (1992). *What we have learned about religious education from the religion achievement test results*. Paper presented at the Seventh-day Adventist North American Division Commission on Religious Education. http://circle.adventist.org/browse/resource.phtml?leaf=6435

Thayer, J. D. (1993). Measuring faith maturity: Reassessing ValueGenesis and development of a denomination-specific scale. *Journal of Research on Christian Education, 2*(1), 93-113.

Thayer, O. J. (1996). *Assessing participation in the spiritual development modes: Construction and testing of the Christian Spiritual Participation Profile* (Doctoral dissertation, Trinity Evangelical Divinity School). Available from ProQuest Digital Dissertations database.

Thayer, O. J. (2004). Constructing a spirituality measure based on learning theory: The Christian Spiritual Participation Profile. *Journal of Psychology and Christianity, 23*(3), 195-207.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.

Thompson, S. J., Johnstone, C. J., Anderson, M. E., & Miller, N. A. (2005). *Considerations for the development and review of universally designed assessments* (Technical Report 42). University of Minnesota: National Center on Educational Outcomes.

Thurber, A. M. (2005). Conclusion. In P. W. Cobb (Ed.), *Gateways to spirituality: Pre-school through grade twelve*. New York: Peter Lang Publishing.

Tisdale, T. C. (1999). The Faith Maturity Scale: A review. In P. Hill, R. Butman & R. Hood (Eds.), *Measures of Religious Behavior*. Birmingham, AL: Religious Education Press.

Tourangeau, R., & Smith, T. W. (1996). Asking sensitive questions: The impact of data collection mode, question format, and question context. *Public Opinion Quarterly, 60*(2), 275-304.

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin, 133*(5), 859-883.

Tracy, F. (1922). The meaning of religious education. *Religious Education, 17*(Feb), 3-8.

Travis, J. W., & Ryan, R. S. (2004). *Wellness index*. Berkeley, CA: Celestial Arts.

Trent, J. T., Osborne, R., & Bruner, K. D. (Eds.). (2000). *Parents' guide to the spiritual growth of children: Helping your child develop a personal faith*. Nashville, TN: Focus on the Family.

Trochim, W. M. (2006). The research methods knowledge base (2nd ed.) Retrieved from http://www.socialresearchmethods.net/kb/

Tuck, R. (1997). Is self-assessment a valid concept? In C. Cullingford (Ed.), *Assessment versus evaluation*. London: Cassell.

Tyler, R. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.

Uebersax, J. S. (2006). Likert scales: Dispelling the confusion. *Statistical Methods for Rater Agreement, 2010*(March 6). Retrieved from http://www.john-uebersax.com/stat/likert.htm

Uecker, J. E. (2009). Catholic schooling, Protestant schooling, and religious commitment in young adulthood. *Journal for the Scientific Study of Religion, 48*(2), 353-367. doi: 10.1111/j.1468-5906.2009.01451.x

US Department of Health & Human Services. (n.d.). Step-by-step usability guide. Retrieved from http://www.usability.gov

Valuegenesis Europe. (2006-2008). Retrieved from http://valuegenesis.org/material.htm

ValueGenesis: Study 1 core report. (1993). Wahroonga, NSW: South Pacific Division of Seventh-day Adventists.

Van den Akker, J. (1999). Principles and methods of development research. In J. van den Akker, N. Nieveen, R. M. Branch, K. L. Gustafson & T. Plomp (Eds.), *Design methodology and developmental research in education and training* (pp. 1-14). Dordrecht, Netherlands: Kluwer Academic Publishers.

Van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). *Educational design research.* London: Routledge.

Van der Walt, J. L., & Zecha, G. (2004). Philosophical-pedagogical criteria for assessing the effectiveness of a Christian school. *Journal of Research on Christian Education, 13*(2), 167-198.

Van Dyk, J. (2000). *The craft of Christian teaching: A classroom journey.* Sioux Center, IA: Dordt.

Van Geert, P. (1994). *Dynamic systems of development: Change between complexity and chaos.* New York: Harvester Wheatsheaf.

Van Geert, P. (2000). The dynamics of general developmental mechanisms: From Piaget and Vygotsky to dynamic systems models. *Current Directions in Psychological Science, 9*(2), 64-68.

Vygotsky, L. S. (1962). *Thought and language.* New York: John Wiley & Sons.

Waggoner, B. J. (2008). *The shape of faith to come: Spiritual formation and the future of discipleship.* Nashville, TN: B&H Books.

Walker, D. F. (2003). *Fundamentals of curriculum: Passion and professionalism* (2nd ed.). London: Lawrence Erlbaum Associates.

Walker, L. J., & Reimer, K. S. (2005). The relationship between moral and spiritual development. In E. C. Roehlkepartain, P. E. King, L. Wagener & P. L. Benson (Eds.), *The handbook of spiritual development in childhood and adolescence.* Thousand Oaks, CA: Sage.

Wallace, J. M., Forman, T. A., Caldwell, C. H., & Willis, D. S. (2003). Religion and U.S. secondary school students: Current patterns, recent trends, and sociodemographic correlates. *Youth & Society, 35*, 98-125.

Wang, F., & Hannafin, M. J. (2004). *Using design-based research in design and research of technology-enhanced learning environments.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

Wang, F., & Hannafin, M. J. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development, 53*(4), 5-23. doi: 10.1007/BF02504682

Wangerin, W. (1996). *The orphean passages: The drama of faith*. Grand Rapids, MI: Zondervan.

Watson, B. (2007). Secularism, schools and religious education. In M. Felderhof, P. Thompson & D. Torevell (Eds.), *Inspiring faith in schools: Studies in religious education*. Aldershot, Hampshire: Ashgate.

Weaver, A. J. J., Samford, J. A., Morgan, V. J., Lichton, A. I., Larson, D. B., & Garbarino, J. (2000). Research on religious variables in five major adolescent research journals: 1992 to 1996. *The Journal of Nervous and Mental Diseases, 188*(1), 36-44.

Webb, N. L. (2007). Issues related to judging the alignment of curriculum standards and assessments. *Applied Measurement in Education, 20*(1), 7-25.

Webster, P. A. (1996). *Moral orientation, ego maturity, and religious commitment: An exploratory study from a developmental perspective.* Ph.D., Andrews University, Berrien Springs, MI.

Welk, G. J., & Meredith, M. D. (Eds.). (2008). *Fitnessgram / Activitygram Reference Guide*. Dallas, TX: The Cooper Institute.

Wenger, E. (2007). Communities of practice. A brief introduction. Retrieved from http://www.ewenger.com/theory/

Westerhoff III, J. H. (1979). Editorial. *Religious Education, 74*(4), 338.

Westerhoff III, J. H. (2000). *Will our children have faith?* (Revised ed.). Harrisburg, PA: Morehouse Publishing.

Whelply, H. H. (1997). Assessing spiritual development of students in the Concordia University system. *Lutheran Education, 132*, 124-133.

White, E. G. (1903). *Education*. Nampa, ID: Pacific Press.

Whitson, J. A. (2007). What is curriculum? Retrieved from http://wp.me/p1V0H-q

Wiggins, G. (1993). *Assessing student performance: Exploring the purpose and limits of testing*. San Francisco, CA: Jossey-Bass.

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. San Francisco, CA: Jossey-Bass.

Wiggins, G., & McTighe, J. (1999). *The understanding by design handbook*. Alexandria, VA: Association for Supervision and Curriculum Development.

Wiggins, G., & McTighe, J. (2008). Reshaping high schools: Put understanding first. *Educational Leadership, 65*(8), 36-41.

Wikia. (n.d.). Psychometric assessment. Retrieved June 30, 2008, from http://psychology.wikia.com/wiki/Psychometric_assessment

Wiles, J. (2005). *Curriculum essentials: A resource for educators* (2nd ed.). Boston: Allyn and Bacon.

