

Intermediate phase teachers' metacognitive awareness and worldviews for the process of self-directed learning in private school settings

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Declaration of authenticity

I, the undersigned, hereby declare that the work contained in this dissertation is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature

Date October 2022

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Preface

This study would not have been conceptualised and completed without my Creator, Father God, in heaven. For in everything under heaven, there is a season, and my academic season has thus developed with the writing of this dissertation.

Furthermore, this study would not have been possible or accomplished without the support, guidance and encouragement of so many wonderful people and friends in my life. I owe you my heartfelt gratitude. My deepest thanks to the following people:

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Abstract

In an era of transformative education and curriculum re-landscaping, teachers' awareness and personal attributes, such as their worldviews, are often neglected and overlooked. Recognising a worldview as a significant element in the educational context of teaching and learning is a necessary step towards understanding teacher beliefs about knowledge and knowing. This study proposes a model for the content of and relationship between metacognitive awareness, worldview and self-directed learning of Intermediate Phase teachers from a private school group in South Africa. The researcher adopted a pragmatist paradigm with a mixed-methods approach and followed a convergent parallel design. The population of the study consists of Intermediate Phase teachers (Grades 4-6) from a private school group in South Africa from which the sample was drawn. Analyses of the data obtained from a worldview test, a metacognitive awareness inventory for teachers and a learning diagnostic tool constituted the quantitative part of the study, whereas a reflective narrative comprised the qualitative part. The results and findings of the two data sets were triangulated with a conceptual framework to answer the primary research question, namely: What role do private school Intermediate Phase teachers' metacognitive awareness and worldview play in the process of their self-directed learning? The results indicate metacognitive knowledge and an integrated worldview promote self-directed learning, whereas the findings propose an interaction between metacognitive knowledge and metacognitive regulation as well as an awareness of the subcategories of a worldview to promote self-directed learning. Through triangulation the conclusion was made that metacognitive awareness and an integrative worldview promote teacher's process of self-directed learning.

Key terms

Intermediate Phase, metacognitive awareness, model, self-directed learning, worldviews

Opsomming

In 'n era van transformerende onderwys en kurrikulumherontwerp word onderwysers se bewustheid en persoonlike eienskappe, soos hul wêreldbeskouings, dikwels verwaarloos en oor die hoof gesien. Die erkenning van 'n wêreldbeskouing as 'n belangrike element van onderrig en leer in 'n opvoedkundige konteks is 'n noodsaaklike stap om onderwysers se oortuigings oor kennis, onderrig en leer te verstaan. Hierdie studie stel 'n model voor vir die inhoud van en verhouding tussen metakognitiewe bewustheid, wêreldbeskouing en selfgerigte leer van intermediêrefase-(graad 4-6)-onderwysers van 'n private skoolgroep in Suid-Afrika. Die navorser het 'n gemengde-metode-benadering gevolg en 'n konvergerende parallelle ontwerp ingebed binne 'n pragmatistiese paradigma gebruik. Die populasie van die studie bestaan uit intermediêrefaseonderwysers van 'n privaat skoolgroep in Suid-Afrika waaruit die steekproef getrek is. Ontledings van die data wat verkry is vanaf die wêreldbeskouingtoets, inventaris vir metakognitiewe bewustheid vir onderwysers en die leer-diagnostiese instrument het die kwantitatiewe deel van die studie uitgemaak, terwyl 'n persoonlike besinning die kwalitatiewe deel uitgemaak het. Die resultate en bevindings van die twee datastelle is met 'n konseptuele raamwerk verduidelik om die primêre navorsingsvraag te beantwoord, naamlik: Watter rol speel die metakognitiewe bewustheid en wêreldbeskouing van privaatskoolonderwysers in die intermediêre fase in die proses van hul selfgerigte leer? Die resultate ondersteun dat metakognitiewe kennis en 'n geïntegreerde wêreldbeskouing selfgerigte leer bevorder, terwyl die bevindinge 'n interaksie tussen metakognitiewe kennis en metakognitiewe regulering voorstel, asook 'n bewustheid van die subkategorieë van 'n wêreldbeskouing om selfgerigte leer te bevorder. Deur triangulasie is 'n gevolgtrekking gemaak dat metakognitiewe bewustheid en 'n geïntegreerde wêreldbeskouing die onderwyser se proses van selfgerigte leer bevorder.

Sleuteltermes

Intermediêre fase, metakognitiewe bewustheid, model, selfgerigte leer, wêreldbeskouing

List of abbreviations

ANOVA	Analysis of Variance
CAPS	Curriculum and Assessment Policy Statement
CFI	Comparative Fit Index
CI	Confidence Interval
MAIT	Metacognitive Inventory for Teachers
RMSEA	Root Mean Square Error of Approximation
SPSS	Statistical Package for Social Sciences

Proof of editing

PROOF OF EDITING

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DECLARATION

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I hereby confirm that I have proofread and edited the following dissertation, including the bibliography:

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Table of contents

CHAPTER 1 ORIENTATION TO THE RESEARCH	1
1.1 Introduction	1
1.2 Problem statement and context of the study	1
1.3 Rationale	3
1.4 Research questions	3
1.4.1 Primary research question	3
1.4.2 Secondary research questions in the quantitative strand	3
1.4.3 Secondary research questions in the qualitative strand.....	4
1.5 Research aims.....	4
1.5.1 Secondary research aims in the quantitative strand	4
1.5.2 Secondary research aims in the qualitative strand	5
1.6 Preliminary conceptual framework	5
1.6.1 Self-directed learning	5
1.6.2 Worldviews.....	6
1.6.3 Metacognitive awareness.....	6
1.7 Theoretical framework.....	7
1.7.1 Bandura's social cognitive theory.....	8
1.7.2 Transformational learning theory	9
1.7.3 Theory of self-transcendence.....	9
1.7.4 Social-constructivism as meta-theory	10
1.8 Empirical design of the study	10

1.8.1	Methodology.....	11
1.8.2	Research approach.....	11
1.8.3	Research design	12
1.8.4	Population and sampling.....	12
1.8.5	Sampling techniques.....	13
1.9	Data collection methods.....	13
1.9.1	Quantitative data collection	13
1.9.2	Quantitative research instruments	14
1.9.3	Qualitative data generation	14
1.9.4	Qualitative data collection method	14
1.10	Data analysis methods	15
1.10.1	Quantitative data analysis	15
1.10.2	Qualitative data analysis	15
1.11	Validity in a mixed-methods study	16
1.12	Ethical issues	16
1.13	Chapter division	17
1.14	Contribution of the study	17
CHAPTER 2	LITERATURE REVIEW	18
2.1	Introduction	18
2.2	Background and context of the study.....	18
2.3	Self-directed learning	20
2.3.1	Development of the understanding of self-directed learning.....	20

2.3.2	Factors associated with self-directed learning	21
2.3.3	Defining self-directed learning.....	21
2.4	Worldviews	25
2.4.1	The four main worldviews and the implications thereof within a educational context.....	28
2.4.1.1	Traditional worldview and implications thereof within a educational context	28
2.4.1.2	Modern worldview and implications thereof within a educational context	31
2.4.1.3	Postmodern worldview and implications thereof within an educational context.....	33
2.4.1.4	Integrative worldview and implications thereof within an educational context	35
2.4.2	Metamodernism	38
2.5	Metacognition.....	38
2.5.1	Defining metacognition.....	38
2.5.2	Dimensions of metacognition	40
2.5.3	Importance of metacognition in an educational context	41
2.6	Theoretical framework.....	45
2.6.1	Relationship between worldviews and self-directed learning theory 1: social cognitive theory	45
2.6.2	Relationship between worldviews and metacognitive awareness theory 2: transformational learning theory.....	46
2.6.3	Metacognitive awareness promotes self-directed learning theory 3: theory of self-transcendence.....	47
2.6.4	Theory 4: Social constructivism as meta-theory	48
2.7	Synthesis	48

CHAPTER 3 EMPIRICAL DESIGN AND METHODOLOGY	50
3.1 Introduction	50
3.2 Pragmatism as a research paradigm	50
3.2.1 Postpositivist paradigm for the quantitative strand.....	51
3.2.2 Interpretivist paradigm for the qualitative strand	52
3.3 Research approach.....	52
3.4 Research design	53
3.5 Population and sampling	54
3.5.1 Contextual background of respondents or participants	54
3.5.2 Population and sampling schemes	56
3.5.3 Quantitative sampling techniques	57
3.5.4 Qualitative sampling techniques	57
3.6 Data collection methods.....	58
3.6.1 Quantitative data collection method	59
3.6.2 Quantitative research instruments	60
3.6.3 Qualitative data collection method	62
3.6.4 Qualitative research instrument	62
3.7 Data analysis procedures.....	63
3.7.1 Quantitative data analysis	63
3.7.2 Descriptive statistics.....	63
3.7.3 Inferential statistics.....	63
3.7.4 Qualitative data analysis	64
3.8 Mixed-methods validity	66

3.8.1	Quantitative validity	66
3.8.2	Qualitative validity	67
3.9	Triangulation	68
3.10	Ethical issues	68
3.10.1	Ethical clearance	68
3.10.2	Legal authorisation, goodwill permission and informed consent	69
3.10.3	Anonymity, privacy and confidentiality	69
3.10.4	Risks	70
3.10.5	Instruments	70
3.11	Conclusion.....	70
CHAPTER 4	ANALYSIS OF QUANTITATIVE DATA	71
4.1	Introduction	71
4.1.1	Overview of the quantitative part of the study	71
4.1.2	Description of the biographical information	73
4.1.3	Respondents' age groups	73
4.1.4	Number of years of teaching experience in the Intermediate Phase	74
4.1.5	Primary language of instruction.....	75
4.1.6	Number of respondents per province	75
4.1.7	Grades taught by the respondents	76
4.1.8	Subjects taught by the respondents	77
4.2	Reliability, validity and descriptive statistics	78
4.3	Comparison to biographical data	80

4.3.1	Effect sizes and statistical significance	80
4.3.2	Effect sizes for the language of instruction and self-directed learning	80
4.3.3	Effect sizes for the language of instruction and metacognitive awareness	81
4.3.4	Effect sizes for the language of instruction and worldviews	82
4.3.5	Analysis of variance	83
4.4	Correlations using Spearman's rho	90
4.4.1	Correlations between age and years of teaching experience	92
4.4.2	Correlations between metacognitive awareness and self-directed learning	93
4.4.3	Correlations between metacognitive knowledge and self-directed learning	93
4.4.3.1	Correlations with metacognitive regulation and self-directed learning	94
4.4.4	Worldview and the variables of metacognitive awareness.....	95
4.4.5	Self-directed learning and worldview	95
4.5	Structural equation modelling	96
4.5.1	The two domains of self-directed learning	98
4.5.2	Model 1: Metacognitive awareness of self-directed learning	99
4.5.3	Model 2: Worldview and self-directed learning	101
4.5.4	Model 3: Worldview, metacognitive awareness and self-directed learning	103
4.5.5	Model 4: Integrative worldview, metacognitive knowledge and self-directed learning	104
4.6	Summary	106
CHAPTER 5 ANALYSIS OF THE QUALITATIVE DATA.....		107
5.1	Introduction	107
5.2	Research questions	107

5.3	Findings and their relationship with the conceptual-theoretical framework	108
5.4	Findings from Part A: The theme of self-directed learning.....	111
5.4.1	Assignment management (AM).....	113
5.4.2	Online learning proficiency (OLP)	114
5.4.3	Stress management (SM)	114
5.4.4	Technical proficiency (TP).....	115
5.4.5	Procrastination management (PM)	115
5.4.6	Online discussion proficiency (ODP).....	115
5.4.7	Seminar learning proficiency (SLP).....	116
5.4.8	Comprehension competence (CC).....	116
5.4.9	Examination management (EM).....	117
5.4.10	Time management (TM).....	117
5.4.11	In summation.....	117
5.5	Findings from Part B: The theme of worldviews.....	120
5.5.1	Ontology (O).....	121
5.5.2	Epistemology (E).....	121
5.5.3	Axiology (Ax)	122
5.5.4	Anthropology (An)	122
5.5.5	Societal vision (S)	122
5.6	Categorising worldviews	124
5.6.1	The category of traditional (T)	124
5.6.2	The category of modern (Mo).....	125

5.6.3	The category of postmodern (PM)	125
5.6.4	The category of integrative (I)	125
5.7	Findings from Part C: The theme of metacognitive awareness	126
5.7.1	Metacognitive regulation (MR)	127
5.7.2	Metacognitive knowledge (MK)	128
5.7.3	In summation.....	128
5.8	Synthesis	130
CHAPTER 6 DISCUSSION OF RESULTS		132
6.1	Introduction	132
6.2	Overview of the study	132
6.3	Pragmatist stance and triangulation	134
6.4	Searching for overlapping differences and similarities between models.....	135
6.5	Establishing the literature in the context of the study	139
6.6	Model level and model components	139
6.7	Contextual components	140
6.7.1	Age and teaching experience.....	140
6.7.2	Language of instruction.....	140
6.7.3	Grade level taught.....	141
6.8	Answering the secondary research questions	141
6.9	Answering the primary research question	150
6.10	Applications of the model: Contribution and Recommendations	151
6.11	Conclusion and a reflection on my journey	151

BIBLIOGRAPHY	153
 ADDENDA	 167
Addendum A – Statistical techniques associated with the secondary research questions	168
Addendum B – Invitation to respondents for the quantitative questionnaire	169
Addendum C – Quantitative questionnaire.....	170
Addendum D – Invitation to participants for writing the narrative	182
Addendum E – Qualitative prompts – Writing a narrative	183
Addendum F – Quantitative analysis: Variables, subscales and worldview test	187
Addendum G – Goodwill permission from the head of the primary school	192
Addendum H – Legal authorisation	197
Addendum I – Ethical clearance certificate	201
Addendum J – Proposed timeline	203
Addendum K – E-mail form librarian	204
Addendum L – Turnitin	205
Addendum M – Letter from Statistical Consultation Services	206

List of tables

Table 1-1:	Overview of the chapters.	17
Table 2-1:	Traditional worldview and implications within an educational context.....	29
Table 2-2:	Modernist worldview and implications within an educational context.....	32
Table 2-3:	Postmodernist worldview and implications within an educational context.	34
Table 2-4:	Integrative worldview and implications within an educational context.....	36
Table 3-1:	Overview of the applicable quantitative and qualitative sampling schemes.....	56
Table 3-2:	Overview of the quantitative research instruments.	60
Table 3-3:	Spearman's rho values.	64
Table 3-4:	Overview of the codes-to-theory model applied for the three concepts.	65
Table 4-1:	Overview of the quantitative data analysis and statistical procedures.	72
Table 4-2:	Years of teaching experience in the Intermediate Phase.....	74
Table 4-3:	Primary language of instruction.....	75
Table 4-4:	Subjects taught by respondents.....	78
Table 4-5:	Instrument reliability and descriptive statistics.	79
Table 4-6:	T-test statistics for differences in the language of instruction and self-directed learning.....	81
Table 4-7:	T-test statistics for differences in the language of instruction and metacognitive awareness.....	81
Table 4-8:	T-test statistics for differences in the language of instruction and worldviews.....	82
Table 4-9:	Group statistics of ANOVA and effect sizes for differences between grade level and self-directed learning.	83