Wilhoit, J. C., & Dettoni, J. M. (1995). *Nurture that is Christian.* Wheaton, IL: Victor Books.

Wilkins, M. J. (1992). *Following the master: A biblical theology of discipleship.* Grand Rapids, MI: Zondervan.

Williams, D. D., Hricko, M., & Howell, S. L. (2006). *Online assessment, measurement, and evaluation: Emerging practices.* Hershey, PA: Information Science Publishing.

Witte, J. C., Amoroso, L. M., & Howard, P. E. N. (2000). Research methodology: Method and representation in internet-based survey tools – mobility, community, and cultural identity in survey. *Social Science Computer Review, 18*(2), 179-195.

Wolters, C. A., Pintrich, P. R., & Karabenick, S. A. (2005). Assessing academic self-regulated learning. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development* (pp. 251-270). New York: Springer.

Woolley, K. K. (1996). *Revised thinking about the nature of score validity.* Paper presented at the Annual Meeting of the Southwest Educational Research Association, New Orleans, LA.

Wraga, W. G. (1999). "Extracting sun-beams out of cucumbers": The retreat from practice in reconceptualized curriculum studies. *Educational Researcher, 28*(1), 4-13. doi: 10.3102/0013189X028001004

Wright, A. (1993). *Religious education in the secondary school: Prospects for religious literacy.* London: David Fulton.

Wright, A. (2001a). The contours of critical religious education: Knowledge, wisdom, truth. *British Journal of Religious Education, 25*(4), 279-291.

Wright, A. (2001b). Dancing in the fire: A deconstruction of Clive Erricker's postmodern spiritual pedagogy. *Religious Education, 96*(1), 120-135.

Wuthnow, R. (1998). *After heaven: Spirituality in America since the 1950s.* Berkeley: University of California Press.

Wuthnow, R. (2003). Spirituality and spiritual practices. In R. K. Fenn (Ed.), *Sociology of religion: The Blackwell companion to*. Oxford, UK: Blackwell Publishing.

Youniss, J., McLellan, J. A., & Yates, M. (1999). Religion, community service, and identity in American youth. *Journal of Adolescence, 22*, 243-253.

Yount, W. R. (1996). *Created to learn: A Christian teacher's introduction to educational psychology*. Nashville: Broadman & Holman Publishers.

Yount, W. R., & Barnett, M. (2007). *Called to reach: Equipping cross-cultural disciplers*. Wheaton, IL: Tyndale House.

Yust, K. M., Johnson, A. N., Sasso, S. E., & Roehlkepartain, E. C. (Eds.). (2006). *Nurturing child and adolescent spirituality: Perspectives from the world's religious traditions*. Lanham, MD: Rowman & Littlefield.

Ziebertz, H.-G. (2003). *Religious education in a plural western society*. Rutgers University, NJ: Transaction Publishers.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3-17.

Zimmerman, B. J. (2008). Goal setting: A key proactive source of academic self-regulation. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications*. New York: Lawrence Erlbaum.

Zinnbauer, B. J., & Pargament, K. I. (2005). Religiousness and spirituality. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality*. New York: Guildford Press.

Zinnbauer, B. J., Pargament, K. I., Cole, B., Rye, M. S., Butter, E. M., Belavich, T. G. (1997). Religion and spirituality: Unfuzzying the fuzzy. *Journal for the Scientific Study of Religion*.

Zohar, D., & Marshal, I. (2000). *SQ: Connecting with our spiritual intelligence*.

APPENDICES A-I

The following Appendices, referenced in Chapters 1-5, further document the development of the *Growing Disciples Inventory* (GDI) as a self-assessment for adolescents participating in Christian education.

APPENDIX A

GROWING DISCIPLES INVENTORY (GDI)

A-1: GDI ITEMS WITHIN CONSTRUCTS

Inventory items are shown clustered under the GD curriculum framework commitments (goals in curriculum terminology, constructs or factors in statistical analysis). Items are numbers in the order they appeared in the GDI during the validation phase. The Likert scales for the response sets in Sections 1-4 are included in the key below. All research was conducted online through the research website http://inventory.growingdisciples.info. A sample report can be viewed by entering code '100' after clicking 'view report' on the homepage.

CONNECTING: GROWING IN RELATIONSHIP WITH GOD, SELF, AND OTHERS

C1. As a growing disciple, I am deepening my relationship with God.
2. One way I love to learn about God is by studying the Bible.
3. I feel closer to God when I'm out in nature or studying His creation.
83. I have experienced God's presence or help in my life.
84. I have experienced answers to prayer.
85. I attend meetings or worship services at my church.

C2. As a growing disciple, I am discovering who I am in relationship to Christ.
1. I know God has a special purpose for my life.
4. I am sure that whatever God asks me to do can be accomplished through His strength.
5. Spending time with Jesus helps me understand who I am and why I'm here.
6. The Holy Spirit prompts me to confess my sins and to make things right.
7. I am not sure that my sins are forgiven when I confess them to God.   (reverse scored)

C3. As a growing disciple, I am developing Christ-like family relationships.
8. I show my love for my family by helping at home without being asked.
9. Helping guests feel welcome in my home is not important to me.   (reverse scored)
76. God designed marriage and families to help me understand His love.
86. How much have your family relationships helped you follow Jesus?
87. I willingly read the Bible or pray for family worship.

C4. As a growing disciple, I am developing Christ-like relationships with others in my church/religious faith.
10. I enjoy worshipping with others in my church.
11. I am not interested in hearing about mission projects. (reverse scored)
12. My best friends love God as much or more than I do.
13. I enjoy talking with one or more of my friends about spiritual things.

C5. As a growing disciple, I am developing Christ-like relationships with those who are not from my church or family.
14. I avoid people whose beliefs are different from mine.   (reverse scored)
15. By God's grace, I am able to forgive others who hurt me.
16. I am kind to neighbours regardless of their age, culture, or religion.

17. What I do while shopping or working shows others that honesty is important to me.
18. I pray for people who don't know God yet.

UNDERSTANDING: GROWING THROUGH STUDYING AND OBEYING GOD'S WORD

U1. As a growing disciple, I am learning that Christ calls me to be His disciple.
52. The things I do reflect my daily commitment to live for Jesus. (m1)
53. I memorize Bible verses and passages. (c1)
54. I pray for the Holy Spirit to be my guide in living for Jesus. (m3)
55. I obey what I have learned from the Bible even when it is difficult.(m1)
56. My faith in God shapes what is important to me. (c1)

U2. As a growing disciple, I am learning that God is the source of life.
60. God reveals Himself as Father, Son, and Holy Spirit, a unity of three eternal Persons.
61. God, our Heavenly Father, still maintains and cares for all He created on this earth and throughout the universe.
62. God is the all-powerful source of life; He still works miracles today.
63. God created the weekly seventh-day Sabbath as a time to reconnect with Him.

U3. As a growing disciple, I am learning about the consequences of the human fall from God's original plan.
64. There is a great controversy taking place between God and Satan. It began in heaven with the rebellion of Lucifer and will continue until the end of time.
65. The first man and woman, created as free beings in the image of God, chose to rebel against God. I have inherited their fallen nature along with all its consequences.
66. The Ten Commandments reveal God's character and design for my happiness.
67. Sin damaged God's perfect creation of this earth; all of nature was affected.

U4. As a growing disciple, I am learning that God has provided everything needed to save me.
57. When I'm serving God and keeping His commandments, God loves me more. (reverse scored)
58. Even if I don't choose to follow Jesus, God still loves me and does everything possible to save me.
68. Before God created this earth, He made a plan to rescue people if they chose to follow Satan and become sinners.
69. God the Son, Jesus, became truly human so He could save me from my sins.
70. Jesus' death defeated Satan; He gives me victory over sin.
71. When people die, they remain in the grave until the resurrection.
72. Those who reject God's grace will not burn forever but will be totally destroyed.
73. Being baptized shows others I personally accept Jesus as my Saviour, and want to follow Him.
74. Taking part in the Communion Service expresses thanks to Jesus for saving me.

U5. As a growing disciple, I am learning that God has provided everything needed to restore me to His image.
59. I choose to be a good steward of all God created by using natural resources wisely.
75. The church is God's family on earth, a community of faith in which many members, all equal in Jesus, join for worship, instruction and service.
78. God gave Ellen White prophetic messages to help the Adventist church share the truth about God.
79. Jesus calls end-time believers to prepare the world for His second coming.
80. The elements of the earthly sanctuary help me understand why Jesus died for me and what He's doing in the heavenly sanctuary now.
81. The end-time millennium begins with Jesus' second coming when those who accept God's grace are taken to heaven, and ends with the final destruction of those who reject God's grace.

82. After the millennium, God will recreate the earth as a perfect, eternal home for the saved. Sin will never exist again.

MINISTERING: GROWING BY PARTICIPATING IN GOD'S MISSION OF REVEALING HIMSELF AND DRAWING US BACK TO HIM

M1. As a growing disciple, I am sharing my faith through my daily activities.
31. After I ask the Holy Spirit to lead me, I wait to hear or see what God wants me to do.
32. I enjoy humbly doing my best for God in ordinary daily activities.
33. What I watch and listen to shows others that God is important to me.
34. I stand up for what is right even if my friends don't join me.

M2. As a growing disciple, I am helping others grow more like Jesus.
35. I help my friends with their religious questions or struggles.
36. I pray for those I love, asking God to help them grow spiritually.
37. I invite friends to attend church or school religious activities with me.
38. I encourage or teach younger kids how to live for God.

M3. As a growing disciple, I am responding to the needs of God's suffering children.
39. I volunteer to help with community service projects such as cleaning up my neighbourhood.
40. I try to help people who are poor, hungry, sick or unable to care for themselves.
41. I choose to show respect for God's creation by recycling or reusing paper, plastics or other disposable items.
42. I plan to participate in activities that promote social justice or respectful care of people who are mistreated.
43. I enjoy serving others regardless of their age, culture, religion, or status.

M4. As a growing disciple, I am supporting my church's ministries with personal resources.
44. I willingly share what God gives me with others.
45. I support God's work by paying tithe on what I earn or am given.
46. I enjoy giving my time to help people through my church's ministries.
47. I give personal money for missions or other projects that share God's love.

M5. As a growing disciple, I am helping my church tell the story of Jesus.
48. I pray for the Holy Spirit to prepare me to share the good news about God with others.
49. I don't know enough about Jesus to tell others about Him. (reverse scored)
50. I am willing to talk with people outside of my church family about my faith.
51. I'm ashamed to explain what I believe about God. (reverse scored)
77. God gives me spiritual gifts to help tell others the story of Jesus.

EQUIPPING: GROWING THE BODY OF CHRIST BY DISCIPLING ONE ANOTHER

E1. Growing disciples help one another to deepen their relationship with Christ.
19. I talk with one or more of my friends about what God is like.
20. I have helped one or more people to grow stronger in their faith in God.
88. Who is helping you to know and love God?
89. Who is encouraging you to spend quiet time with God daily?

E2. Growing disciples help one another build Christ-like relationships with others.
21. I share jokes that make fun of other people or Christian living. (reverse scored)
22. I encourage friends to humbly honour God when praised or thanked.
90. Who talks with you about their faith or relationship with God?

91. Who is helping you learn how to resolve conflicts in a Christ-like way?

E3. Growing disciples help one another study and obey God's Word.
23. I encourage my friends to join me in doing what the Bible teaches, wherever we are.
24. I am too young to help anyone study the Bible. (reverse scored)
92. Who is helping you understand that Jesus is the centre of all the Bible teaches?
93. Who helps you understand how God's Word applies today?

E4. Growing disciples help one another live a contagious, holistic Christian life.
25. I encourage my friends to care for their bodies as the temple of God.
26. I have encouraged one or more friends to say no to things that destroy healthy relationships, such as eating unhealthy foods or doing drugs.
94. Who is inspiring you to obey God's laws to protect your health and happiness?
95. Who is encouraging you to tell others the story of Jesus?
96. Whose Christ-like life inspires you to follow Jesus more each day?

E5. Growing disciples help one another discover God working in their lives and His world.
27. When I discover how God is working somewhere, I enjoy telling my friends about it.
28. When I notice God leading in a friend's life, I share what I observe to strengthen their faith.
97. Who is helping you understand God's purpose for your life?
99. *Where* are you learning about God's work around the world?

E6. Growing disciples help one another discover and use spiritual gifts in God's work.
29. I help my friends recognize their God-given talents and skills.
30. I encourage my friends to use their spiritual gifts to serve God.
98. Who is helping you to identify your spiritual gifts?
100. *Where* are you using your abilities or strengths to serve God?

A-2: GDI RESPONSE SETS

Section 1: Items 1-59
How often is this true about you? Choose ONE of these options:

Always true	80-100% of the time
Often true	60-79% of the time
Sometimes true	40-59% of the time
Not often true	20-39% of the time
Never true	0-19% of the time
I don't understand:	check this if the statement makes no sense to you

Section 2: Items 60-82
Which words best describe what you *personally* believe about each statement?

I strongly believe this
I believe this
I have some doubts
I strongly doubt this
I don't believe this
I don't understand this

Section 3: Items 83-87
Read all options carefully before choosing the one that's most true about you.

#83 & 84
__ yes, once __ yes, occasionally __ yes, many times __ no, never __ I don't understand

#85
__ more than once a week   __ once a week __ 2-3 times a month __ once a month __ several times a year __ does not apply __ I don't understand

#86
__ very much ___ somewhat __ not much ___ not at all __ does not apply __ I don't understand

#87
__ more than once a week __ once a week __ once a month __ seldom or never

__my family doesn't worship together at home __ I don't understand

Section 4: Items 88-100
Check ALL boxes that are true for you for each question.

#88-98   one or both parents
one or more other family members
one or more school teachers
one or more adults in my church
one or more friends
others

#99-100 __at home __ at school __ at church __ magazines or television __ internet __ other

A-3: GDI VALUE TABLES

The following values were assigned to create the individual report graphs online, and for research data analysis.

For items 1-59 (except 9 reverse scored)
5 always true
4 often true
3 sometimes true
2 not often true
1 never true
0 I don't understand

Reverse scored
(7,9,11,14,21,24,49,51,57)
1 always true
2 often true
3 sometimes true
4 not often true
5 never true
0 I don't understand

For items 60-82
5 I strongly believe
4 I believe
3 I have some doubts
2 I strongly doubt
1 I don't believe
0 I don't understand

For items 83-84
1 yes, once
3 yes, occasionally
5 yes, many times
0 no, never
0 I don't understand

For item 85
5 more than once a week
4 once a week
3 2-3 times a month
2 once a month
1 several times a year
0 does not apply
0 I don't understand

For item 86
5 very much
3 somewhat
1 not much
0 not at all/does not apply/don't understand

For item 87
5 more than once a week
4 about once a week
3 about once a month
1 seldom or never
0 my family does not have worship at home
0 I don't understand

For item 88-98 (SUM checked options)
one or both parents
one or more other family members
one or more school teachers
one or more adults in my church
one or more friends
others

For item 99 (SUM checked options)
at home
at school
at church
through magazines or television
through the internet
other

For item 100 (SUM checked options)
at home
at school
at church
on mission trips
in my community
other

A-4: GDI BACKGROUND INFORMATION FIELDS

Gender
male
female

Age
13
14
15
16
17
18
19
child
adult

Grade
Grade 7
Grade 8
Grade 9
Grade 10
Grade 11
Grade 12
child
adult

Type in your school's name
text entry field

How many years have you lived in this area?
1-2
3-5
more than 5

Which country are you a citizen of?
text entry field

What church do you usually attend?
Adventist Christian
Other Protestant Christian
Catholic Christian
Buddhist
Hindu
Jewish
Muslim
Another Religion
I don't attend religious services

If you are a Christian, have you made a personal commitment to follow Jesus?
yes
no
thinking about it
not interested
not a Christian

If you have been baptized a Seventh-day Adventist, select the year of baptism.
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
baptized but don't remember year
not baptized but planning to be
not an Adventist

What year were you born in?
text entry field

A-5: GDI REPORT SCORING

Scoring is programmed to create online graphs that display results for each individual, available directly after completing the GDI.