Table 4-10:	Group statistics of ANOVA and effect sizes for differences between grade level and metacognitive awareness.	85
Table 4-11:	Group statistics and effect sizes for differences between grade level and worldview.	87
Table 4-12:	Associations between self-directed learning and worldview.	87
Table 4-13:	Associations between the respondents' worldview and their metacognitive awareness.	89
Table 4-14:	Correlations between metacognitive awareness, self-directed learning and worldview groups.	91
Table 4-15:	Correlations between age and years of teaching experience with the main constructs.	92
Table 4-16:	Spearman's rank order correlations for the variables of metacognitive awareness and self-directed learning.	93
Table 4-17:	Spearman's rank order correlations between a worldview and metacognitive awareness.	95
Table 4-18:	Spearman's rank order correlations between self-directed learning and worldview.	96
Table 4-19:	Reliability and mean inter-item correlations of the two self-directed learning domains (visible and affective).	97
Table 4-20:	Standardised regression estimates for the relationship between metacognitive awareness and self-directed learning.	99
Table 4-21:	Standardised regression estimates for the relationship between worldviews and self-directed learning.	101
Table 4-22:	Standardised regression estimates for the relationship between an integrative worldview, metacognitive awareness and self-directed learning.	103
Table 4-23:	Standardised regression estimates for the relationship between an integrative worldview, metacognitive knowledge and self-directed learning.	105
Table 5-1:	Overview of the qualitative data analysis.	108

Table 5-2:	Summary of the profile of the theme “self-directed learning”.	111
Table 5-3:	Summary of the profile of the theme “worldviews”.	120
Table 5-4:	Summary of the profile of the theme “metacognitive awareness”.	126
Table 6-1:	Summary of the quantitative findings and the qualitative results.	137
Table 6-2:	Grouping of the secondary questions.	138
Table 6-3:	Concepts or dimensions of self-directed learning and worldview.	142
Table 6-4:	Concepts or dimensions of worldview and metacognitive awareness.	144
Table 6-5:	Concepts or dimensions of metacognitive awareness and self-directed learning.	145

List of figures

Figure 1-1:	Preliminary conceptual-theoretical framework.	8
Figure 2-1:	Khiat's (2015) dimensions of self-directed learning.	23
Figure 2-2:	Representation of the four worldview groups and their components.	27
Figure 2-3:	Interplay between cognition and metacognition on the object level and the meta-level.....	39
Figure 2-4:	Two dimensions of metacognitive awareness.....	40
Figure 2-5	Dimensions of the conceptual-theoretical framework	44
Figure 2-6:	Conceptual relationship between a worldview and self-directed learning within the context of the social cognitive theory.	45
Figure 2-7:	Conceptual relationship between worldviews and metacognitive awareness within the context of the transformational learning theory.....	46
Figure 2-8:	Conceptual relationship between metacognitive awareness and self-directed learning within the context of the theory of self-transcendence.	47
Figure 3-1:	Components of the empirical design.....	51
Figure 3-2:	The convergent parallel mixed-methods design.	53
Figure 3-3:	Recruitment process.	59
Figure 4-1:	Respondents' age groups.	73
Figure 4-2:	Number of respondents per province.....	76
Figure 4-3:	Grades the respondents teach.....	77
Figure 4-4:	Conceptual-theoretical model illustrating the links between the constructs.	97
Figure 4-5:	Model 1: Metacognitive awareness of self-directed learning.	100
Figure 4-6:	Model 2 on worldviews and self-directed learning.	102

Figure 4-7:	Model 3 on integrative worldview, metacognitive awareness and self-directed learning.....	104
Figure 4-8:	Model 4 on integrative worldview, metacognitive knowledge and self-directed learning.....	105
Figure 5-1:	The dimensions of the conceptual-theoretic framework.....	110
Figure 5-2:	Interactive dimensions of self-directed learning.	119
Figure 5-3:	Interactive dimensions of the worldview groups.....	123
Figure 5-4:	Dimensions of metacognitive awareness.....	129
Figure 6-1:	Overview of the study.....	133
Figure 6-2:	Triangulation.	135
Figure 6-3:	Final model explaining the interaction between the concepts.....	148

Chapter 1 Orientation to the research

1.1 Introduction

In the face of a transforming curriculum, it is considered necessary that teachers stay abreast of curricular advancements. Subsequently, teachers' beliefs regarding these innovations are neglected and overlooked. In Chapter 1, the researcher confers the rationale of the study, research questions, aims and outlines the conceptual framework for the study. The problem the researcher wished to explore was what role private school Intermediate Phase teachers' metacognitive awareness and worldviews played in the process of their own self-directed learning.

1.2 Problem statement and context of the study

Pretorius and Lephalala (2011) state that South Africans face a severe education crisis. The improvement made to date is regarded as inadequate for the educational needs of the country, and the education system is still, by any neutral standard, failing both learners and teachers. A lack of educational resources and infrastructure, poor governance and shortages of qualified teachers compound the issue (Macha & Kadakia, 2017). Consequently, South Africa was graded last in numerous Progress in International Reading Literacy Studies before 2016 (Mullis *et al.*, 2012). The growing request for independent schools, accompanied by the unceasing challenges in the public education system, presents an advantageous opportunity to generate more private schools. It is argued that private schools can offer education opportunities of better quality for learners and boast more proficient management systems than public schools (Mupunga, 2019).

Given the predicament of the below-average literacy rate, the facilitation of metacognitive awareness among Intermediate Phase learners is crucial (Van Aswegen *et al.*, 2019). It is suggested that early mediation is vital before learners develop unproductive habits about themselves as learners (Van Aswegen *et al.*, 2019). In this regard, researchers have examined teacher beliefs, teachers' metacognitive awareness and the way in which teacher beliefs influence teaching habits (Solis, 2015). It is argued that metacognitive awareness can be taught to primary school learners (Aktag *et al.*, 2017; Sperling *et al.*, 2016). For this, the

Intermediate Phase¹ is chosen because metacognitive knowledge and metacognitive regulation in everyday problem-solving performance, especially for these learners who need to be prepared for the next phase of their schooling (Pennequin *et al.*, 2020), can be taught.

Based on remarks made by Jagals and Van der Walt (2018) and Pedro and Van der Merwe (2020), the researcher believes that teachers can develop a positive disposition regarding their assumptions and personal beliefs (worldviews) by equipping them with the necessary perspectives to model metacognitive skills (such as learning how to plan, how to monitor progress and how to evaluate understanding of the task) to foster self-directed learning. Furthermore, this would help teachers to adapt to the demands of teaching in a 21st-century classroom environment (as in the case of Mishra & Mehta, 2017). Moreover, a more reflective practice (habitually reflecting on one's thoughts and actions) regarding metacognitive awareness could advance self-directed learning. However, this may contain epistemological challenges for teachers, as these challenges have not been sufficiently managed in the milieu of traditional conventions regarding the composition of teacher education programmes (Li, 2016; Russell & Martin, 2017).

Past research on the improvement of metacognitive awareness (e.g. Jagals & Van der Walt, 2016; Perry *et al.*, 2019), teachers' worldviews (e.g. Chan & Wong, 2014; Solis, 2015) and the development of an environment conducive to fostering self-directed learning (e.g. Du Toit-Brits, 2019) provided a limited view by using either qualitative or quantitative approaches. Thus, there is a great need for a comprehensive awareness by comparing both qualitative and quantitative data in one study. Therefore, this mixed-methods study, explored the role private school Intermediate Phase teachers' metacognitive awareness and worldviews played in the process of their self-directed learning. The research aim was achieved by applying a convergent parallel mixed-methods design. In this mixed-method study, the qualitative and quantitative data were collected in parallel, analysed separately and then compared. The quantitative data component included 200 primary school Intermediate Phase teachers from a private school group in South Africa. They were invited to complete an online questionnaire on self-directed learning, worldviews and metacognitive awareness. The qualitative data were gathered by narratives with guided prompts written by various participants to explore the role of private school Intermediate Phase teachers' experience of their self-directed learning, their worldviews and their metacognitive awareness. The purpose of gathering quantitative and qualitative data was to converge and compare results. This helped the researcher to gain a

¹ To ensure familiarity for the international reader, the Intermediate Phase consists of learners between the ages of nine and 12, similar to K4 to 6.

greater comprehension of the problem than would be achieved by either type of data independently (Creswell & Plano Clark, 2018).

1.3 Rationale

To empower teachers to manage a 21st-century classroom, teachers must explore the role of their metacognitive awareness and worldviews in the process of their self-directed learning. Regrettably, teaching metacognition as a higher-order concept is generally daunting to the typical teacher (Perry *et al.*, 2019; Solis, 2015). Thus, the main rationale for conducting this research was to explore the role that private school teachers' metacognitive awareness and worldviews played in the process of their self-directed learning. This implies that reflection-in-action (thinking about what I am doing) and the central issues of reflective practice (the skill to reflect on my actions so that I can continue to learn) may lead teachers to better understand themselves. To do so, the researcher applied a pragmatic lens to explore the concepts of self-directed learning, worldviews and metacognitive awareness.

1.4 Research questions

To address the research problem, specific research questions guided the remainder of the study.

1.4.1 Primary research question

The primary research question of this study was:

What role do private school Intermediate Phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning?

To clarify the primary research question, secondary questions were developed that formed part of the qualitative and quantitative research strands.

1.4.2 Secondary research questions in the quantitative strand

The following is a list of the secondary research questions in the quantitative strand:

- What is the relationship, if any, between self-directed learning and Intermediate Phase teachers' worldviews, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?

- What is the relationship, if any, between Intermediate Phase teachers' worldviews and metacognitive awareness, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?
- What is the relationship, if any, between Intermediate Phase teachers' metacognitive awareness and their self-directed learning, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?
- What model, if any, can illustrate the relationship between the worldviews and metacognitive awareness of Intermediate Phase teachers and their self-directed learning?

The reader is also directed to Addendum A for a breakdown of the quantitative research questions in terms of the statistical techniques considered to answer each question.

1.4.3 Secondary research questions in the qualitative strand

The following is a list of the secondary research questions in the qualitative strand:

- What aspects of self-directed learning do Intermediate Phase teachers become aware of?
- What aspects of worldviews do Intermediate Phase teachers become aware of?
- What aspects of metacognition do Intermediate Phase teachers become aware of?

1.5 Research aims

The primary aim of the study was to explore the role of private school Intermediate Phase teachers' metacognitive awareness and worldviews in the process of their self-directed learning.

1.5.1 Secondary research aims in the quantitative strand

The secondary research aims in the quantitative strand were:

- to determine the relationship, if any, between self-directed learning and Intermediate Phase teachers' worldviews, and to determine whether demographics such as age, language, subjects, years' experience and province play a role in the relationship;
- to determine the relationship, if any, between Intermediate Phase teachers' worldviews and metacognitive awareness, and to determine whether demographics such as age, language, subjects, years' experience and province play a role in the relationship;

- to determine the relationship, if any, between Intermediate Phase teachers' metacognitive awareness and their self-directed learning, and to determine whether demographics such as age, language, subjects, years' experience and province play a role in the relationship; and
- to determine what model, if any, can illustrate the relationship between the worldviews and metacognitive awareness of Intermediate Phase teachers and their self-directed learning.

The reader is also directed to Addendum A for a breakdown of the quantitative research questions and the statistical techniques considered to answer each question.

1.5.2 Secondary research aims in the qualitative strand

The secondary research aims in the qualitative strand were:

- to determine Intermediate Phase teachers' awareness of aspects of their self-directed learning;
- to determine Intermediate Phase teachers' awareness of aspects of their worldviews; and
- to determine Intermediate Phase teachers' awareness of aspects of their metacognitive awareness.

To further clarify the aim of the study, a preliminary conceptual and theoretical framework was developed.

1.6 Preliminary conceptual framework

In this section, the three main concepts are explained. Furthermore, a preliminary conceptual framework regarding the process of self-directed learning, worldviews and metacognitive awareness is offered.

1.6.1 Self-directed learning

Malcolm Knowles, the pioneer of self-directed learning, wrote seminal works on self-direction and the important role of adult educators who merely teach by educating individuals, versus helping them learn and comprehend (Smith, 2002). Acknowledging the variety of definitions for the term "self-directed learning", the definition by Xu and Ko (2019) hints toward self-directed learning as a teacher's process of independence and control displayed when he or she directs, monitors and regulates actions towards achieving learning goals. Past research

suggests self-directed learning to be a rational and intellectual process, where teachers purposefully make decisions about their teaching and learning goals and, in so doing, become agents of change for their learning (Cazan & Schiopca, 2014). Recent definitions of self-directed learning take into account previous definitions but also recognise and include specific elements that govern the development of self-directed learning. These elements embrace teachers' self-concept, relevant study skills, past experiences, cultural background and worldview, as well as the educational setting and subject matter (Du Toit-Brits, 2019). Teachers who are concerned with modelling self-directed learning skills often reflect on their epistemological beliefs (teacher beliefs about knowledge and teaching methods) regarding skills required to become an efficient self-directed teacher (Bhat *et al.*, 2007).

1.6.2 Worldviews

The concept of a worldview stems from the German word *Weltanschauung*, implying a specific view or outlook on the world (Naugle, 2002). Another understanding of the term "worldview", according to Miller and West (1993), refers to a set of interconnected conventions and beliefs regarding one's world. Past research suggests that many authors have tried to acquire a tangible consciousness of *worldview* and how it influences the field of psychology and education (Koltko-Rivera, 2004). A more recent interpretation to understand the term "worldview" reveals noteworthy associations between a worldview and someone's opinion (e.g. choosing to attend a public or a private school), as well as exhibited human behaviour (De Witt *et al.*, 2016). Consequently, teachers' worldviews are shaped and influenced by their surrounding reality and experiences. The researcher conceptualises a worldview as a basis of meaning making that develops during a person's lifetime and provides a frame of reference that guides decision making, judgements calls, thoughts and one's understanding of reality. Therefore, understanding a teacher's philosophical stance is essential for addressing educational innovations.

1.6.3 Metacognitive awareness

During the late seventies, Flavell (1979) devised the term 'metacognition'. Metacognition was originally viewed as an individual's reasoning about one's thoughts. This definition indicates that metacognition embodies metacognitive regulation and metacognitive knowledge, which collectively refer to the metacognitive experience of awareness (Flavell, 1979). In this sense, it was assumed that a metacognitive individual (e.g. a teacher) was someone who could evaluate existing ideas to reconstruct new ones to improve and expand comprehension (Flavell, 1979).

The literature indicates that metacognition has gained influence in educational studies over the past decade. In a study by Chekwa *et al.* (2015), metacognition is considered a significant component of effective teaching. It assists awareness and control over the way in which teachers conceptualise their thinking and, therefore, drives their teaching practices. Recent studies, such as Smith *et al.* (2020), explain that metacognitive awareness can be taught and fostered by modelling appropriate strategies, such as questioning, making inferences, activating prior knowledge, synthesising, self-monitoring and reflection. This approach can help empower teachers to navigate the problem and make better decisions regarding their teaching methods. Recent research on metacognition suggests that teaching metacognitive awareness may improve academic progress.

The following section aims to familiarise the reader with three standard theories (see Figure 1-1) that pertain to the purpose of the current study.

1.7 Theoretical framework

Three theories were identified as valuable epistemological tools to explore Intermediate Phase teachers' mindfulness of their metacognitive awareness and accompanying worldviews in the process of their self-directed learning. The social cognitive theory (Bandura, 1989) explains the link between self-directed learning and worldviews; the transformational learning theory (Mezirow, 1978) bridges the connection between the concepts of worldviews and metacognitive awareness; and the theory of self-transcendence (Maslow, 1943) sheds light on the conceptual similarity between metacognitive awareness and self-directed learning. In addition, social-constructivism was identified as the meta-theory because Vygotsky's (1978) insights still prove to be truthful today. For instance, he maintained that language and culture were necessary in human intellectual development and an individual's perception of their world (Vygotsky, 1978). Based on this reasoning, both these ideas allude to the conceptual relationship between self-directed learning and worldviews, as well as metacognitive awareness, that can best be interpreted by the meta-theory of social constructivism.