BAR GRAPHS

Four bar graphs are titled *Connecting, Understanding, Equipping* and *Ministering*. Each includes five or six bars. Formulas for calculation are listed in the left column, with labels in the right column.

Connecting Bar Graph	Bar Titles
$C1=(2+3+83+84+85)/5$	With God
$C2=(1+4+5+6+7)/5$	With Self
$C3=(8+9+76+86+87)/5$	With Family
$C4=(10+11+12+13)/4$	With Church
$C5=(14+15+16+17+18)/5$	With Others

Understanding Bar Graph	
$U1=(52+53+54+55+56)/5$	Spiritual Growth
$U2=(60+61+62+63)/4$	Nature of God
$U3=(64+65+66+67)/4$	Sin & Suffering
$U4=(57+58+68+69+70+71+72+73+74)/9$	Redemption
$U5=(59+75+78+79+80+81+82)/7$	Restoration

Equipping Bar Graph	
$E1=(19+20+88+89)/4$	Devotional Life
$E2=(21+22+90+91)/4$	Christ-like Relationships
$E3=(23+24+92+93)/4$	Bible Study
$E4=(25+26+94+95+96)/5$	Christian Lifestyle
$E5=(27+28+97+99)/4$	Doing God's Will
$E6=(29+30+98+100)/4$	Using Spiritual Gifts

Ministering Bar Graph	
$M1=(31+32+33+34)/4$	Personal Vocation
$M2=(35+36+37+38)/4$	Discipling Others
$M3=(39+40+41+42+43)/5$	Community Service
$M4=(44+45+46+47)/4$	Stewardship
$M5=(48+49+50+51+77)/5$	Evangelism

SUMMARY CIRCLE GRAPH

This is the first visual displayed, summarizing individual scores for each process. Clicking on a circle sector displays the bar graph comparing results in the five or six more specific commitments listed above.

Ways of Growing Spiritually	Circle Sector Titles
$C=(c1+c2+c3+c4+c5)/5$	Connecting
$U=(u1+u2+u3+u4+u5)/5$	Understanding
$E=(e1+e2+e3+e4+e5+e6)/6$	Equipping
$M=(m1+m2+m3+m4+m5)/5$	Ministering

APPENDIX B

RECOMMENDED GDI REVISIONS

B-1: TRIMMED GDI ITEMS

This GDI version incorporates all item and response set improvements reported on in this study. These refinements are recommended for future versions of the GDI, along with several minor technical improvements based on further reading or feedback from one or more samples, which did not directly relate to the research questions in this study. For clarity and comparison with Appendix A, item numbers are retained here, but will be adjusted in the trimmed GDI. Italicized items (other than U1) reference uniquely Seventh-day Adventist beliefs, and could be replaced or omitted for wider use in Christian education, with no significant impact on the reliability or validity of the GDI (cf. Table 4.8).

CONNECTING: GROWING IN RELATIONSHIP WITH GOD, SELF, AND OTHERS

C1. As a growing disciple, I am deepening my relationship with God.
  2. One way I love to learn about God is by studying the Bible.
  3. I feel closer to God when I'm out in nature or studying His creation.
83. I have experienced God's presence or help in my life.
84. I have experienced answers to prayer.
~~85. I attend meetings or worship services at my church.~~
53. I memorize Bible verses and passages. (from u1)
56. My faith in God shapes what is important to me. (from u1)

C2. As a growing disciple, I am discovering who I am in relationship to Christ.
  1. I know God has a special purpose for my life**.**
  4. I am sure that whatever God asks me to do can be accomplished through His strength.
  5. Spending time with Jesus helps me understand who I am and why I'm here.
  6. The Holy Spirit prompts me to confess my sins and to make things right.
  ~~7. I am not sure that my sins are forgiven when I confess them to God.   (reverse scored)~~

C3. As a growing disciple, I am developing Christ-like family relationships.
  8. I show my love for my family by helping at home without being asked.
  ~~9. Helping guests feel welcome in my home is not important to me.   (reverse scored)~~
76. God designed marriage and families to help me understand His love.
86. How much have your family relationships helped you follow Jesus?
87. I willingly read the Bible or pray for family worship.

C4. As a growing disciple, I am developing Christ-like relationships with others in my church/religious faith.
10. I enjoy worshipping with others in my church.
11. I am not interested in hearing about mission projects. (reverse scored)
12. My best friends love God as much or more than I do.
13. I enjoy talking with one or more of my friends about spiritual things.

C5. As a growing disciple, I am developing Christ-like relationships with those who are not from my church or family.
~~14. I avoid people whose beliefs are different from mine.   (reverse scored)~~
15. By God's grace, I am able to forgive others who hurt me.
16. I am kind to neighbours regardless of their age, culture, or religion.

17. What I do while shopping or working shows others that honesty is important to me.
18. I pray for people who don't know God yet.

UNDERSTANDING: GROWING THROUGH STUDYING AND OBEYING GOD'S WORD

U1. As a growing disciple, I am learning that Christ calls me to be His disciple.
move to m1 52. The things I do reflect my daily commitment to live for Jesus.
move to c1 53. I memorize Bible verses and passages.
discard   54. I pray for the Holy Spirit to be my guide in living for Jesus.
move to m1 55. I obey what I have learned from the Bible even when it is difficult.
move to c1 56. My faith in God shapes what is important to me.

U1. As a growing disciple, I am learning that God is the source of life.
60. God reveals Himself as Father, Son, and Holy Spirit, a unity of three eternal Persons.
61. God, our Heavenly Father, still maintains and cares for all He created on this earth and throughout the universe.
62. God is the all-powerful source of life; He still works miracles today.
63. God created the weekly seventh-day Sabbath as a time to reconnect with Him.

U2. As a growing disciple, I am learning about the consequences of the human fall from God's original plan.
64. There is a great controversy taking place between God and Satan. It began in heaven with the rebellion of Lucifer and will continue until the end of time.
65. The first man and woman, created as free beings in the image of God, chose to rebel against God. I have inherited their fallen nature along with all its consequences.
66. The Ten Commandments reveal God's character and design for my happiness.
67. Sin damaged God's perfect creation of this earth; all of nature was affected.

U3. As a growing disciple, I am learning that God has provided everything needed to save me.
57. When I'm serving God and keeping His commandments, God loves me more. (reverse scored)
58. Even if I don't choose to follow Jesus, God still loves me and does everything possible to save me.
68. Before God created this earth, He made a plan to rescue people if they chose to sin.
69. God the Son, Jesus, became truly human so He could save me from my sins.
70. Jesus' death defeated Satan; He gives me victory over sin.
71. When people die, they remain in the grave until the resurrection.
72. Those who reject God's grace will not burn forever but will be totally destroyed.
73. Being baptized shows others I personally accept Jesus as my Saviour, and want to follow Him.
74. Taking part in the Communion Service expresses thanks to Jesus for saving me.

U4. As a growing disciple, I am learning that God has provided everything needed to restore me to His image.
59. I choose to be a good steward of all God created by using natural resources wisely.
75. The church is God's family on earth, a community of faith in which many members, all equal in Jesus, join for worship, instruction and service.
78. *God gave Ellen White prophetic messages to help the Adventist church share the truth about God.*
79. Jesus calls end-time believers to prepare the world for His second coming.
80. The elements of the earthly sanctuary help me understand why Jesus died for me and what He's doing in the heavenly sanctuary now.
81. The end-time millennium begins with Jesus' second coming when those who accept God's grace are taken to heaven, and ends with the final destruction of those who reject God's grace.
82. After the millennium, God will recreate the earth as a perfect, eternal home for the saved. Sin will never exist again.

MINISTERING: GROWING BY PARTICIPATING IN GOD'S MISSION OF REVEALING HIMSELF AND DRAWING US BACK TO HIM

M1. As a growing disciple, I am sharing my faith through my daily activities.
31. After I ask the Holy Spirit to lead me, I wait to hear or see what God wants me to do.
32. I enjoy humbly doing my best for God in ordinary daily activities.
33. What I watch and listen to shows others that God is important to me.
34. I stand up for what is right even if my friends don't join me.
52. The things I do reflect my daily commitment to live for Jesus. (from u1)
55. I obey what I have learned from the Bible even when it is difficult. (from u1)
54. I pray for the Holy Spirit to be my guide in living for Jesus. (from u1)

M2. As a growing disciple, I am helping others grow more like Jesus.
35. I help my friends with their religious questions or struggles.
36. I pray for those I love, asking God to help them grow spiritually.
37. I invite friends to attend church or school religious activities with me.
38. I encourage or teach those younger than me how to live for God.

M3. As a growing disciple, I am responding to the needs of God's suffering children.
39. I volunteer to help with community service projects such as cleaning up my neighbourhood.
40. I try to help people who are poor, hungry, sick or unable to care for themselves.
41. I choose to show respect for God's creation by recycling or reusing paper, plastics or other disposable items.
42. I participate in activities that promote social justice or respectful care of people who are mistreated.
43. I enjoy serving others regardless of their age, culture, religion, or status.

M4. As a growing disciple, I am supporting my church's ministries with personal resources.
44. I willingly share what God gives me with others.
45. I support God's work by paying tithe on what I earn or am given.
46. I enjoy giving my time to help people through my church's ministries.
47. I give personal money for missions or other projects that share God's love.

M5. As a growing disciple, I am helping my church tell the story of Jesus.
48. I pray for the Holy Spirit to prepare me to share the good news about God with others.
49. I don't know enough about Jesus to tell others about Him. (reverse scored)
50. I am willing to talk with people outside of my church family about my faith.
51. I'm ashamed to explain what I believe about God. (reverse scored)
77. God gives me spiritual gifts to help tell others the story of Jesus.

EQUIPPING: GROWING THE BODY OF CHRIST BY DISCIPLING ONE ANOTHER

E1. Growing disciples help one another to deepen their relationship with Christ.
19. I talk with one or more of my friends about what God is like.
20. I have helped one or more people to grow stronger in their faith in God.
88. Who is helping you to know and love God?
89. Who is encouraging you to spend quiet time with God daily?

E2. Growing disciples help one another build Christ-like relationships with others.
21. I share jokes that make fun of other people or Christian living. (reverse scored)
22. I encourage friends to humbly honour God when praised or thanked.
90. Who talks with you about their faith or relationship with God?
91. Who is helping you learn how to resolve conflicts in a Christ-like way?

E3. Growing disciples help one another study and obey God's Word.

23. I encourage my friends to join me in doing what the Bible teaches, wherever we are.
24. I am too young to help anyone study the Bible. (reverse scored)
92. Who is helping you understand that Jesus is the centre of all the Bible teaches?
93. Who helps you understand how God's Word applies today?

E4. Growing disciples help one another live a contagious, holistic Christian life.

25. I encourage my friends to care for their bodies as the temple of God.
26. I have encouraged one or more friends to say no to things that destroy healthy relationships, such as eating unhealthy foods or doing drugs.
94. Who is inspiring you to obey God's laws to protect your health and happiness?
95. Who is encouraging you to tell others the story of Jesus?
96. Whose Christ-like life inspires you to follow Jesus more each day?

E5. Growing disciples help one another discover God working in their lives and His world.

27. When I discover how God is working somewhere, I enjoy telling my friends about it.
28. When I notice God leading in a friend's life, I share what I observe to strengthen their faith.
97. Who is helping you understand God's purpose for your life?
99. *Where* are you learning about God's work around the world?

E6. Growing disciples help one another discover and use spiritual gifts in God's work.

29. I help my friends recognize their God-given talents and skills.
30. I encourage my friends to use their spiritual gifts to serve God.
98. Who is helping you to identify your spiritual gifts?
100. *Where* are you using your abilities or strengths to serve God?

B-2: UPDATED GDI RESPONSE SETS

Section 1: Items 1-59
How often is this true about you? Choose ONE of these options:

Always true   80-100% of the time
Often true   60-79% of the time
Sometimes true   40-59% of the time
Not often true   20-39% of the time
Never true   0-19% of the time
I don't understand: check this if the statement makes no sense to you

Section 2: Items 60-82
Which words best describe what you *personally* believe about each statement?

I strongly believe this
I believe this
I have some doubts
I strongly doubt this
I don't believe this
I don't understand this

Section 3: Items 83-87
Read all options carefully before choosing the one that's most true about you.

#83 & 84
__ yes, once __ yes, occasionally __ yes, many times __ no, never __ I don't understand

#85
__ 5-7 days a week   __ once a week __ 2-3 times a month __ once a month __ several times a year __ does not apply __ I don't understand

#86
__ very much ___ somewhat __ not much ___ not at all __ does not apply __ I don't understand

#87
__ 5-7 days a week __ about once a week __ about once a month __ seldom or never

__my family doesn't worship together at home __ I don't understand

Section 4: Items 88-100
Check ALL boxes that are true for you for each question.

#88-98   one or both parents
          one or more other family members
          one or more school teachers
          one or more adults in my church
          one or more friends
          others

#99-100 __at home __ at school __ at church __ magazines or television __ internet __ other

B-3: UPDATED GDI VALUE TABLES

The following values were assigned to create the individual report graphs online, and for research data analysis.

For items 1-59 (except 9 reverse scored)
5 always true
4 often true
3 sometimes true
2 not often true
1 never true
-1 I don't understand
-2 Does not apply to me

Reverse scored
(7,9,11,14,21,24,49,51,57)
1 always true
2 often true
3 sometimes true
4 not often true
5 never true
-1 I don't understand
-2 Does not apply to me

For items 60-82
5 I strongly believe
4 I believe
3 I have some doubts
2 I strongly doubt
1 I don't believe
-1 I don't understand

For items 83-84
1 yes, once
3 yes, occasionally
5 yes, many times
-2 no, never
-1 I don't understand

For item 85
5 more than once a week
4 once a week
3 2-3 times a month
2 once a month
1 several times a year
-1 I don't understand
-2 Does not apply to me

For item 86
5 very much
3 somewhat
1 not much
-1 I don't understand
-2 Does not apply to me

For item 87
5 more than once a week
4 about once a week
3 about once a month
1 seldom or never
-2 my family does not have worship at home
-1 I don't understand

For item 88-98 (SUM checked options)
one or both parents
one or more other family members
one or more school teachers
one or more adults in my church
one or more friends
others

For item 99 (SUM checked options)
at home
at school
at church
through magazines or television
through the internet
other

For item 100 (SUM checked options)
at home
at school
at church
on mission trips
in my community
other

B-4: UPDATED GDI BACKGROUND INFORMATION FIELDS

Gender
male
female

Age
11-14
15-19
young adult
adult
senior

Group code
select from pull-downs as directed by teacher:
church/school & group/class code as pre-arranged
for participants with range of access codes
If independent, will enter church name and city

Which country are you a citizen of?
Select from pull-down

What church do you usually attend?
Adventist Christian
Other Protestant Christian
Catholic Christian
Buddhist
Hindu
Jewish
Muslim
Another Religion
I usually don't attend religious services

Have you made a personal commitment to follow Jesus?
Yes, many times
Yes, several times
Yes, once
No, but I am interested in learning more
No, I am not interested
No, I am not a Christian

B-5: UPDATED GDI REPORT SCORING

Scoring is programmed to create online graphs that display results for each individual, available directly after completing the GDI.