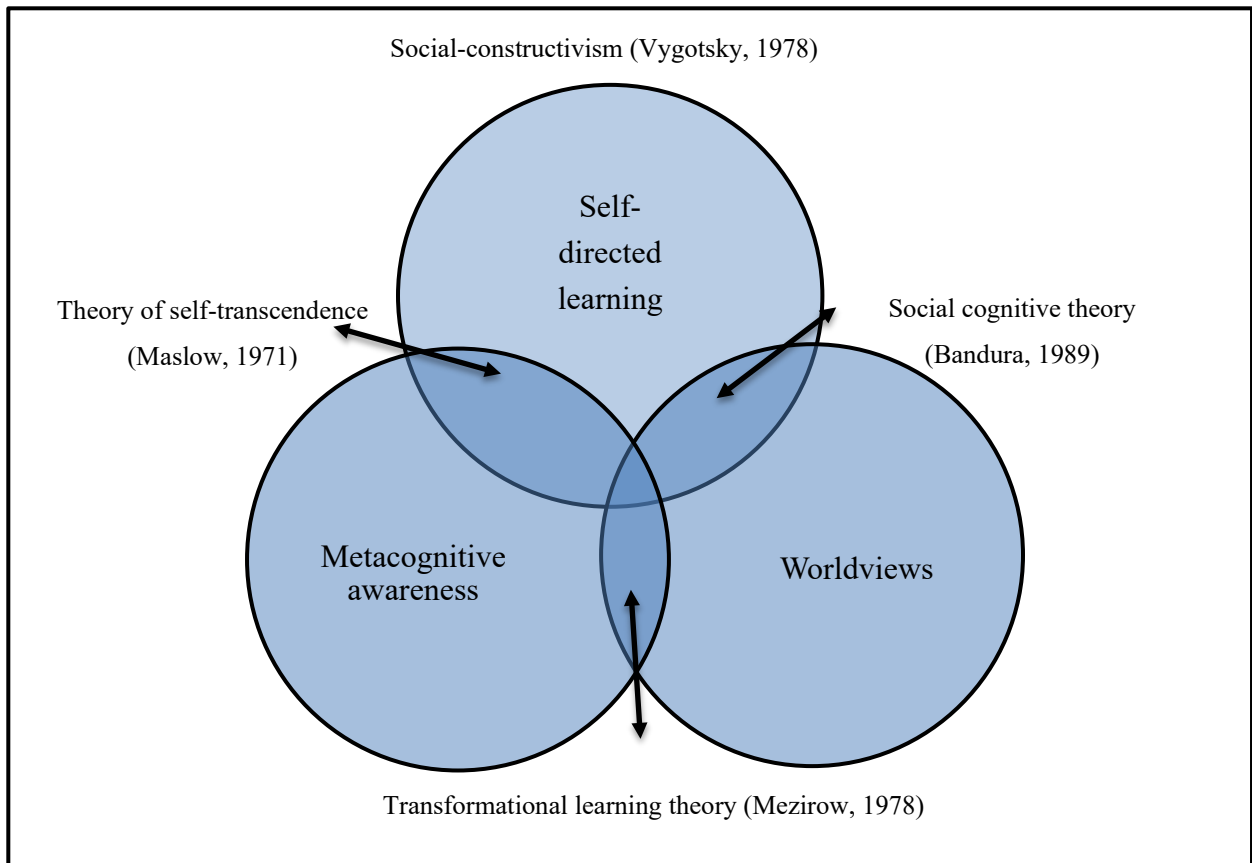


Figure 1-1: Preliminary conceptual-theoretical framework.

First, Figure 1-1 illustrates the concepts of self-directed learning, worldviews and metacognition as the conceptual framework. Second, overlaps between these concepts are illustrated by the theories. And last, social-constructivism serves as the meta-theory to explain and understand a collective view of these concepts and theories.

1.7.1 Bandura's social cognitive theory

Albert Bandura's (1989) social cognitive theory has its roots in behaviourism but also takes into account the mental and thinking aspects of individuals (Ormrod, 2000). Internal mental processes form part of the learning process in all human beings. Teachers can help to develop this seemingly invisible process by the choice of strategies they model in a teaching-learning environment to enhance self-directedness. Albert Bandura (1989) argues that people, including teachers and learners, learn best through observing each other, imitating friends and modelling behaviour from friends. The social cognitive theory highlights human behaviour in terms of shared interaction between intellectual, behavioural and environmental influences. As a result, this interaction facilitates metacognitive development by broadening individuals' experiences and competence (Bojare, 2016). In so doing, learners can exhibit new behaviours

by simply observing a model. This, of course, has tremendous implications for teachers' epistemological worldviews or their philosophy about knowledge and knowledge collection, as this influences the way teachers reason and make imperative instructional judgements (Hofer, 2002). That being so, the social cognitive theory emphasises learning from a social and cognitive perspective; hence, teachers and learners are regarded as active participants in the learning process.

1.7.2 Transformational learning theory

During the late 1900s, Jack Mezirow developed the transformational learning theory. This theory accredits an individual's development and the application of critical self-reflecting when considering personal beliefs and experiences (Howie & Bagnall, 2013). The transformational learning theory can be interpreted as learning that challenges questionable ideas and assumptions to make them more embrative, reflective and less discriminative (Mezirow & Taylor, 2009). Mezirow's (1978) theory was mostly sparked by peoples' conception of worldviews and what causes individuals to change (or not) their particular worldview. As a result, he believes that individuals are indeed capable of altering their viewpoints over time if given an opportunity. On account of this, he argues that when people are faced with a dilemma that does not coincide with their frame of reference, they are urged to re-examine their beliefs. This often arises through critical reflection when conversing with others. An educational learning environment is a valuable place to model and facilitate disorienting dilemmas (Christie *et al.*, 2015). When teachers provide opportunities for themselves and their learners to critically engage with new ideas, transformative learning can take place. To this end, the conceptual relationship between worldviews and metacognitive awareness can be best described by the transformational learning theory.

1.7.3 Theory of self-transcendence

Self-transcendence is acclaimed as part of Abraham Maslow's (1943) hierarchy of needs, as cited in Koltko-Rivera (2006). The verb transcendence indicates rising to a higher state. *Transcendence* comes from the Latin prefix *trans-* (*beyond*) and the word *scandare* (to climb). Therefore, to attain transcendence, one must surpass one's ordinary limitations, beliefs and thoughts (Messerly, 2017). To this end, Maslow adapted his initial model, assigning self-transcendence as an inspirational step above self-actualisation (Maslow, 1969). He regarded self-transcendence to be an awareness of the spiritual parts of the *self*. Self-transcendence is, therefore, about exceeding or excelling the *self* regarding something greater than the *self*. As attested by Maslow, self-transcendence transports individuals from their current experiences

or beliefs to surpass their limitations and see themselves from a more sophisticated perspective. Messerly (2017) argues that these incidents and situations provide positive emotions such as joy and peace and a perceptive sense of consciousness. Consequently, recognising self-transcendence included in Maslow's hierarchy is significant, as it provides a broader understanding of people's worldviews, the significance of life, social progress and educational developments (Koltko-Rivera, 2006). The theoretical relationship between metacognitive awareness and self-directed learning can thus be interpreted by the theory of self-transcendence.

1.7.4 Social-constructivism as meta-theory

Lev Vygotsky is commonly viewed as the pioneer of the "social-constructivist theory". This theory emphasises the interactive nature of learning in education (Vygotsky, 1978). Unlike Piaget, Vygotsky does not approve that learning could be detached from its social context. Vygotsky argues that intellectual functions initiate social interactions and can, therefore, be viewed as a product of social interaction. Towards this end, he claims that learning cannot simply include the assimilation and accommodation of new knowledge but is rather the process by which individuals are included into a knowledge society. Consequently, Vygotsky maintains that language and culture are indispensable in human intellectual development and individuals' perception of their world, that is, their worldview. The conceptual relationship between self-directed learning, worldviews and metacognitive awareness is embodied in Vygotsky's notion that individuals develop on a social (inner psychological) level, as well as an individual (intra-psychological) level, that is *inside* the individual. It is for this reason that Vygotsky's theory of social learning is still valid for many theorists and researchers in the field of education (Van der Walt, 2019).

1.8 Empirical design of the study

The mixed-methods design is defined in this section, and the researcher states why this particular approach was applicable in the study. The methodology that informed and framed the design of the study is introduced to explore the primary aim. After a comprehensive and rigorous understanding of the problem had been obtained, the researcher applied the convergent parallel mixed-methods design (see Creswell & Plano Clark, 2018) to address the primary research question.

1.8.1 Methodology

In any research paper, researchers are advised to explain the reasons for their research procedures in a particular paradigm or worldview. Crotty (1998) attests that a methodology provides the focus of and approach for a study, as well as the procedure through which the researcher has decided the methods that would be applied to address the specific research question, in other words, how one's philosophy fits into the design of one's study. According to Morgan (2007), a paradigm is viewed as a set of principles and practices that guide a field, while Crotty (1998) refers to a paradigm as a worldview that consists of beliefs and assumptions about knowledge. A research paradigm consists of ontology (how we view reality), epistemology (how we understand what we know), axiology (values) and methodology (how we do research). So, paradigm variances influence how one knows, one's understanding of what is real and the truth, and one's principles and methodology in inquiry. According to Tashakkori and Teddlie (2003), pragmatism is most often connected to mixed-methods research. Pragmatists believe that the focus of research is on the consequences and the importance of the research question being asked instead of the methods employed (Johnson *et al.*, 2007). The pragmatist paradigm perceives reality as both singular and plural, depending on what works best for the research situation at that particular time. In this study, quantitative research questions were posed to measure the relationship between the variables, namely teachers' self-directedness, their worldviews and their metacognitive awareness. The researcher posed qualitative research questions to explore the role private school Intermediate Phase teachers' metacognitive awareness and worldviews played in the process of their self-directed learning.

The role of the researcher included multiple stances obtained from qualitative and quantitative data and perspectives. The researcher collected both data sets and interpreted the results to gain a rigorous appreciation of the research problem. She believed that the pragmatic paradigm best suited with the nature of this research, as both the quantitative and the qualitative data would present interesting findings.

1.8.2 Research approach

There are many debates in the literature regarding mixed-methods research and what it entails (Morgan 2007; Sandelowski, 2010). The definition by Johnson *et al.* (2007) states that mixed-methods research can be seen as a type of investigation where the researcher blends quantitative and qualitative research elements to obtain a deeper and more rigorous understanding of the problem under investigation. In this definition, a mixed-methods approach

is not perceived as simply a method to execute research but rather as a methodology that incorporates both quantitative and qualitative research aspects as multiple ways to address a problem. In addition, a mixed-methods approach enables researchers to investigate educational issues through words and numbers, thereby benefitting educational establishments and society as a whole (Almalki, 2016). To this end, the quantitative component of this study highlights the relationship between the variables and provides a broader understanding of the problem, whereas the qualitative component explores these relationships and honours the expressions of the participants.

1.8.3 Research design

The researcher adopted the convergent parallel mixed-methods design (see Creswell & Plano Clark, 2018). This type of design indicates predetermined and deliberate quantitative and qualitative techniques at the beginning of the research process. In line with the pragmatist philosophy that motivated the use of a mixed-methods research approach, the convergent parallel design encompasses the following aspects: (i) implement the quantitative and qualitative strands concurrently (QUAN + QUAL); (ii) both strands have equal emphasis; and (iii) the results of the distinct strands are interpreted. The intent of choosing this design was to compare the results from the two databases, as suggested by Creswell and Plano Clark (2018). The researcher believed two data sets would provide a more nuanced interpretation of the problem than by either approach individually, as one data set would be insufficient to fully comprehend the dimensions of the research problem (see Wittink *et al.*, 2006). Consequently, the researcher analysed the data retrieved from the questionnaires quantitatively and the data obtained from the narratives qualitatively. The results of the quantitative strand and the findings from the qualitative strand were triangulated to evaluate in what ways the quantitative and qualitative strands converged or diverged.

In the following section, the population and sampling strategies for the two independent strands are discussed.

1.8.4 Population and sampling

The demographic background of the study included all nine provinces of South Africa, as various schools across all nine provinces were included. The population (N = approx. 1 000) included Intermediate Phase teachers from which the sample (n = approx. 200) was drawn. These teachers taught learners between the ages of nine and 12. Their primary language of instruction was English or Afrikaans for all subjects in this phase.

1.8.5 Sampling techniques

A purposive, non-random sampling scheme was applied for the quantitative strand because the researcher wanted to focus on explicit features of the population (N = approx. 1 000) that would best assist in answering the research questions. In this case, the respondents (n = 200) represented Intermediate Phase teachers (Grades 4-6) from a specific private school group in South Africa. As a non-probability sample cannot be used to correctly hypothesise about the population, the researcher included a qualitative sample (8-12 participants) as well. The qualitative sample included a purposive sampling scheme because Intermediate Phase teachers were best suited to shed light on the research question. The participants were invited to write a narrative with various prompts regarding their experience of their metacognitive awareness and worldviews in the process of their self-directed learning. Both sampling techniques were applied by inviting the Intermediate Phase teachers to complete a voluntary questionnaire on Google Forms. Both samples together were deemed necessary to yield a rich understanding concerning the complexity of the research problem (see Creswell & Plano Clark, 2018).

The inclusion criteria for both parts of the study included the following: (i) teachers must currently teach any grade in the Intermediate Phase and (ii) be full-time employees at this particular private school group. Exclusion criteria for both parts of the study were as follows: (i) teachers who do not currently teach in the Intermediate Phase, (ii) teachers who are not full-time employees at this private school group and (iii) student teachers and administration staff.

1.9 Data collection methods

In line with a convergent parallel design, the both sets of data were gathered during a single phase.

1.9.1 Quantitative data collection

The data collection method for the quantitative strand of the study included three standardised closed-ended questionnaires (see Addendum C). This method applied to this study because all respondents from this specific private school group had access to (i) an active e-mail address registered within the company, (ii) a laptop (iii) and the internet. The advantages of applying a questionnaire for this study included the following: (i) bias and partiality could be eliminated; (ii) the respondents could complete the questionnaire in their own time; (iii) no paper had to be printed or posted; and (vi) the questionnaire could be completed across all

nine provinces. This data collection method was applied by sending an invitation (see Addendum B) via e-mail to all schools in the population of the study.

1.9.2 Quantitative research instruments

The quantitative research instrument consisted of three standardised questionnaires. The first section entailed biographical details regarding the respondents. The second section was concerned with self-directed learning, and Khiaat's (2015) instrument obtained in his article "Measuring self-directed learning: a tool for adult learners" was applied. The third section entailed the standardised worldviews test developed by De Witt *et al.* (2016). The last section of the questionnaire consisted of the Metacognitive Inventory for Teachers (MAIT), developed by Balcikanli (2011). An in-depth discussion of the quantitative instruments considered for the study follows in Chapter 3.

The next section provides more information regarding qualitative data generation.

1.9.3 Qualitative data generation

The data collection method for the qualitative strand was narratives written by the participants (see Addendum E). These narratives aided the researcher to develop an rigorous understanding of the participants' perspectives of their self-directed learning, worldviews and metacognitive awareness. This data collection method was applied in the same manner as in the quantitative data strand. The first 12 completed narratives received were decoded for the qualitative strand of the research. Reasons for choosing this specific method of data collection were as follows: (i) the researcher could capture multiple facets of the phenomenon; (ii) the participants' opinions and real-life accounts generated deep and rich data to answer the research questions; and (iii) a narrative inquiry aided the discovery of additional data to understand the research problem (see Creswell & Plano Clark, 2018; Rule & John, 2011).

1.9.4 Qualitative data collection method

Narrative writing is one of many qualitative methodologies that can be applied to gather and examine data (McAlpine, 2016). In this study, a narrative inquiry revealed how the Intermediate Phase teachers understood and interpreted experiences in their lives. This method was applied by inviting participants (see Addendum D) to write a brief narrative regarding their experiences with self-directed learning, their worldview on teaching and learning and their metacognitive awareness. An email invitation with clear instructions was sent to all teachers.

1.10 Data analysis methods

Following the convergent parallel design, the researcher analysed the quantitative and qualitative strands separately. After this, both data sets were triangulated as suggested by Creswell and Plano Clark (2018).