BAR GRAPHS

Four bar graphs are titled *Connecting, Understanding, Equipping* and *Ministering*. Each includes five or six bars. Formulas for calculation are listed in the left column, with labels in the right column.

Connecting Bar Graph	Bar Titles
$C1=(2+3+53+56+83+84)/6$	With God
$C2=(1+4+5+6)/4$	With Self
$C3=(8+76+86+87)/4$	With Family
$C4=(10+11+12+13)/4$	With Church
$C5=(15+16+17+18)/4$	With Others

Understanding Bar Graph	
$U1=(60+61+62+63)/4$	Nature of God
$U2=(64+65+66+67)/4$	Sin & Suffering
$U3=(58+68+69+70+71+72+73+74)/8$	Redemption
$U4=(75+78+79+80+81+82)/6$	Restoration

Equipping Bar Graph	
$E1=(19+20+88+89)/4$	Devotional Life
$E2=(22+90+91)/3$	Christ-like Relationships
$E3=(23+24+92+93)/4$	Bible Study
$E4=(25+94+95+96)/4$	Christian Lifestyle
$E5=(27+28+97+99)/4$	Doing God's Will
$E6=(29+30+98+100)/4$	Using Spiritual Gifts

Ministering Bar Graph	
$M1=(31+32+33+52+55)/5$	Personal Vocation
$M2=(35+36+37+38)/4$	Discipling Others
$M3=(39+40+41+42+43)/5$	Community Service
$M4=(44+45+46+47)/4$	Stewardship
$M5=(48+49+50+51+77)/5$	Evangelism

SUMMARY CIRCLE GRAPH

This is the first visual displayed, summarizing individual scores for each process. Clicking on a circle sector displays the bar graph comparing results in the five or six more specific commitments listed above.

Ways of Growing Spiritually	Circle Sector Titles
$C=(C1+C2+C3+C4+C5)/5$	Connecting
$U=(U1+U2+U3+U4)/5$	Understanding
$E=(E1+E2+E3+E4+E5+E6)/6$	Equipping
$M=(M1+M2+M3+M4+M5)/5$	Ministering

APPENDIX C

PARENT & PARTICIPANT LETTER OF CONSENT

Andrews ◊ University

Research Participation: Informed Consent Letter
Validating the *Growing Disciples Inventory* for Teens

Purpose of Study: The *Growing Disciples Inventory* is being designed to help teens discover their strengths and growth points in Christian spiritual growth. Students in Grades 7-12 attending this Adventist school will take the online Inventory during Bible classes this Fall.

Procedure: For each of 100 items, students choose one of several answers that best reflect their beliefs, attitudes, behaviour or perceptions about knowing, loving and serving God. Once completed, students can view individual results. After reviewing their report, a 10-item exit survey gathers their perceptions of the value of this experience.

Risks and Discomforts: There are no known physical or emotional risks to student involvement in this study. Participation will not affect student grades in any way, and the Inventory results have no numeric results at all – all results are shown as colourful graphs to aid understanding by comparing personal strengths and growth points. Results are available only to the student, secured by their individual access code, with data stored anonymously.

Benefits/Results: Students receive an individual report, which includes short explanations of what they mean, with links to ideas on steps to take in personal spiritual growth. Students do not have to share their results with anyone, but they can print the report or email it to themselves or others if they wish (email addresses are used immediately to send the message, never stored). It is hoped this self-assessment will prompt deep thinking about where God is working in their lives, and where to ask the Holy Spirit to help in specific areas of perceived weakness. This can be a tool for personal reflection, and for use within Bible classes, church or home settings.

Voluntary Participation: Student involvement in this study is voluntary. Students are free to skip any items or to select the option "I Don't Understand". No personal information is stored, so their responses are stored, analyzed, and reported anonymously. Our school has reviewed the Inventory, and in the interests of helping our students grow spiritually, we invite all students to participate during the class time given.

Contact Information: Feel free to contact researcher Glynis Bradfield at glynisb@andrews.edu (269.845.0178) or the principal if you have any questions about participating in this study.

_____   _____   _____
Signature of Parent or Guardian   Signature of Subject   Signature of Witness

Signed at: _____   Date: _____

APPENDIX D
TEACHER'S GUIDE

Growing Disciples Inventory
TEACHER'S GUIDE
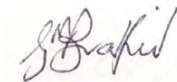
Time needed: 45-60 minutes, in October 2009

Who to Include: all Grade 7-12 students/learners you teach

Venue: wherever all students each have access to a computer with internet access

Procedure:
1. Assign codes within the given range to all students/learners.   Keep the list confidential, but available to prompt a student who may forget their code and wish to access their report later. Do NOT send this assignment of codes to me – data will be stored and analyzed anonymously. Teacher and school data will all be kept confidentially and reported anonymously.

2. OPTION 1 (recommended): Arrange for one 45-60 minutes in a school computer lab, then following the step-by-step class directions on page 2 below.
   OPTION 2: if internet access is not feasible during class, enthusiastically introduce this, and give each learner a copy of the Extra Credit Activity sheet. Add your school name and class title, plus an assignment deadline. Reminders would be appreciated to maximize participation. Please read the instructions in the box below (1a) when explaining the extra credit assignment, as you would have if completing this in class. After the deadline, I can email a list of all access codes that completed both the Inventory and the Exit Survey online – you can reference your code assignment list for names.

3. Please email me a time I can call you within a week after students participate, to gather your observations. Thank you for noting student feedback during (or in class after doing this for extra credit). If you incorporate this into a class project or see ways you might use it, thank you for sharing your ideas/plans with me. This debriefing interview will provide valuable qualitative data to complement your student/learner responses.

Thank you for presenting this research project positively to foster a willingness to participate. Your support will help the quality of data collection greatly.   Thanks for helping make this study possible,

Glynis Bradfield, researcher
Berrien Springs, Michigan, USA
Phone: 269.473.2686 | 269.845.0178
Email: glynisb@andrews.edu

PS: *Here's one way to incorporate this self-assessment into any Bible class.* Discuss learner reflections after completing this. This could inform lesson planning, and inspire students to create a personal lifelong spiritual 'fitness plan'. A sample personal spiritual growth plan worksheet is linked on the Youth:Learn More webpage.   More information about the Growing Disciples curriculum framework and resources are linked on the Educator pages at inventory.growingdisciples.info

GDI INSTRUCTIONS FOR IN-CLASS PARTICIPATION

When students are each in front of a computer with internet access, proceed as follows:

1. Read these instructions before students begin:

> *The Growing Disciples Inventory is being tested as a tool to help teens discover their strengths and weaknesses in Christian spiritual growth. It will take about 45 minutes to complete. Your best answer is usually your first impression, so read each item carefully, then select the response that best represents you at this time, and move on.*
>
> *Your responses are private, and reflect your personal attitudes and beliefs. You do not have to share your results with anyone, although you may email them to yourself or friends if you wish.*
>
> *You can choose how much you get out of this experience. You may skip items or choose to stop at any time. If you do so however, your personal report will be less meaningful.*
> *When you complete this self-assessment, you give permission for your responses to be included anonymously (unidentified) in research to improve the Growing Disciples Inventory for teens.*
>
> *Any questions?* [Teacher answers as appropriate. Invite learners to begin with a prayer.]

    a. Go to inventory.growingdisciples.info online.
Click Begin Inventory and enter an access code. Students can access their reports anytime in future using this code, so have them write it down and/or memorize it.
    b. Encourage all students to complete the GDI, reading directions and items carefully. Manage the climate to ensure all students complete this individually as a serious self-assessment. *Optional extension: Invite students to read Learn More under the Youth tab while they wait for others to finish, or during another class period.*

2. After completing the GDI, students review the results online (10-15 minutes):
    a. At inventory.growingdisciples.info, click View Results and enter the access code again. OR click View Results directly from the GDI submission confirmation page.
    b. Have students view their results. Prompt them to click on all 4 sectors of the circle graph to view the more specific bar graph results. Read what they mean below. Invite students to email the report for easy access even if they forget their access code.

3. **After reviewing the results, have students complete the exit survey (5-10 minutes):**
    a. At inventory.growingdisciples.info, click on Exit Survey and enter the access code again. OR click Take Exit Survey directly from the report page.
    b. Please encourage students to share their perceptions of the value of this experience honestly and individually. This 2nd survey provides important perceptions of the value of the Growing Disciples Inventory and individual results, so check it is not skipped.

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL

Andrews ◆ University

April 23, 2009
Glynis Bradfield
AU School of Education

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

IRB Protocol #: 09-024   **Application Type:** Original   **Dept:** School of Education

Review Category: Expedited   **Action Taken**: Approved

Title: The development and validation of the Growing Disciples Inventory as a curriculum-aligned
               self assessment for Christian Education

This letter is to advise you that the Institutional Review Board (IRB) has reviewed and approved your proposal for research. You have been given clearance to proceed with your research plans.

All changes made to the study design and/or consent form, after initiation of the project, require prior approval from the IRB before such changes can be implemented. Feel free to contact our office if you have any questions. In all communications with our office, please be sure to identify your research by its IRB Protocol number.

The duration of the present approval is for one year. If your research is going to take more than one year, you must apply for an extension of your approval in order to be authorized to continue with this project.

Some proposal and research design designs may be of such a nature that participation in the project may involve certain risks to human subjects. If your project is one of this nature and in the implementation of your project an incidence occurs which results in a research-related adverse reaction and/or physical injury, such an occurrence must be reported immediately in writing to the Institutional Review Board. Any project-related physical injury must also be reported immediately to University Medical Specialties, by calling (269) 473-2222.

We wish you success as you implement the research project as outlined in the approved protocol.

Sincerely,

[electronic signed copy on file]

Joseth Abara
Administrative Associate
Institutional Review Board

APPENDIX F

WEBSITE URL APPROVAL

-----Original Message-----
From: Kathleen Beagles (Kathy)
Sent: Tuesday, January 27, 2009 1:21 PM
To: Glynis Bradfield
Cc: Allan Martin; Diane Helbley
Subject: Formal approval

Hello Glynis

We discussed your request of 13 January to use inventory.growingdisciples.info for your inventory site on the Web.

For the religious education program, I am commissioned to tell you that we are honoured to be connected with your on-going passion for growing disciples.

Please just keep us informed of your progress so that we can stay knowledgeable.

Sincerely,

Kathy Beagles, Assistant Professor

Religious Education Program
Seventh-day Adventist Theological Seminary
Andrews University, Berrien Springs, MI

APPENDIX G

GDI PILOT THINK ALOUD PROTOCOL

Before: Set Up
1. Invite participation
   Convenience sample by phone invitation, promising reward an ice cream coupon or $5. Purpose of study explained to parent for approval prior to inviting child to participate. Arrange appointment time and location.
2. Select the sample
   At researcher's discretion, learners qualify if representative of range of grades/age, nationality, gender, academic & spiritual level. Recommendations from schools were used to develop the phone list.
3. Check qualifications
   Review research as outlined in consent letter and answer any questions. Check both parent and child signed. If parent unable to make it, note time of verbal approval by phone interview on consent letter.
4. Show a sample GDI report, and summarize the learner's role today, in usability testing.
   Say: "*While you do this Inventory, I will record our conversation so that I can take notes later to understand what I may miss in taking notes. None else will review what you say. There are no right or wrong answers. You may stop at any time. You can begin as soon as you're ready.*" Start recording on laptop. Set browser screen to inventory.growingdisciples.info

During: Think-aloud Protocol
Say: "*As you read, think out loud, so I can tell what you are thinking or feeling as you answer items. Anything that comes to mind I'd like to know – if the items seem easy, hard, confusing, dumb or make you think of something in a new way, please share out loud. All you say will help me improve this for teens to use.*"
Note: body language, level of interest, pacing (record time takes for 25, 50, 75 and 100 items).

After: Reflect and Thank
Ask (if comments are not spontaneously made) about these elements:
4. What was your first impression of this website (look and feel, or design)?
5. Was anything confusing? Why? (follow up to clarify as needed – re website, items)
6. How would you describe this experience to a friend who didn't know about it? (follow up as appropriate to clarify responses)

Ending:
7. Stop recording (save after they leave).
8. Thank you for participating – choose either the ice cream coupon or $5 as a gift
9. Review notes and complete any items while ideas still fresh, including exit observations

APPENDIX H

DISCARDED GROWING DISCIPLES INVENTORY ITEMS

The following 39 items were deleted after the second cycle of expert reviews, based on qualitative comments and agreement scale results (cf. 4.2). They are numbered here as in the pilot version of the GDI (cf. Appendix I, first column).

 2 I think of prayer as talking to my best friend, Jesus.
 3 When I pray, I feel closer to God.
 9 One way the Holy Spirit speaks to me is through the words I read in the Bible.
10 I am thankful that God created me as a unique and special person.
11 I am so glad God's love for me is not based on what I do.
12 Because God wants me to live healthfully and happily, I choose to take care of my body.
13 I ask the Holy Spirit to help me understand myself, who I am.
14 I am not ashamed to be known as a Christian even if it is difficult.
17 I think of myself first as a child of God, and then as a member of my family.
18 I choose to be a peacemaker in my home.
19 I am respectful of my parents and older members of my family.
23 I can discuss spiritual matters with a mature Christian in my family that I trust .
25 I choose to be kind to Christians who others may treat unfairly.
40 My behavior demonstrates my decision to follow Christ.
42 God invites me to depend on His help to grow more like Jesus forever.
45 I believe the Holy Spirit prompts me to become a child of my heavenly Father God.
50 I believe that all people have inherited Adam and Eve's fallen, sinful nature.
56 God freely gives me everything I need to be saved from sin; all I can do is accept Jesus as my Savior and Lord of my life.
57 The gift of salvation is free, yet I must keep the law to be worthy to receive it.
62 I treat all people, created and equally loved by God, with respect.
65 I believe Jesus will come back to earth again and take those who believe in Him to heaven.
66 I believe that after the millennium, God will recreate the earth as a perfect, eternal home for the redeemed.
70 I believe that foot washing during Communion services reminds us to take care of each other the way Jesus did.
74 I pray for the Holy Spirit to change my character to better reflect Jesus to others.
76 My actions during sports activities have nothing to do with my faith.
77 I choose to honor God in all I do, even when the right choice is not popular.
78 I try to positively influence others for Christ through the way I look.
79 My words demonstrate my choice to build God's kingdom rather than my own.
81 I pray that the Holy Spirit will prompt me to help friends grow more like Jesus.
87 I pray for children who are abused, hurt or abandoned in the world.
89 I help friends or neighbors (outside my family) when asked, without expecting any reward.
97 Giving money to God's work is important for adults with jobs, not teens like me.
103 I volunteer to help with my church's evangelistic meetings.
104 I am teaching Bible truths or supporting others who do this well.
106 Who is encouraging you to grow spiritually throughout life? Select all that apply.
109 I listen to my friend's suggestions about my spiritual walk with God.