1.10.1 Quantitative data analysis

During the quantitative data analysis phase, the raw data were converted from Google Sheets into an appropriate format (e.g. .xls in Microsoft Excel). Numeric values were assigned to each response from the questionnaires (according to the applicable Likert-type scale). Statistical analysis was conducted in consultation with a statistical consultant of the North-West University. The Statistical Package for Social Sciences (SPSS, 2009) was utilised to inspect the data for trends by means of descriptive and inferential statistics. In particular, mean scores, standard deviations, including Cohen's (1988) effect sizes for the interpretation of results, ANOVAs (analysis of variance) and T-tests for the reporting of *p*-values for the sake of completeness, were applied. Correlations were determined by using Spearman's correlation coefficients to inform the development of a model to describe the relationship between the concepts using structural equation modelling (refer to Addendum A as an illustration of how each research question necessitates these statistical techniques).

1.10.2 Qualitative data analysis

During the qualitative data analysis phase, the researcher read through the data to understand the issue from a holistic point of view, as advised by Trochim (2006). This step also included writing analytical memos to record the researcher's initial thoughts. After this, *a priori* codes were applied to code the data into meaningful categories and themes. A detailed indication of the codes applied to each section is provided in Chapter 3. As per the convergent parallel design, both sets of data were regarded as equally important to answer the research questions. After the initial separate analyses, the two sets of results were triangulated and the findings were compared. A table was drawn up to indicate the qualitative findings and the quantitative results. This was followed by comparing the quantitative results and qualitative findings to determine how they confirmed, disconfirmed or expanded one another (see Creswell & Plano Clark, 2018).

1.11 Validity in a mixed-methods study

In this study, validity was achieved by applying procedures to confirm the legitimacy of both strands of data and results, and the interpretation thereof. The issue of validity is different in quantitative and qualitative research, although both approaches resolve to check the value of the data, the results as well as the researcher's understanding of the results (Creswell & Plano Clark, 2018). One of the most crucial aspects to consider during the research process, is validating the outcomes in a mixed-methods study (Tashakkori & Teddlie, 2003).

Consequently, the quantitative and qualitative databases were triangulated to produce verified and valid conclusions about the research problem. Triangulation is a technique to substantiate data by authentication from two or more additional sources (Creswell & Plano Clark, 2018). For the study, two rigorous and independent data sets were obtained, analysed separately and then compared. The researcher achieved authentication and validity by triangulating the data. This was done by comparing the quantitative statistical results and the qualitative outcomes. An in-depth discussion of this comparison is provided in Chapter 3.

1.12 Ethical issues

The ethical issues surrounding the study is presented in this section. The researcher obtained ethical clearance (see Addendum I) from the North-West University, followed by legal authorisation (see Addendum H) from the head of the Curriculum Department of the private school group before she started to collect data. Then she obtained goodwill permission (Addendum G) from the principals of all the participating schools. Only then data were collected by inviting respondents to complete an online questionnaire. She requested and obtained informed consent from all the participants.

The right to privacy and anonymity of the participating Intermediate Phase teachers was protected by keeping the questionnaires unnamed and confidential. No South African departmental employees of the Department of Basic Education were invited to take part in the research. The language used in the questionnaires was not biased, racist, sexist or discriminatory in any way that could cause the respondents to feel disempowered or marginalised. The respondents answered the quantitative and qualitative questionnaires in English. No participant, school or community was exposed to any physical or emotional harm during the research process. A detailed discussion follows in Chapter 3.

1.13 Chapter division

The chapters of the study are outlined in Table 1-1.

Table 1-1: Overview of the chapters.

Chapter 1: Orientation	Research questions and aims, as well as a broad overview of the methodology, sampling techniques and ethical considerations of a mixed-methods study.
Chapter 2: Literature review	The three main concepts are clarified. The theoretical framework is used to familiarise the reader with the three theories that best suited the purpose of the study.
Chapter 3: Empirical design and methodology	Research process.
Chapter 4: Analysis of quantitative data	Core findings of the quantitative strand are presented.
Chapter 5: Analysis of the qualitative data	Core findings of the qualitative strand are presented.
Chapter 6: Discussion of results	Results and recommendations for future research.

1.14 Contribution of the study

Self-directed learning has gained much attention over the past decade. Although many definitions of the term exist, self-directed learning must be contextualised within a specific field to grasp its dimensionality. The researcher was intrigued by various teachers' opinions regarding self-directed learning and their interpretations thereof. This discrepancy sparked a curiosity in the self-directed learning movement. Take as an example the fact that during the nationwide lockdown, teaching had to continue online and teachers had to come up with new ways of teaching. The current study contributes to the field by gaining insight into teachers' metacognitive awareness and their worldviews regarding their teaching world and how their assumptions influence their teaching behaviour for self-directed learning. The researcher believes that if teachers were made aware of and understood their own thoughts, beliefs and opinions, they would be more open to discovering other ways of knowing and doing and, in this way, contribute to the advancement of their own self-directed learning in the Intermediate Phase.

Chapter 2 Literature review

2.1 Introduction

Chapter 2 provides the background and context of the study by presenting a scholarly review of the main concepts emerging from the problem statement in Chapter 1, which are self-directed learning, worldviews and metacognitive awareness. The research problem does not address the many challenges in terms of education in South Africa; instead, it explores the relationship between the concepts that emerge from these challenges by conceptualising the underlying concepts that developed upon the foundational theoretical framework surrounding the social cognitive theory (Bandura, 1989), the transformational learning theory (Mezirow, 1978) and the theory of self-transcendence (Maslow, 1971). Upon synthesis of the conceptual and theoretical frameworks, the chapter ends with a conceptual-theoretical framework that serves as a proposed conceptual-theoretical model to illustrate the interconnectedness of the metacognitive awareness, worldviews and self-directed learning of Intermediate Phase teachers in a private school setting.

2.2 Background and context of the study

Research on a national level claims the South African education system does not sufficiently prepare learners for the workplace, as education is characterised as substandard (Mtantato, 2018; The Economist, 2017). Mtantato (2018) and Macha and Kadakia (2017) provide practical reasons for the poor education system, including issues such as poor infrastructure and scarce supplies in schools, especially in rural areas. Even though South Africa has undergone various policy cycles since 1994, quality education remains a challenge. Mtantato (2018), for instance, argues that although the curriculum, that is, the *Revised National Curriculum Statement* or *Curriculum Assessment Policy Statement* (CAPS) (Department of Basic Education 2012), requires learners to engage in problem solving as opposed to only knowledge accumulation, South African learners continue to struggle with skills associated with problem solving. Jagals and Van der Walt (2018) and Van Aswegen *et al.* (2019) explain that one reason for this continuous struggle is that these skills are not always explicitly modelled by the teacher in the classroom. Internationally, a movement away from outdated transmission-only teaching methods to a more holistic approach – where learners make sense of how they learn and develop critical questioning and problem-solving skills and where resilience and adaptability are promoted in their lived world as a social environment (Mishra & Mehta, 2017; Smith *et al.*, 2020) – is currently afoot.

A study by Bonet (2019) on the choice of a public or independent school indicates that there are various reasons why parents enrol their children at either a public or an independent school. Reasons may include proximity to the school, infrastructure, sports facilities, class size, religious education programmes and the teaching of moral values. It seems as if many South African parents are looking towards independent² schools as an alternative to public schools³ for answers and better education opportunities (Mupunga, 2019). As suggested by Bonet (2019:4) an important reason for choosing a particular school is that the school reflects and reiterates the parents' values and philosophies, in other words, *their* worldview regarding the nature of reality, opinions about education, beliefs about the meaning of life and beliefs about one's role in society.

During the 2020 academic year, the education system in South Africa, along with schools across the world, faced an unforeseen and unprecedented challenging time, as most schools were forced to close for several months due to the worldwide Covid-19 pandemic. Teachers had to come up with alternative ways and methods of teaching learners, as schools were closed for an indefinite period (Chinyamurindi, 2020). Consequently, when schools reopened, some schools adopted a blended learning approach to accommodate learners in the classroom as well as in an online learning setting. Geduld (2019) indicates that teachers' knowledge and beliefs about themselves and their lived world (epistemological beliefs) affected their perceptions regarding their teaching behaviour, which, in turn, prompted behaviour that was conformable to these beliefs. This thought is echoed by Chinyamurindi (2020) who notes that teachers were forced to rethink how they taught by challenging methods rooted in tradition. Ferguson and Lunn Brownlee (2018) argue that teachers' beliefs about knowledge, knowing and learning (epistemological beliefs) impact how they process knowledge and then present this knowledge (teach) in the classroom. These beliefs constitute the reasoning processes and provide justification for their teaching methods (Ferguson & Lunn Brownlee, 2018; Hofer & Pintrich, 1997; Jagals & Van der Walt, 2018; Muis, 2007). The researcher argues that teachers may become metacognitively aware of the challenges in their own classrooms and, based on their beliefs (worldviews), may decide to take the initiative to engage in self-directed learning. Therefore, the researcher proposes, based on the problem statement mentioned in Chapter 1, a model that can assist educationists to explore the link between self-directed learning, metacognition and worldviews further, so that they are not

² Independent schools or private schools are not funded or controlled by the government or public authorities. They are funded through tuition fees, donations and endowments. In addition, they are operated by independent boards of trustees.

³ A Model C school is a public school in South Africa. The term "Model C" refers to the governance and funding model that these schools use. They are public schools, which means they are government-funded, but they have more autonomy in managing their finances, curriculum, and admissions policies than other public schools.

overlooked by the ontological drive of symptomatic problems but, instead, informed by the underlying causes (or ignorance) of the root of these problems, especially according to their theoretical nature.

2.3 Self-directed learning

2.3.1 Development of the understanding of self-directed learning

Self-directed learning (similarly mentioned as a type of heutagogy) has been a key concept in education for the past four decades; yet scholars seemingly still cannot agree on one definition (Brockett & Hiemstra, 1991; Garrison, 1997; Du Toit-Brits & Van Zyl, 2017). Unfortunately, this has led to confusion and some misunderstandings. Since the 1800s, there have been many scholarly efforts to better understand self-directed learning. As early as 1840 and 1859, Craik and Smiles (as cited in Hiemstra, 1994) published works centred on the theme of self-help and in so doing, encouraged the advancement of self-directed learning. Consequently, over the past 50 years, the development in self-directed learning is ubiquitous in the literature and under the scrutiny of many researchers, especially in the field of education. The pioneer for self-directed learning, Knowles, wrote prevalent works on self-direction and the important role of teachers. Knowles' (1975) publication about self-directed learning as part of adult learning offered essential insights that have directed subsequent research. As attested by Knowles (1975), self-directed learning refers to a person's ability to actively be engaged in the learning process by identifying learning goals, monitoring one's understanding of a task and evaluating one's progress of a task.

Inspired by the work of Knowles, Guglielmino (1977) established the Self-directed Learning Readiness Scale that measures the readiness of self-directed learning. Knowles (1975) attested self-directed learning to include all people's ability to learn on their own. Another advancement in self-directed learning during the 1980s was Brookfield's (1984) research that indicated self-directed learning as a constituted factor for adult education. In this sense, Brookfield (1984) argued that researchers should adopt a more self-critical inspection regarding self-directed learning research, as quantitative methods were mostly applied in evaluating the extent of learning.

During the 1990s, the Personal Responsibility Orientation model was developed by Brockett and Hiemstra (1991). This model considered variations and comparisons between self-directed learning as an informative method and the self-directedness of a learner as a set of character traits. They argued that personal responsibility referred to individuals taking

ownership of their opinions and actions. In terms of learning, this involves individuals' willingness to be responsible for their learning and accept the consequences of their thoughts and actions that determine any potential for self-direction (Brockett & Hiemstra, 1991). Furthermore, Brockett and Hiemstra (1991) stated self-directed learning to be a pedagogical practice focussed on evaluating needs, implementing learning activities and assessing learning. During the following decade, Avdal (2013) also contended that self-directed learning was a learning method or a process, similar to the claim made by Brockett and Hiemstra (1991). This included the planning of one's work and understanding what, when and how to learn.

2.3.2 Factors associated with self-directed learning

Reid (2016) argues that teachers can only facilitate the learning process, during which learners can navigate the complexity of their world if the teacher becomes curious about his or her own acquired skills to cope in this fast changing world. This includes taking cognisance of one's teaching methods through a process of metacognitive awareness of self and latent epistemological beliefs concerning the worldviews held regarding the advancement (or not) of one's self-directed learning processes. Therefore, the teacher cannot be exempted from the learning process, because the teacher is instrumental in developing young learners (and him- or herself) to engage in the process and become or model self-directed learning when the teacher is seen as an adult learner in the context of the study (Reid, 2016).

Du Toit-Brits and Van Zyl (2017) suggest self-directed learning competency can enable learners to successfully take on academic work, even beyond formal education, which, in turn, leads to better economic growth and career success. Consequently, learners are not prepared to engage in lifelong learning (Du Toit-Brits, 2019). In addition, Du Toit-Brits and Van Zyl (2017) argue that teachers' beliefs about modelling higher-order metacognitive approaches to encourage self-directed learning leave most teachers overwhelmed. According to Du Toit-Brits (2019) and Du Toit-Brits and Van Zyl (2017), a willingness for self-directed learning is possible if teachers are positive practitioners and supporters of self-directed learning. Furthermore, Du Toit-Brits and Van Zyl (2017) argue that South African learners need to learn how to learn, which includes metacognition, thinking skills and self-directed learning. Moreover, Jagals and Van der Walt (2018) argue metacognition as a deliberate and intentional skill can indeed be taught, but unfortunately, the value of teaching metacognition is overlooked in the *Revised National Curriculum Statement* or CAPS (Department of Basic Education, 2012).

2.3.3 Defining self-directed learning

The literature debates whether self-directed learning should be viewed as an educational goal, a process, a personality characteristic, a concept or a construct (Brockett & Hiemstra, 1991; Du Toit-Brits & Van Zyl, 2017; Van der Walt, 2019). For example, Arkan *et al.* (2016) suggests self-directed learning to be a learning goal for education and a learning competency to be grasped during the learning process. Van der Walt (2019) attests self-directed learning to not be interpreted as a mechanistic process but rather as one where individuals exercise freedom, autonomy and choice to engage in the learning process. Furthermore, Van Wyk (2017) indicates that personal attributes come into play during the learning process. These attributes include motivation for being accountable for one's learning and for applying appropriate metacognitive strategies as one engages in the learning process (Brockett & Hiemstra, 1991; Du Toit-Brits & Van Zyl, 2017; Van der Walt, 2019). Alharbi (2018) indicates that self-directed learning behaviour is characterised by someone who possesses specific skills. These skills could include time and stress management skills, proper note-taking skills, preparing for assessments, learning from online tutorials, problem solving, critical thinking and acquiring new knowledge. (Alharbi, 2018 as cited in Van der Walt, 2019).

It is worthwhile to mention self-directed learning does not have a mechanical and rigid quality but is, instead, a flowing process encompassing various continuous and flexible dimensions. Manning (2007) points out self-directed learning informs a large part in adult education as adults have a desire to be self-directed. It is worthwhile to mention that Knowles' (1984) work pertains particularly to adult education and development. His principles for adult education (andragogy) are based on five assumptions. These assumptions are as follows: an adult's self-concept (as one matures, one's self-concept grows from a reliant towards a more self-reliant personality); adult learner experience (as one matures, a developing reservoir of experience accumulates that develops a collective resource for learning); willingness to learn (as one develops, readiness to learn becomes focused on developmental tasks of one's social roles); position to learning (as one develops, orientation towards learning swings from one that is subject-centred to one that is problem-centred); and inspiration to learn (as one develops, the incentive to learn becomes intrinsic).

In their study, Zhu *et al.* (2020) investigated the role of motivation, self-monitoring and self-management as included in self-directed learning. They established that motivation directly impacts learners' cognitive and metacognitive approaches (for example goal setting, planning learning, monitoring and evaluating progress). This, which, in turn, influence behaviour, for example time management, stress management and searching for information. The participants in their study were university students, but as argued earlier, the researcher views

a teacher as an adult learner. For this study, self-directed learning is conceptualised as an inherent process that may not be visible or tangible at first, as personal beliefs (worldviews) are applied and challenged to formulate (new) learning aims and approaches that facilitate the capacity to become aware of one's own knowledge and the regulation of knowledge (metacognition). This eventually includes the altering of one's thoughts and beliefs regarding teaching strategies, teaching developments and, most importantly, the development of self. Therefore, the researcher proposes a model to explore the interconnected nature of metacognitive awareness and worldviews and their impact on self-directed learning.

In addition, Khiat's (2015) work on self-directed learning involving university students (adult learners) was applied. The aim of Khiat's (2015) study was to help adult learners to identify and expand their existing self-directed learning strategies. Khiat (2015) contends that adult learners are not always aware of self-directed learning strategies in which they excel or fare poorly. Thus, a diagnostic tool was designed to help adult learners recognise their strengths and limitations for self-directed learning. To enable the application of the diagnostic tool, ten dimensions were identified, as shown in Figure 2-1.

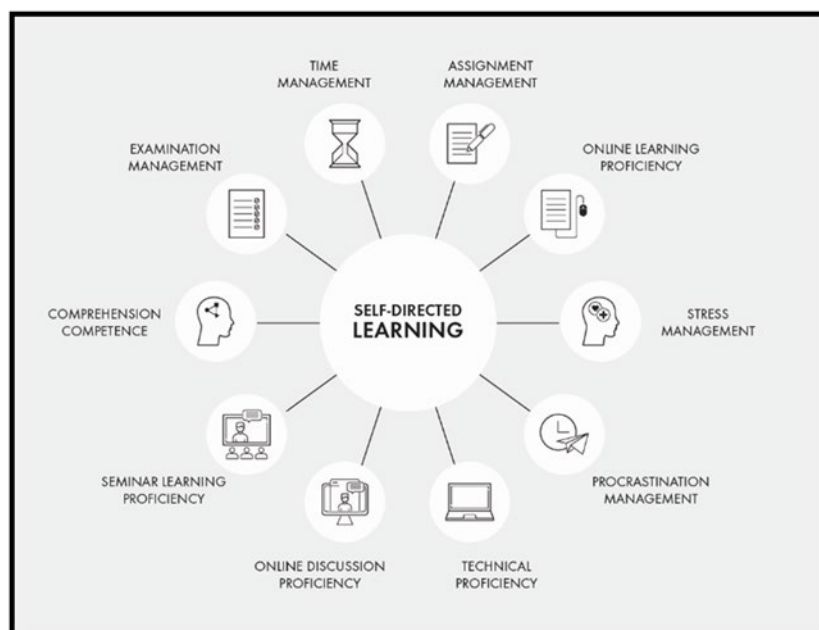


Figure 2-1: Khiat's (2015) dimensions of self-directed learning.

Source: Khiat (2015)

Khiat's (2015) dimensions of self-directed learning are best explored in light of metacognitive awareness. Each self-directed learning dimension necessitates the planning, monitoring and evaluation of a task (metacognitive regulation), along with comprehension of the self,

understanding of strategies to apply and knowledge of which strategies to apply when. Metacognitive awareness is closely linked with Schoenfeld's (1992) identified skills for this awareness. These skills refer to an individual's knowledge, the appropriate application of strategies, examining one's performance or outcomes and, lastly, the belief system (worldview) of the individual's achievement.

The first dimension in Khayat's (2015) diagnostic tool entails *assignment management* and implies a teacher's ability to select appropriate information when setting an examination or a test for learners in a specific subject or grade. Assignment management also includes metacognitive skills of planning, monitoring and evaluating, as well as self-knowledge, task knowledge and which strategies to apply. The second dimension entails *online learning proficiency*, which refers to a teacher's skill to learn from online video lectures or webinars. Learning from a webinar also requires teachers to be competent to examine and assess their learning and performance and to develop their self-knowledge. The third dimension entails *stress management* and implies a teacher's skill to handle academic stress in an educational environment. Stress management also requires the metacognitive skills of planning, monitoring and evaluating one's progress or lack thereof. An individual's belief system also plays a role in his or her perceived level of success.

The fourth dimension entails *technical proficiency*, which refers to a teacher's ability to operate basic computer programmes to type class notes or access the internet. This requires teachers to be metacognitively aware of their self-knowledge, which strategies to apply to access information and monitor performance and their beliefs about their success. The fifth dimension entails *procrastination management*, which refers to a teacher's ability to manage deadlines. The metacognitive skills of planning, monitoring, evaluation and self-knowledge are necessary. An individual's belief system regarding decision making and time management also plays a role in his or her procrastination. The sixth dimension entails *online discussion proficiency*, and this indicates a teacher's skill to cope in online discussion platforms relating to teaching and learning courses or self-development courses. The metacognitive skills of self-knowledge will aid an individual in discussion forums.

The seventh dimension entails *seminar learning proficiency*, which refers to a teacher's ability to learn new information during seminars or lectures. The metacognitive skills of self-knowledge, strategy knowledge (which strategies one must apply, and how and when to learn) and the monitoring of one's performance will guide a teacher's progress. The eighth dimension entails *comprehension competence*, and this refers to a teacher's aptitude for reading comprehension and note taking (to help plan, monitor and evaluate) during training sessions

and to keep track of what they know (self-knowledge) or do not know relating to the subject matter or new teaching approaches. The ninth dimension entails *examination management*, which highlights a teacher's proficiency to plan a lesson for a formal class visit or to do well in an online examination or assignment. The tenth dimension entails *time management*, which highlights the teacher's proficiency to utilise class time effectively (planning) and set personalised learning goals (monitoring) for what he or she wants to achieve that day (evaluation).

Reid (2016) suggests that teachers need to become curious about themselves, their roles and skills to develop their way of seeing the educational world. Such ways can serve as the inherent expressions that one follows to create or establish the educational environments considered to be conducive to self-directed learning. In so doing, old and forged teaching habits and beliefs may be challenged when, as Olthuis (1985) puts it, a teacher becomes mindful of how a worldview touches one's awareness of one's world and one's actions in the world. Although a teacher may not vehemently articulate a specific worldview, it forms the basis from which reality is interpreted, regulated and acted upon. Consequently, a worldview becomes the foundation upon which all teachers' everyday thinking and doing (behaviour) rests.

In the following section, the researcher elaborates on the concept of a worldview and how a worldview influences an individual's, in this case an Intermediate Phase teacher's, outlook on education.

2.4 Worldviews

The term 'worldview' was first coined by the Prussian philosopher Immanuel Kant (1724-1804) in his work *Critique of Judgement* published in 1790 (as cited in Naugle, 2002). "Worldview" stems from the German word *Weltanschauung*, which denotes a specific view or outlook of the world. Kant proposed the notion that humans can only know things within the framework of their creation; thus, the mind can organise one's chaotic world into a comprehensive and orderly whole (Naugle, 2002). There are various definitions of the concept throughout the literature, especially in philosophy and theology, as many researchers have tried to define and understand the term.

Aerts *et al.* (1994) contend that a worldview is a reasonable and rational set of concepts that allows people to establish an extensive image of their world, thus aiding them to understand their lived encounters. Koltko-Rivera (2004) contends a worldview to be a set of truths or

propositions about a person's physical and social reality, or guidelines of living that serve as the foundation for particular beliefs, cognition and behaviour. Hart (2010) refers to a worldview as a mental lens that one applies to perceive and understand the world. In this study, the researcher understands a worldview as being composed of various personal and salient beliefs that affect an individual's awareness, perception and interpretation of reality. These beliefs form the foundation from which an individual makes choices and directs behaviour.

Epstein (2016) suggests that people's awareness of the world and its surroundings is formed in tandem with other individuals within a similar social context, for example a classroom. Although one's awareness, which later on becomes epistemological beliefs, is not explicitly reflected upon, Taylor (1989) and Fisher (2012) both suggest that it does, to some extent, still have an impact on one's beliefs, such as the way one teaches, the way one thinks about knowledge and the way one believes knowledge should be transferred; thus, a worldview develops over time. Research by Johnson *et al.* (2011) indicates the necessity of humans to have a worldview, as people have questions about their existence and their identity that need answers. Bishop and Van der Walt (2010) argue that an individual's worldview is comprised of fundamental beliefs that the person is actively aware of, and these beliefs rationalise one's actions as one thinks about them. This thinking is closely linked to Flavell's (1979) conceptualisation of metacognition as being aware of one's knowing and thinking. This would imply that an individual can direct and be aware of his or her own cognition, which also incorporates awareness of skills, tactics and feelings (Efklides, 2011). Considering an educational context, it is suggested that if a teacher is aware of and has information of the dimensions of metacognition (which includes planning, monitoring and evaluation), these skills can be modelled and explicitly taught in a classroom (Jagals & Van der Walt, 2018). Teachers require an awareness of their cognition, as it is a prerequisite for self-directed learning (Long, 2000). Kari and Savolainen (2010) also mention that an individual's epistemological beliefs can indeed progress and be modified with age as well as education.

Current research by De Witt *et al.* (2016) argues that a worldview denotes an encompassing system of meaning making that informs how humans understand reality. De Witt (2013) contends that a worldview can provide understanding and justification to life and, in so doing, provide sought-after answers to existing questions individuals ask, such as the following: *What is the nature of my teaching world? How can I know what knowledge is real and necessary to teach my learners? What are important values I want to impart to my learners? What are my role and purpose in teaching my learners? How should we organise and behave in our*

society? These are crucial questions and play a significant role in a person's identity formation and integrity.

The current study was conducted in light of research done by De Witt *et al.* (2016) which suggests four non-scientific worldview groups present in the Western world. These groups are labelled “*traditional, modern, postmodern and integrative*” (De Witt *et al.*, 2016, 102). Figure 2-2 is a representation of the four worldview groups and their dimensions.

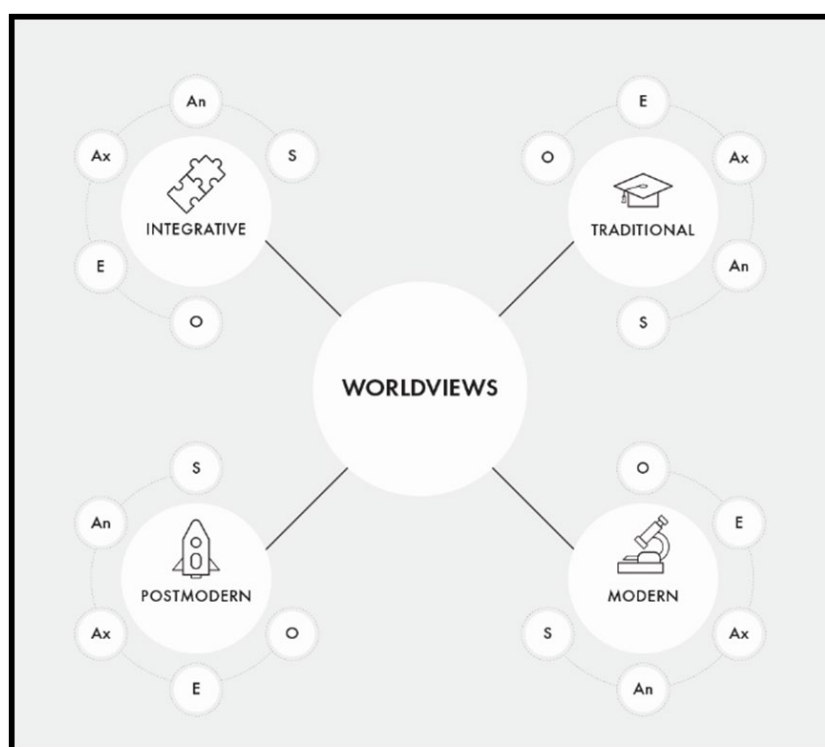


Figure 2-2: Representation of the four worldview groups and their components.

Source: (De Witt *et al.*, 2016).

Each worldview group is composed of five components, namely “*Ontology (O), Epistemology (E), Axiology (Ax), Anthropology (An) and Societal Vision (Sv)*” (De Witt *et al.*, 2016, 102). *Ontology* refers to one's beliefs about the nature of one's world, one's existence and one's reality. *Epistemology* refers to the philosophy of knowledge, in other words, beliefs that individuals harbour regarding knowledge and knowing. *Axiology* refers to an individual's beliefs about values (e.g. what is good?). *Anthropology* is concerned with human behaviour, and lastly, *societal vision* is a collective vision that society holds regarding social behaviour. The existence of these worldview groups has also been suggested by work in sociology, philosophy and developmental psychology (De Witt, 2013). Although these groups are not pertinently mentioned in educational research, researchers (e.g. Dimov *et al.*, 2015; Özgen *et*

al., 2019) have explored teacher and learner opinions about knowledge and understanding and the effect thereof on teaching and learning.

2.4.1 The four main worldviews and the implications thereof within a educational context

In the context of this study, it is important to provide an overview of the four worldviews, as they may operate and come to expression in and interface with teachers' classroom behaviour, curriculum choices and teaching methods in the South African educational context. For this study, the four worldviews are explored qualitatively from "within", that is, in terms of teachers' inner experience as narrated by the teacher participants themselves, as well as quantitatively from "without", that is, through analysing the statistical patterns found in the data. De Witt's (2013) descriptions are merely archetypes of each worldview, and each description is neither exhaustive nor definitive. The aim of the descriptions is to provide a general and preliminary understanding of the main assumptions and beliefs of each worldview, without resorting to stereotyping or insulting any particular person. Furthermore, it is imperative to understand these worldviews are not conceptualised as rigid characterisations of people or societies but draw on general similarities of perspectives (De Witt, 2013). The researcher understands and interprets the four worldviews from this nuanced perspective.

In the following subsections, each worldview is discussed and interpreted to serve as a basis from which one can work to understand what a specific worldview in a South African educational context may include.

2.4.1.1 Traditional worldview and implications thereof within a educational context

In this section, an explanation is provided of what a traditional teacher may look like in a educational context. The discussion elaborates on Table 2-1.

Table 2-1: Traditional worldview and implications within an educational context.

Traditionalist		
Worldview component	A perspective on...	Explanation/ description
Ontology What is the nature of my world?	The nature of reality	- Reality is singular and superior - The material world is where I look for knowledge (De Witt, 2013) - What I see is what it is, for example, a classroom with desks, chairs, a blackboard and textbooks are my educational reality - Reductionism (Ackerman, 2003) - Arrange the correct environment and provide the appropriate stimuli after the target behaviour has been emitted (Allen, 1991)
Epistemology What is valid knowledge, and what is not?	A perspective on how knowledge of reality can become about.	- Knowledge is treated as truth (De Witt, 2013) - Leaners are seen as blank slates - Learning occurs in the form of memorisation and regurgitation - Deductive reasoning: knowledge construction is deductive
Axiology What is the meaning of life?	What a 'good life' is, in terms of morals and quality of life, ethical and aesthetic values.	- Emphasis on traditional values, tradition and family (Ackerman, 2003) - Critical thinking and reflection discouraged - Individual creativity suppressed
Anthropology What is the role of the teacher?	A perspective on who the human being is and what his role and position in the universe entails.	- Learning is controlled by an authoritative figure - Teacher-centred approach - The teacher transfers and prescribes knowledge (Ackerman, 2003) - Model desired processes and skills and then use operant conditioning to modify those to the desired standard. - Dominant learning theory of behaviourism
Societal Vision How do we collectively envision our social life?	How society should be organised and how societal problems and issues should be addressed.	- Traditional ways of doing - Building a community - Social values are emphasised (De Witt, 2013; Kane, 2019)

Ontologically, traditionalists believe that traditions and customs guide people and their worldviews (De Witt, 2013). Traditionalist teachers, for instance, view reality as a singular space with a superior experience. This means that a belief in the oneness and unity of reality, despite the appearance of diversity in the world, is upheld. In an educational environment, a traditionalist teacher may envisage a classroom with desks, chairs, prescribed textbooks and a writing board as being the only place where knowledge can exist. Reductionism in education is the practice of analysing and describing a complex matter in terms of its fundamental parts, especially if it can provide a clear explanation. One could call this a “no-nonsense” approach to a curriculum (Ackerman, 2003). Reductionist views on education can be described as “scientific”, as the emphasis is placed upon specifiable, measurable and observable outcomes (Allen, 1991). Teachers who support a reductionist view of education interpret what they teach according to their views of it. In so doing, reductionism manifests itself in what the teacher says about his or her subject and in what aspects he or she emphasises, ignores or

reinterprets the information (Allen, 1991). For example, a reductionist history teacher may only focus on objective and sociological facts about past events, as these are “real” and can be tested in an examination. As a result, history is reduced to knowledge and neutral facts, and the “essence” of human values, morals and beliefs that come to play, which may have influenced what happened, is dismissed as “unreal”.