111 Who is helping you learn how to live a balanced Christ-like life? Select all that apply.

113 Who is inspiring you to respect and care for people in your life? Select all that apply.

117 Who is open to discuss moral values and social issues with you? Select all that apply.

119 I am encouraging my friends to obey what God's Word teaches us.

125 I am willing to talk about why I choose to be a positive Christian witness wherever I am.

126 I am learning how to lead someone to accept Christ as their Lord and Savior.

131 I inspire my friends to use green technology or other methods to conserve the world God created for us.

134 Who encourages you to use your talents to do what God calls you to do?

138 I consider counsel from Christian friends I trust on how to use my spiritual gifts to do God's work.

APPENDIX I

EXPERT REVIEW RESULTS

The following 3 pages tabulate the agreement scale results for 12 expert reviewers, as well as the number of comments per item, from all cycles of expert review. See discussion of the GDI design and development phase in section 4.2

GDI v1	N	Mean	Mode	Minimum	Maximum	#Comments[a]	GDI v2[b]
i1	12	3.50	3	3	4	3	02r
i2	12	3.67	4	2	4	3	x
i3	12	3.50	4	2	4	1	x
i4	12	3.50	4	2	4	5	85r
i5	12	3.17	4	2	4	4	83r
i6	12	3.58	4	3	4	1	03r
i7	12	3.42	4	2	4	1	86rr
i8	12	3.33	4	1	4	1	84r
i9	12	3.58	4	3	4	2	x
i10	10	3.70	4	3	4	3	x
i11	12	3.75	4	3	4	2	x
i12	12	3.33	3	2	4	2	x
i13	12	3.33	3	2	4		x
i14	12	3.58	4	3	4	2	x
i15	12	3.67	4	3	4		01r
i16	11	3.45	3	3	4		05r
i17	12	3.00	2	2	4	3	x
i18	11	3.27	3	2	4	2	x
i19	12	3.33	4	1	4	2	x
i20	12	3.33	4	2	4	3	09r
i21	12	3.67	4	3	4	1	76rr
i22	12	3.33	3	2	4	3	08r
i23	12	3.50	4	2	4	2	x
i24	11	3.00	2	2	4	4	87r
i25	11	3.73	4	3	4	2	x
i26	12	3.42	4	2	4	3	12r
i27	12	3.33	3	2	4	3	11r
i28	12	3.50	3	3	4	5	90r
i29	12	3.50	3	3	4	5	10r
i30	12	3.83	4	3	4	2	13r
i31	12	3.83	4	3	4	1	14r
i32	12	3.75	4	3	4	2	16r
i33	12	3.33	3	3	4	1	17rr
i34	12	3.58	4	2	4		34
i35	11	3.82	4	3	4	4	18r
i36	12	3.67	4	3	4	2	52rr
i37	12	3.42	4	2	4	3	53r
i38	12	3.67	4	3	4		54
i39	12	3.67	4	3	4	2	55r
i40	12	3.92	4	3	4		x
i41	12	3.75	4	3	4	2	56r
i42	12	3.58	4	2	4	3	x
i43	12	3.42	4	2	4	2	60r
i44	12	3.50	3	3	4	2	61r
i45	12	3.58	4	2	4	2	x

GDI v1	N	Mean	Mode	Minimum	Maximum	#Comments[a]	GDI v2[b]
i46	12	3.42	4	2	4	4	63r
i47	12	3.58	4	3	4		62r
i48	12	3.75	4	3	4		64r
i49	12	3.58	4	2	4		65r
i50	12	3.67	4	3	4	1	x
i51	12	3.58	4	3	4		66r
i52	12	3.67	4	3	4	1	67r
i53	12	3.75	4	3	4	1	68r
i54	12	3.25	3	2	4	4	69r
i55	12	3.58	4	2	4	2	70r
i56	12	3.75	4	3	4		x
i57	12	3.33	4	1	4	3	x
i58	11	3.55	4	2	4	2	57rr
i59	11	3.45	4	2	4	7	80rrr
i60	12	3.42	4	1	4		06r
i61	12	3.58	4	1	4	1	58
i62	12	3.50	4	2	4	1	x
i63	12	3.58	4	3	4		59r
i64	12	3.58	4	2	4		82r
i65	12	3.75	4	3	4	1	x
i66	12	3.58	4	3	4	1	x
i67	12	3.58	4	2	4		75r
i68	12	3.67	4	3	4	1	73r
i69	12	3.42	4	2	4	1	74r
i70	11	3.36	4	2	4	1	x
i71	12	3.67	4	3	4		29r?
i72	12	3.50	3	3	4	2	81r
i73	12	3.50	3	3	4	3	78r
i74	11	3.45	4	2	4	1	x
i75	12	3.58	4	3	4		31rr
i76	12	3.42	4	1	4	3	x
i77	12	3.58	4	2	4	2	x
i78	12	3.75	4	3	4	1	x
i79	12	3.42	4	2	4	2	x
i80	12	3.42	4	2	4	1	33r
i81	12	3.75	4	3	4	1	x
i82	12	3.67	4	3	4	1	35
i83	12	3.67	4	3	4		36
i84	12	3.67	4	3	4	4	37r
i85	11	3.82	4	3	4	3	38r
i86	12	3.67	4	3	4	1	39r
i87	12	3.67	4	3	4		x
i88	12	3.83	4	3	4	3	40r
i89	11	3.73	4	3	4		x
i90	12	3.58	4	2	4	2	41r
i91	12	3.33	4	1	4	3	42r
i92	12	3.58	4	3	4	1	43r
i93	12	3.58	4	2	4	2	44r
i94	12	3.83	4	3	4		45r
i95	12	3.58	4	3	4		46r
i96	12	3.58	4	3	4	1	47r
i97	11	3.36	4	1	4	1	x
i98	12	3.67	4	3	4		48

GDI v1	N	Mean	Mode	Minimum	Maximum	#Comments[a]	GDI v2[b]
i99	12	3.67	4	3	4	1	49r
i100	12	3.50	3	3	4		77r
i101	12	3.50	4	1	4	2	51r
i102	12	3.83	4	3	4	1	50r
i103	12	3.58	4	3	4	3	x
i104	12	3.42	4	2	4	1	x
i105	12	3.67	4	3	4	2	88
i106	12	3.58	4	3	4	1	x
i107	11	3.64	4	3	4	1	89r
i108	12	3.67	4	3	4	1	19r
i109	12	3.75	4	3	4	1	x
i110	12	3.75	4	3	4		20r
i111	12	3.67	4	3	4	1	x
i112	11	3.73	4	3	4		91
i113	12	3.75	4	3	4		x
i114	12	3.67	4	3	4		25r
i115	12	3.75	4	3	4	2	22rr
i116	12	3.67	4	3	4	1	92r
i117	11	3.73	4	3	4		x
i118	12	3.67	4	3	4		24r
i119	12	3.67	4	3	4		x
i120	12	3.83	4	3	4	2	23r
i121	12	3.75	4	3	4		93r
i122	12	3.67	4	3	4	1	94r
i123	10	3.80	4	3	4	1	95
i124	11	3.73	4	3	4		96r
i125	12	3.67	4	3	4	2	x
i126	12	3.67	4	3	4	1	x
i127	11	3.82	4	3	4	2	26r
i128	12	3.50	4	2	4	1	x
i129	12	3.58	4	2	4		97r
i130	11	3.55	4	2	4		99r
i131	12	3.67	4	3	4		x
i132	12	3.67	4	3	4	1	27rr
i133	12	3.75	4	3	4		28r
i134	12	3.58	4	2	4	1	x
i135	12	3.50	4	2	4	2	98r
i136	12	3.58	4	2	4	2	98r
i137	12	3.67	4	3	4	3	29r
i138	12	3.67	4	3	4		x
i139	12	3.75	4	3	4	1	30r

[a]Number of comments from all expert reviewers (not limited to those who completed agreement scale)

[b]Final GDI (version 2) item numbers; x=item deleted; r=reworded based on expert questions and suggestions and re-examination of the curriculum framework and theological foundations (rr = reworded with further cycles of expert review, rrr = reworded up to 7 times)