Epistemologically, traditionalists tend to view the world impartially and objectively, according to De Witt (2013). They then believe that people who disagree with them are uninformed and irrational. Consequently, knowledge is treated as truth. This implies that a traditionalist teacher views a learner’s developing mind as deserving of knowledge and truth (Ackerman, 2003). Learning opportunities for learners include memorisation, repetition, regurgitation and elaboration of target knowledge, as the focus of instruction is on the mastery of knowledge and content. The traditionalist view of *axiology* places value on taking care of one another and building a strong community of practice. Traditionalists strive for traditional values, such as humility, conservatism, conformity, obedience, solidarity and respect for authority (De Witt, 2013). There is a definite belief in good and evil and an almost childlike belief in right and wrong behaviour. Family and community values (e.g. ‘ubuntu’) are important values that one should strive for, as answers to fundamental questions (e.g. what is the meaning of life?) are found with others, and not independently. Traditionalist teachers value and educate from a view where old-time morals are upheld and include safety, security, consistency, dedication and discipline (Ackerman, 2003). Consequently, in a classroom situation, a traditionalist teacher may be wary of encouraging critical thinking and reflection due to a more reductionist mindset (Allen, 1991). Also, there may be a tendency to question ‘new’ concepts, as these are viewed as contradictory to tradition (De Witt, 2013).

The social order, in terms of the *anthropology* of the community, is established by social roles and rules that people abide by and accept and respect, thereby emphasising obedience and conformity (De Witt, 2013). It is from this view that learning is regarded as a process controlled by an authoritative figure. A teacher, for instance, can be regarded as the authoritative figure who possesses knowledge and then transfers and prescribes the specific knowledge (Ackerman, 2003). The traditionalist view of anthropology perceives the role of the teacher as someone who models desired processes and skills to learners to help them master the knowledge. The dominant learning theory in such a classroom will most likely be behaviourism, as learning is seen in terms of measurable outcomes.

A traditionalist view of *societal vision* supports the values of the community. For example, in a classroom situation, the teacher can foster the continuity and upkeep of all communal

practices, knowledge, ideas and values with the indirect help of social guardians and leaders in society. Also, traditional values such as reliability, stability, moderation, humility, perseverance and hard work are applied to solve societal problems (De Witt, 2013; Kane, 2019).

2.4.1.2 Modern worldview and implications thereof within a educational context

In general, the term modernism refers to a departure from traditional forms of art, philosophy, religion and social organisation (Lorcher, 2009). This movement started in the late 19th and early 20th centuries. Specific factors that influenced the shape of modernism were the realities of World War 1 from 1914 to 1919 and the accompanying 19th-century bourgeois social order and its specific worldview. Modernist authors felt let down by the war, undoubting the institutions in which they had been taught to trust had led the civilised world into defeat. Therefore, traditional religious institutions were no longer seen as a dependable means to access the significance of life. Thus, modernism was characterised by an intentional split from earlier conservative traditions (Lorcher, 2009).

In the following section, the researcher explains what a modernist teacher may look like in a educational context. The discussion elaborates on Table 2-2.

Table 2-2: Modernist worldview and implications within an educational context.

Modernist		
Components	A perspective on...	Explanation/ example
Ontology What is the nature of my world?	The nature of reality	- Rejects realism (Graff, 1973) - Reality is inherent - More than one reality can exist
Epistemology What is valid knowledge, and what is not?	A perspective on how knowledge of reality can become about.	- Truth is objective - Knowledge is still treated as truth - Learners have prior knowledge and continue to build their schema (Ackerman, 2003) - Inductive reasoning
Axiology What is the meaning of life?	What a 'good life' is, in terms of morals and quality of life, ethical and aesthetic values.	- Independent individuality (Ilechukwu, 2016) - Focus on an individual's cognitive and affective, ambition needs - Develop an understanding of personal interests and goals and facilitate the development of personally-important capacities.
Anthropology What is the role of the teacher?	A perspective on who the human being is and what his role and position in the universe entails.	- Learning is facilitated by an authority figure - Learners voices used to validate curriculum - Pursue independence (De Witt, 2013) - Dominant learning theory: constructivism
Societal Vision How do we collectively envision our social life?	How society should be organized and how societal problems and issues should be addressed.	- More mechanistic modes of doing and thinking than purely traditional methods of doing and thinking. - Awareness of scientific advancements to help solve problems (De Witt, 2013)

Ontologically, modernism explicitly rejects realism and views reality as immanent and inherent (Graff, 1973). Consequently, this paves the way for science to explain the existence of creation as well (De Witt, 2013). In an educational environment, a modernist teacher may be someone who agrees that there is more than one educational reality and that a (traditional) classroom can pave the way for different ways of thinking and doing if the teacher thinks differently about teaching and learning.

Epistemologically, modernists view reality as relative and imminent. In other words, there is no absolute truth, and the world is what people say it is. This has led to society believing that knowledge and truth are not only founded on religious doctrine but science as well. This has led to the development of the scientific method, as scientists can observe events, experiences and behaviours to develop other ways of knowing. So, in a modernist classroom, the teacher is someone who agrees that there are "other" ways of knowing and that science does have a part to play in what people believe is true. Consequently, the teacher acknowledges that learners have prior knowledge and continues to help them expand their knowledge base by including inductive reasoning as part of the learning process (Ackerman, 2003).

Modernists' view of *axiology* places greater emphasis on self-consciousness, as people turn within themselves to discover answers and the meaning of life (Gardner *et al.*, 1991 as cited in Ilechukwu 2016). Consequently, materialistic values, such as power, self-achievement, self-expression and secular materialism, are enhanced, as material objects and comforts are deemed important (De Witt, 2013). So, in a modernist classroom, a modernist teacher may promote independent individuality by focusing on learners' individual cognitive and affective needs. This is facilitated by creating an awareness of personal interests and aims to assist the advancement of personally important capacities.

From an *anthropological* point of view, modernists understand humans as independent beings whose prime purpose is to pursue independence (De Witt, 2013). Thus, in an educational context, a constructivist approach to learning is emphasised, as learning is facilitated by an authority figure. Also, learners' voices are not silenced, but rather acknowledged to validate and inform the curriculum. Due to a more industrialised society, the modernist view on *societal vision* incorporates more mechanistic modes of doing and thinking than purely traditional methods of doing and thinking. Consequently, in an educational context, this may include an awareness of scientific advancements to help solve problems, instead of denying their existence (De Witt, 2013).

2.4.1.3 Postmodern worldview and implications thereof within an educational context

In general, the term postmodernism describes a historical era that followed modernity (Duigan, 2019). This wide movement expanded in the mid- to late 20th century and is characterised by relativism and a general suspicion of reason, as previous intellectual and cultural norms and values were the products of previously believed and imposed ideologies and thought (Duigan, 2019).

Next, the researcher explains what a postmodernist teacher may look like in an educational context. The discussion elaborates on Table 2-3.

Table 2-3: Postmodernist worldview and implications within an educational context.

Postmodernist		
Components	A perspective on...	Explanation/ example
Ontology What is the nature of my world?	The nature of reality	- Reality is pluralistic and socially constructed (De Witt, 2013) - There is no objective reality and no scientific or historical truth
Epistemology What is valid knowledge, and what is not?	A perspective on how knowledge of reality can become about.	- Knowledge is linked to time, space, social position and other factors that help individuals to construct knowledge - Relativism and scepticism - Deconstruction of knowledge (Duigan, 2019) - Divergent thinking: coming up with new ideas and exploring new ideas
Axiology What is the meaning of life?	What a 'good life' is, in terms of morals and quality of life, ethical and aesthetic values.	- Self-expression, unique individuality - Learners are social, cultural beings of a community (Williams, 2017) - Reject imposed belief structures - Reality, knowledge, and value are constructed within shared discourses within a society (Dewey, 1938 as cited in Williams, 2017)
Anthropology What is the role of the teacher?	A perspective on who the human being is and what his role and position in the universe entails.	- Human behaviour is socially constructed (De Witt, 2013) - Learners are seen as self-expressing and unique individuals that must develop an understanding of personal interests and goals - Pursue voices that are marginalised - Learner-centred
Societal Vision How do we collectively envision our social life?	How society should be organised and how societal problems and issues should be addressed.	- The creative and entrepreneurial society - Learning is a process of forming new relationships with the community (Ackerman, 2003). - Question status quo - Incorporate races, cultures, languages, religions, viewpoints and social class groups (De Witt, 2013)

Ontologically, postmodernist thought asserts reality is not objective and there is no precise or historical truth. Thus, a postmodern teacher will tend to acknowledge multiple perspectives of reality, since all people are unique and have different views and experiences (De Witt, 2013). In this view, reason and logic are abstract constructs and thus relative and only valid within the traditional intellectual conventions in which they are evident (Duigan, 2019). This resonates with Waghid and Higgs (2017), who contend that any philosophy of education is merely a means to make sense of one's thoughts and experiences within a specific culture and identity.

Epistemologically, postmodernism attests that knowledge is linked to time, space, social position and other factors that help individuals to construct knowledge. This thought leads to intense relativism and scepticism, as reality, truth and knowledge are contested. A postmodernist teacher may facilitate the deconstruction of knowledge, as it is believed that

one should question the origins of knowledge and proposed truths to come up with new ideas (Duigan, 2019).

From an *axiological* point of view, postmodernists view the meaning of life in self-expression because each human being has a unique identity. Therefore, learners are social and cultural beings of a community. A postmodernist teacher is inclined to reject imposed and traditional belief structures (e.g. *this is the way we have been doing things for years*) and replace them with individuated constructions of meaning. Thus, learners can be more open to change because reality, knowledge and value are construed within shared discourses within a society. This resounds with Dewey's (1938, as cited in Williams, 2017) beliefs and theories that a school should be a place that supports social and moral development.

A postmodernist view of *anthropology* attests that human behaviour is believed to be socially constructed; therefore, the prime purpose of man is found within oneself (De Witt, 2013). In a classroom situation, a postmodernist teacher will be more inclined to assist learners to create an awareness of personal interests and aspirations, as learners are viewed as self-expressing and unique individuals who are likely to change themselves and their societies for the better so that one can strive for an inclusive society (De Witt, 2013). Hence, a postmodernist teacher is someone whose focus is learner-centred and who is more likely to pursue the voices of the marginalised.

Postmodernists' view of *societal vision* includes the teaching and sharing of ideas and thoughts that lead people to think differently about their world and how they perceive themselves and their purpose. Therefore, a postmodernist teacher will be inclined to strive for a society where people are explorative and innovative. Consequently, postmodernist teachers will strive to navigate their learners in a complex and less predictable world (Ackerman, 2003). Postmodernist thought is characterised by the scepticism of the status quo; therefore, society should strive for a type of idealism where the public can help to expose injustices and solve societal problems, as the well-being of the whole community is important (De Witt, 2013). This includes the incorporation of other races, cultures, languages, religions, viewpoints and social class groups.

2.4.1.4 Integrative worldview and implications thereof within an educational context

An integrative worldview is a combination and awareness of specific elements and beliefs from previous worldviews. As Habermas (as cited in How, 2001) explains in his perspective of the

dialectic of progress, humans engage in analytical thinking and reasoning to explore and pursue other forms of knowledge and truth. So, in fact, every new worldview develops from the limitations of the previous one, generating new insights for future thoughts. This again generates new shortcomings but is part of the transition from one worldview to another (De Witt, 2013).

An explanation of what an integrative teacher may look like in an educational context is provided below. The discussion elaborates on Table 2-4.

Table 2-4: Integrative worldview and implications within an educational context.

Integrative		
Components	A perspective on...	Explanation/ example
Ontology What is the nature of my world?	The nature of reality	Reality is an interconnected whole and not fixed and rigid (De Witt, 2013)
Epistemology What is valid knowledge, and what is not?	A perspective on how knowledge of reality can become about.	- Explore other avenues of understanding the world and reality (De Witt, 2013) - Consult and acknowledge different sources and modes of knowing. Relies on more than one source of knowledge or truth to guide questions about the meaning of life. - Problem-based learning - Divergent thinking
Axiology What is the meaning of life?	What a 'good life' is, in terms of morals and quality of life, ethical and aesthetic values.	- Self-expression (De Witt, 2013) - Doing something for the "greater good" - Serve society - Discover your purpose
Anthropology What is the role of the teacher?	A perspective on who the human being is and what his role and position in the universe entails.	- Teacher and learners learn together - Assist the learner to connect to various networks of knowers, inquirers, and knowledge bases (Reid, 2016; Biesta 2020) - Empower learners to be producers of knowledge that can be accessed throughout one's lifetime
Societal Vision How do we collectively envision our social life?	How society should be organised and how societal problems and issues should be addressed.	- Mindful and purposeful personal growth - Inner development that will enable the amalgamation of diverse interests and perspectives of the society - Learners and teachers work together towards an integrative society - Social change is possible by empowering individuals (Redi, 2016; Biesta, 2020)

Ontologically, people with an integrative worldview tend to synthesise and integrate elements from other worldviews that are mutually exclusive to that specific worldview (De Witt, 2013). An integrative teacher views reality as an interconnected whole, and not fixed and rigid as a traditional worldview postulates. In an educational setting, an integrative teacher represents someone who can adapt more easily to a different teaching environment than, say, a pure traditionalist who holds very strong views on the nature of the teaching world.

Epistemologically, an integrative view on teachers tends to explore other avenues of understanding their world and reality. This does not necessarily mean that they depart from their established framework of knowing, but rather that they also consult and acknowledge different sources and modes of knowing. These can include science and respecting and accommodating other people's views, religion, spiritual traditions and cultural traditions. So, an integrative teacher is somebody who relies on more than one source of knowledge or truth to guide queries regarding the meaning of life, the experiences thereof and the nature of reality (De Witt, 2013). The learning process may also include problem-based learning methods to help learners engage more in divergent thinking patterns than merely memorising content.

The integrative view of *axiology* envisages a teacher as someone who finds the value and meaning of life in doing something for the greater good and being part of society. Consequently, by serving society and discovering one's purpose, there is also personal growth and self-expression. Therefore, an integrative teacher believes a meaningful life to be a journey and a process with innumerable opportunities for inner growth and personal development (De Witt, 2013).

An integrative view of *anthropology* places value on personal growth, but simultaneously, all learners are part of a larger whole with a purpose. In a classroom situation, teachers and learners can, therefore, learn together. The role of the teacher is not to deposit knowledge but instead, to empower learners to explore and construct knowledge that can be acquired throughout one's lifetime (Reid, 2016). This resonates with Biesta (2020), who contends that learners and their learning should be at the centre of the educational endeavour. Biesta (2020) expresses that learning should not only belong to an educational programme but should rather encompass a certain way of reasoning about humans and their place in the world. This is similar to De Witt's (2013) view that one's prime purpose is found within and by self-actualisation, and this is how one can truly contribute to society.

An integrative teacher's view on *societal vision* is characterised by mindful and purposeful personal growth and inner development that enables the amalgamation of diverse interests and perspectives of society. Consequently, schools can become sites of hope, as learners and teachers work together towards an integrative society where problems can be solved and society can progress. Reid (2016) posits that, in so doing, teachers and learners play a significant role in re-imagining their story and their roles if they are given the right environments, skills and support to do so. Therefore, social change is possible by empowering individuals who will then be able to start to transform the world around them (De Witt, 2013).

2.4.2 Metamodernism

In general, the term “metamodernism” or “post-postmodernism” describes the historical era to follow after postmodernism (Henriques, 2020). This cultural mode developed in the late 20th century and was characterised by an oscillation that included and transcended modernist thought and postmodernist scepticism. Although metamodernism does not form part of this study, the researcher is aware of this worldview and the impact thereof on teachers’ worldviews.

2.5 Metacognition

2.5.1 Defining metacognition

The term “metacognition” was coined during the late seventies by John Flavell (1979) and describes an individual’s reasoning about his or her thoughts. This idea is supported by Schraw (2002) and Chatzipanteli *et al.* (2014) who posit that metacognition indicates a higher level of thinking and reasoning that culminate in the active control of mental procedures of individuals who are engaged in learning. In addition, Fisher (1998) and Livingston (2003) argue their interpretation of metacognition as an individual’s (e.g. a teacher’s) cognisance and realisation of his or her cognitive processes and strategies. It is worthwhile to refer to the work of Nelson and Narens (1990) who describe the relationship between cognition and metacognition as two interconnected levels, namely the object level and meta-level, as shown in Figure 2-3. The object level refers to basic information processing procedures, such as remembering or recalling something. In turn, the meta-level encompasses the cognitive procedures involved in executing a task, for example, posing questions such as “what strategies can I apply to remember this?”.

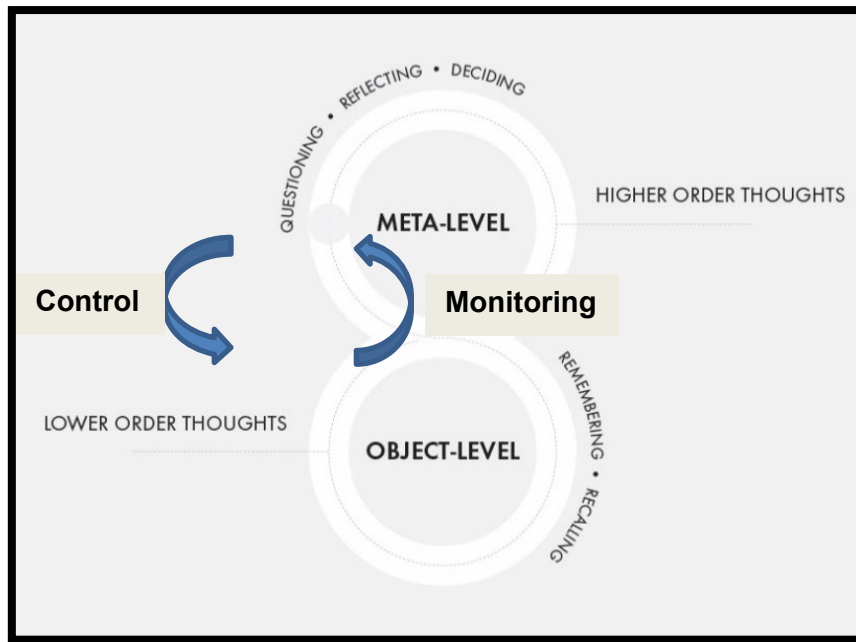


Figure 2-3: Interplay between cognition and metacognition on the object level and the meta-level.

Source: Nelson and Narens (1990)

Figure 2-3 illustrates the intangible yet constant interaction between the two levels as an individual (e.g. a teacher) is confronted with tasks and challenged with how to execute them (Nelson & Narens, 1990). During this time, monitoring and control, as two metacognitive processes, are involved. For example, during a task, a teacher may draw on (recall) previous knowledge of how to summarise a text, whereafter he or she will monitor and regulate the summarising of the text by asking questions such as “do I understand what I have read?” or “does the summary make sense?”. Thus, the meta-level is informed regarding the workings at the object level by a process called “monitoring” (e.g. asking questions or highlighting keywords), whereas the metacognitive process of control helps the meta-level regulate the management of object-level procedures to achieve a particular goal (Koriat, 2019). Hence, monitoring and control are two higher-order metacognitive processes because they regulate cognitive strategies.

Object-level thinking includes cognitive processes such as remembering, recalling, naming, listing, perceiving and understanding, whereas meta-level processes include planning, monitoring and evaluating. Higher-order strategies regulate cognitive strategies because higher-order strategies embody thinking beyond that which one perceives, understands and remembers. Metacognition can then refer to a range of epistemological processes (methods)

as an individual is grappling with knowledge about knowledge or pondering about thoughts, actions and behaviours (Papleontiou-Louca, 2003).

2.5.2 Dimensions of metacognition

Flavell (1979) expanded on Brown's (1987) model, which indicated that metacognition embodies two dimensions, namely *metacognitive regulation* and *metacognitive knowledge*. Metacognitive knowledge indicates taught knowledge regarding cognitive processes; in other words, it is knowledge to control and support thinking processes.

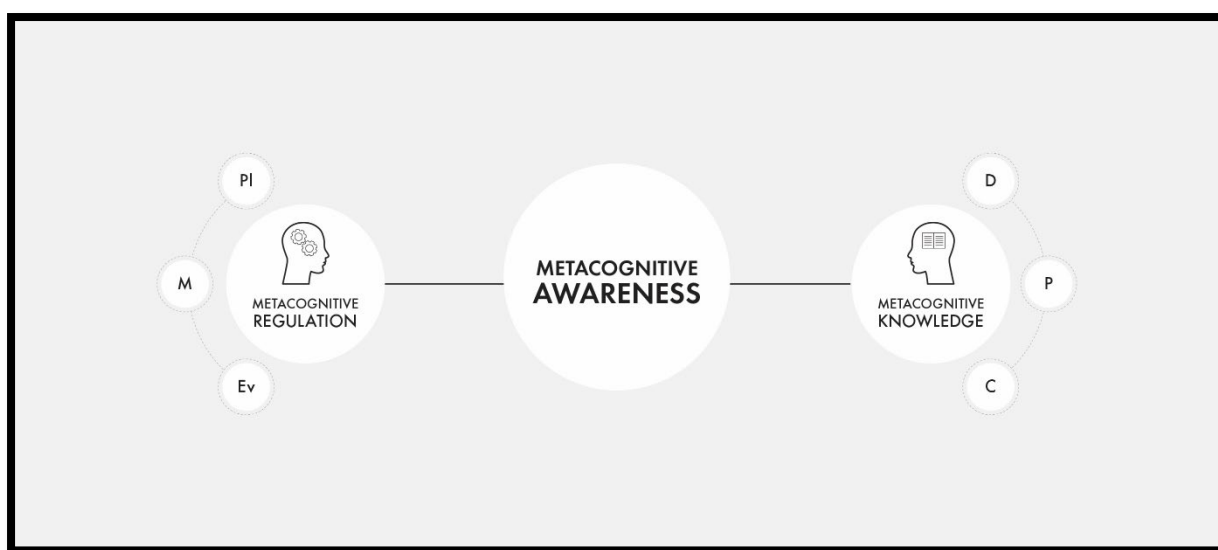


Figure 2-4: Two dimensions of metacognitive awareness.

Source: Brown (1987)

Flavell (1979) further divided metacognitive knowledge into three subcategories. These categories are *declarative knowledge* (D) (knowledge about various strategies to apply when confronted with a task), *procedural knowledge* (P) (knowledge about how to use a strategy) and *conditional knowledge* (C) (knowledge about which strategies to apply when and why). The other dimension of metacognition, that is, metacognitive regulation, involves the following categories: (i) *planning* (PI) (how am I going to teach this concept?); (ii) *monitoring* (M) (asking the learners questions regarding the concept); and (iii) *evaluating* (Ev) (do the learners fully comprehend the concept?). Metacognitive regulation is a continuous process that a teacher applies to direct intellectual activities and confirm that a cognitive intention (e.g. interpretation of a text) has been met. In other words, there is an ongoing interplay between the object level and the meta-level of metacognition.

Collectively, metacognitive knowledge and metacognitive regulation refer to the metacognitive experience of awareness. Flavell (1979) further explains that metacognition is also self-reflexive, as an individual should not merely think with the purpose of knowing, but rather think about his or her thinking *and* knowing. Gómez (2016) argues that, in so doing, metacognitive awareness is indicative of teachers' awareness of their comprehension of a task and the necessary skill to reflect on their knowledge to complete the task, thus directing their teaching methods and goals. In the current study, metacognitive awareness refers to a teacher's reflections that personify his or her being. These personal reflections include an awareness of his or her thinking and knowing, worldview (beliefs), teaching strategies and teaching methods.

2.5.3 Importance of metacognition in an educational context

Livingston (2003) indicates that "metacognition" has become an acceptable word in educational psychology over the past decade and that it is worthwhile to know what cognitive and metacognitive strategies, as part of metacognition entail. He argues that cognitive strategies enable an individual (e.g. a teacher) to reach a goal (e.g. interpreting a text), while metacognitive strategies help to establish whether the goal has been achieved (Livingston, 2003). Thus, there is an interplay between the object level and the meta-level of metacognition.

Livingston's (2003) explanation is supported by Chatzipanteli *et al.* (2014), who advocate the fostering of metacognition as a critical component of effective teaching, as it assists awareness and control over how teachers conceptualise their thinking, which, in turn, informs their teaching practices and behaviour. Consequently, a teacher's understanding of his or her metacognitive knowledge will have an impact on the outcome of a lesson (Chatzipanteli *et al.*, 2014; Smith *et al.*, 2020), as a teacher applies knowledge of a strategy (declarative knowledge), knowledge of how to apply the strategy (procedural knowledge) and knowledge of when and why the strategy is applied (conditional knowledge). Furthermore, it is argued that if teachers are aware and have knowledge of the dimensions of metacognition, that is, metacognitive knowledge (which refer to declarative, procedural and conditional knowledge) and metacognitive regulation (which refer to planning, monitoring and evaluating capacities), they can be mindful of these skills when teaching (Smith *et al.*, 2020).

It is worthwhile to mention that metacognitive and cognitive strategies may coincide and be observed as a cognitive or a metacognitive strategy. This depends on the purpose of applying a specific strategy. For example, self-questioning can be a strategy a teacher applies while

reading to retrieve information (cognitive), but self-questioning can also be applied for the purpose of monitoring what has been read (metacognitive). Consequently, both cognitive and metacognitive strategies are interconnected and reliant upon each other (Chatzipanteli *et al.*, 2014).

Furthermore, Smith *et al.* (2020) contend that fostering metacognitive strategies and teaching learners about the concept of metacognition lead to increased motivation for learning. In addition, teaching metacognitive strategies helps learners to transfer a particular learning strategy across subjects. For example, learning how to draw a Venn diagram in science can help a learner to use this skill in history as well. This provides more exposure to the application of metacognitive strategies, resulting in additional, meaningful learning. This idea is supported by other research studies that indicate the prominence of fostering metacognition in a classroom, as argued by Chekwa *et al.* (2015). Their qualitative study indicates that learners can achieve academic success, as they are taught to continually control and evaluate their progress. Chatzipanteli *et al.* (2014) argue that metacognition is teachable and that teachers can assist learners in the acquisition of learning skills.

One of the many goals of education is to promote self-directed learning (Van Aswegen *et al.*, 2019), as success in society depends on people's ability to learn and competence of learning to learn. Therefore, metacognition must play a key role in the teaching process. Smith *et al.* (2020) attest to the importance of teaching metacognition and confirm that individuals who possess a high level of metacognitive awareness can solve problems more effectively than those who do not possess appropriate metacognitive strategies. This idea resonates with recent studies that indicate that metacognitive awareness can be taught and fostered by modelling appropriate strategies, such as questioning, making inferences, activating prior knowledge, synthesising self-monitoring and reflection (Perry *et al.*, 2019).

Jagals and Van der Walt (2016) encourage the use of metacognitive language. Metacognitive language is a tangible manifestation of an individual's metacognitive awareness, for example "I can think of ...", "I think it means that ..." or "I wonder if ...". By incorporating metacognitive language during teaching time, teachers model to their learners how to clarify a concept, how to unravel a problem and how to search for different solutions to decipher a problem. This method of teaching means a refined role for teachers as they become evaluators of their teaching. Consequently, they see and experience learning through the eyes of their learners and, in so doing, help them become their *own* teachers. Van Aswegen *et al.* (2019) comment on the fact that not all individuals develop metacognition spontaneously. Therefore, teachers must become metacognitively aware of themselves as learners to model and demonstrate

strategies to help their learners to develop metacognition and, accordingly, develop self-directed learning. Recent research on metacognition suggests that teaching metacognitive awareness may improve academic progress.

Figure 2-5 indicates the dimensions of the main concepts and identified theories as applied in the study.

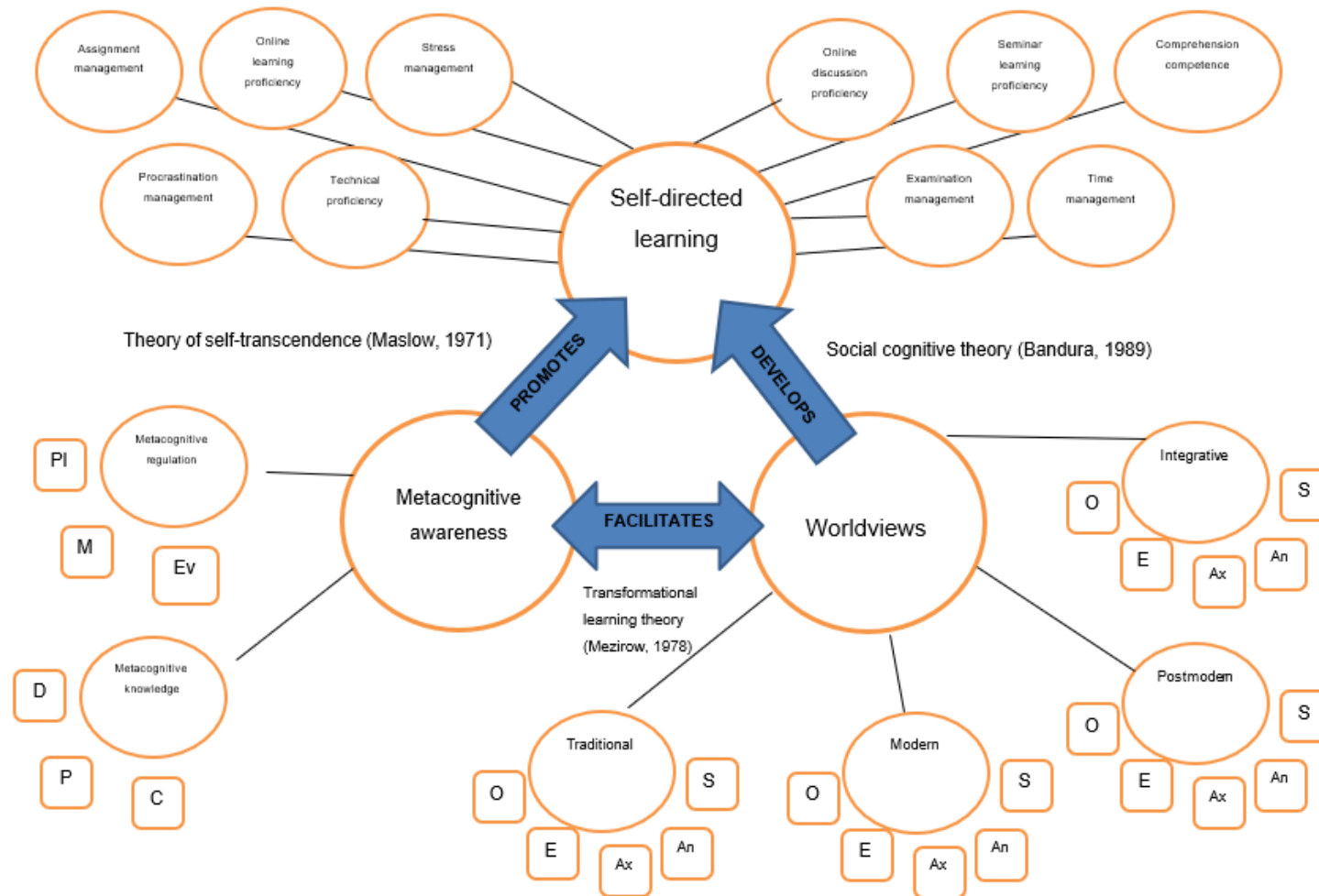


Figure 2-5 Dimensions of the conceptual-theoretical framework

2.6 Theoretical framework

This section sheds light on the interconnectedness of self-directed learning, worldviews and metacognitive awareness in terms of selected theories. These theories further one's understanding of the human behaviour, thought patterns and intellect involved during learning. In this study, the teacher represents an adult learner. The selected theories are contrary to the theory of behaviourism, which focuses solely on learning outcomes and observable behaviour, thereby negating internal thought patterns and personal epistemologies that influence learning and individuals' behaviour. This discussion is followed by linking the concepts and theories through a singular meta-theory, namely social constructivism, which is the conceptual "glue" that links the concepts and the theories. Moreover, the meta-theory advances our comprehension of the process of learning, the construction of knowledge and our understanding of the nature of our world.

2.6.1 Relationship between worldviews and self-directed learning theory 1: social cognitive theory

In this section, the researcher explains how a worldview develops self-directed learning in the context of the social cognitive theory.

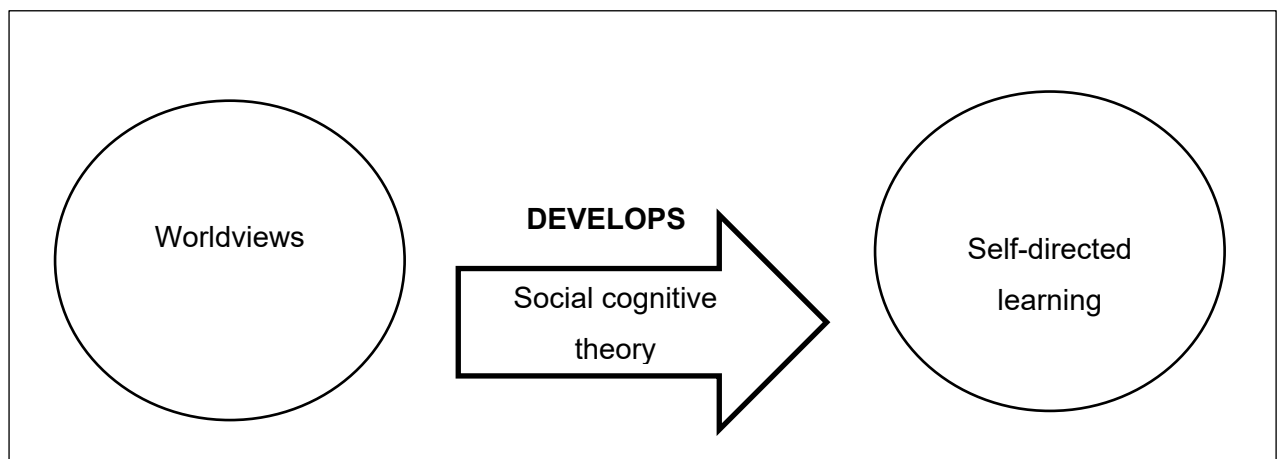


Figure 2-6: Conceptual relationship between a worldview and self-directed learning within the context of the social cognitive theory.

The social cognitive theory was developed by Albert Bandura as a broadening of his social learning theory. Bandura (1989) states that people learn best by observing others' behaviour in a social environment and that an individual's thought processes (cognitive) contribute to motivation, attitudes and behaviour exhibited. Drawing from Bandura's social cognitive theory, one can observe a dynamic interplay between a person's thought processes (personal views

on learning), the behaviour exhibited by the individual and his or her interaction with the environment. It can be assumed, then, that a teacher's personal beliefs (worldview) regarding teaching and learning can facilitate self-directed learning if the teacher models desirable behaviour, for example goal setting, planning and monitoring behaviour. Accordingly, a teacher's epistemological beliefs about learning can have a positive or negative influence on the learning process, as the teacher may assist in facilitating new strategies that lead to improved comprehension and knowledge acquisition or the lack thereof (Chatzipanteli *et al.*, 2014; Geduld, 2019). The environment (reality) in which teaching takes place also contributes to and develops a teacher's personal beliefs regarding teaching and learning and the facilitation of self-directed learning or not.

2.6.2 Relationship between worldviews and metacognitive awareness theory 2: transformational learning theory

In this section, the way in which worldviews and metacognitive awareness are linked within the context of the transformational learning theory is explained.

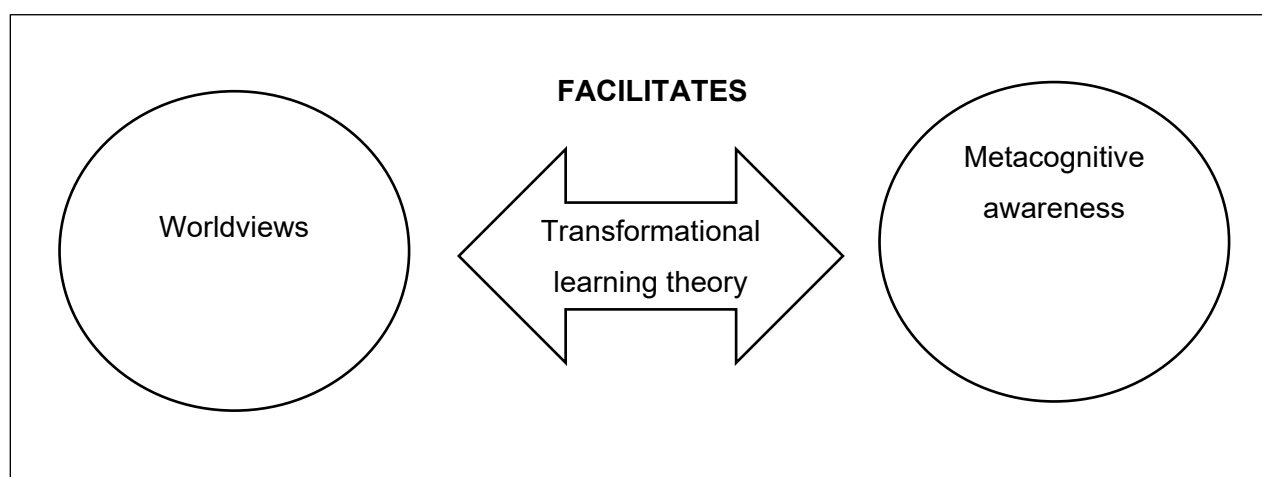


Figure 2-7: Conceptual relationship between worldviews and metacognitive awareness within the context of the transformational learning theory.

Mezirow (1978) developed the transformational learning theory and argued that the process of modifying one's viewpoint (worldview) comprises three dimensions. These dimensions are a *psychological dimension*, which includes altering one's understanding of the self, an *ideological dimension*, which refers to revisiting one's belief structures and, lastly, a *behavioural dimension*, which includes altering one's way of life. Thus, the transformative learning theory can enable teachers to assess new information by evaluating previous

knowledge or experiences and, thereby, reflect on their worldview through critical reflection (Howie & Bagnall, 2013). Critical reflection facilitates metacognitive awareness, as teachers ponder things they know or thought they knew to make room for new insights. It is only when a teacher becomes aware of personal beliefs, judgements and assumptions, that he or she can choose to direct behaviour. Consequently, critical reflection develops teachers' epistemological assumptions that inform their beliefs, habits of mind, points of view and teaching methods (Fazio-Griffith & Ballard, 2016). Van Aswegen *et al.* (2019) reason that, in so doing, an awareness of one's thinking, as one is learning and creating meaning, aids the discovery of new knowledge and new experiences, whereby metacognitive awareness is facilitated.

2.6.3 Metacognitive awareness promotes self-directed learning theory 3: theory of self-transcendence

In this section, the researcher explains how metacognitive awareness promotes self-directed learning within the context of the theory of self-transcendence.

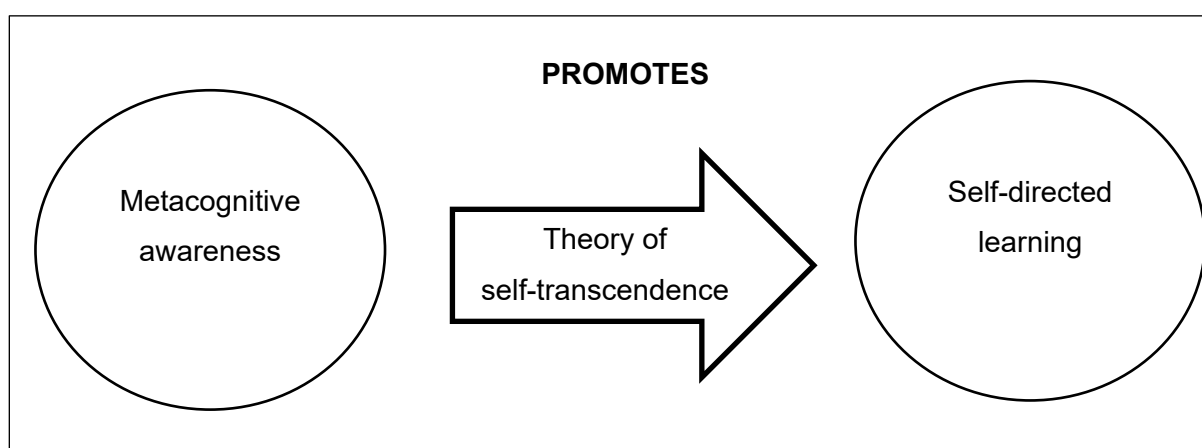


Figure 2-8: Conceptual relationship between metacognitive awareness and self-directed learning within the context of the theory of self-transcendence.

Maslow's (1943) hierarchy of needs describes self-transcendence theory in terms of psychological well-being (Koltko-Rivera, 2006). The term "self-transcendence" can be traced back to Maslow (1971), as he amended his theory to include self-transcendence. The verb "transcendence" indicates rising above something to a higher state. To attain transcendence, one must surpass one's ordinary limitations, beliefs and thoughts by focusing on a higher goal than oneself, which ultimately has implications for one's behaviour and thoughts (Messerly, 2017). This implies an enhanced awareness and critical reflection of oneself that can promote

self-directed learning. The relationship between metacognitive awareness and self-directed learning can be described by Maslow's theory of self-transcendence. As individuals (in this scenario, teachers) become metacognitively aware of themselves (this includes thoughts, beliefs, and behaviour), they can transcend themselves to include and accommodate other ways of knowing, being and teaching. Teachers who are concerned with self-transcendence may reflect on their teacher beliefs about how they plan, monitor and evaluate themselves, as these are metacognitive skills needed to be an effective self-directed teacher (Bhat *et al.*, 2007).

2.6.4 Theory 4: Social constructivism as meta-theory

Historically, the term "social constructivism" was developed by Lev Vygotsky and is used to describe the interactive nature of learning in education (Vygotsky, 1978). Vygotsky's theory suggests that learning is embedded in a social context. Vygotsky forwards the notion that learning occurs on a social (inner psychological) level, as well as an individual (intra-psychological) level. Vygotsky is well known for his concept of the zone of proximal development, which indicates the distance between what an individual can do without help and what can be done once support and intervention are provided by someone with more knowledge and expertise. Thus, social constructivism has many implications for teaching and learning (Van der Walt, 2019). Vygotsky argues that learning cannot simply include the assimilation and accommodation of new knowledge, but is, rather, the process by which individuals become part of a knowledge society. The process of self-directed learning, the formation of a person's worldview and the development of metacognitive awareness do not stand apart from one another but, instead, work together to promote the development of a holistic individual.

2.7 Synthesis

This world consists of various dimensions, and the world of education is one of these dimensions. The implication of this is that one's perception and awareness of the reality of teaching and learning also directly affect the worldview one has formed about education (Jagals, 2015). In this sense, a world of teaching and learning cannot be constructed on its own, but only by the co-existence and co-construction of individuals within this world (Jagals, 2015; Töman, 2017). Worldviews are cognitive, intangible and influential frameworks in which teachers and learners harbour their own epistemological and pedagogical beliefs (Dimov *et al.*, 2015). Beliefs that teachers may grapple with include (but are not limited to) beliefs about classroom instruction, beliefs about where knowledge comes from, beliefs about a learner's acquisition of knowledge and beliefs about the role of a teacher (Dimov *et al.*, 2015).

Habermas (1976) and Kari and Savolainen (2010) argue that epistemological beliefs progress and change over time, as well as through education. Furthermore, they indicate that beliefs about knowledge and knowing may be prerequisites to skilled critical thinking. As the teacher progresses throughout his or her career, these epistemological beliefs may also alter, in as much that the individual may start to question particular teaching methods and, henceforth, create new interpretations of the previous “true” knowledge. It is only through reflection-in-action regarding our beliefs concerning teaching and learning that we become metacognitively aware of our thoughts and how our thoughts and actions either promote or discourage the development of self-directed learning.

Chapter 3 Empirical design and methodology

3.1 Introduction

In Chapter 3, the researcher focuses on the empirical design and methodology of the study. What follows is an overview of the research methodology, namely pragmatism, and the justification of this methodology for a mixed-methods approach. Included in this chapter is a discussion of the two approaches as strands of the research (quantitative and qualitative) as per the mixed-methods convergent parallel design. The researcher elaborates on the recruitment process, data collection, data instruments and analysis procedures for both the quantitative and the qualitative strands of the study. In addition, the role of the researcher during mixed-methods research is outlined. A discussion regarding ethical issues pertaining to the study concludes the chapter.

3.2 Pragmatism as a research paradigm

Van der Walt and Potgieter (2012) state that any research should be clarified and explained by a philosophical assumption that legitimises the interpretation, suggestions and conclusions that the researcher draws from the study. Philosophical assumptions rest upon beliefs that researchers bring to their research regarding the world and how research should be conducted and understood (Thanh & Thanh, 2015). In recent literature on methodology, these assumptions are also described as a researcher's "worldview" or a scientific "paradigm" (Creswell & Plano Clark, 2018) consisting of beliefs and assumptions about knowledge that informed the research. Paradigms differ in terms of broad philosophical theories that explain particular components of reality.

The question as to which paradigm is best suited to mixed-methods research has been a heavily debated topic in research (Creswell & Plano Clark, 2018). During the 1980s, a paradigm war regarding research in teaching ensued between purist quantitative and qualitative researchers (Gage, 1989). According to Tom (1984), research in the 60s and 70s was insufficient and inconclusive regarding how a teacher should teach in a classroom. Erickson (1986) also debates a less scientific method of research in teaching, as human action and perspectives were overlooked in the research during the previous decades. Consequently, Onwuegbuzie and Leech (2005) contend that mono-method research is incapable of advancing the development of social sciences; therefore, they implore researchers to embrace both quantitative and qualitative research paradigms, thus becoming pragmatic researchers.

The current study was guided by a pragmatist philosophy, as the researcher believed that the blending of objective and subjective knowledge would be the best method to answer the research questions in depth. Embedded within this pragmatism were postpositivism and interpretivism.

Figure 3-1 indicates the overarching philosophy (pragmatism), the research approach (mixed methods) and the research design (convergent parallel) as applied to the current study.

Methodology		Research approach	Research Design
Pragmatism	Postpositivism (quantitative strand)	Mixed methods	Convergent parallel design
	Interpretivism (qualitative strand)		

Figure 3-1: Components of the empirical design.

Next, postpositivism and interpretivism and how they applied to the current study are discussed.

3.2.1 Postpositivist paradigm for the quantitative strand

The study's quantitative part employed a postpositivist paradigm for its approach, interpretation, and analysis. Postpositivism emerged as a response to the limitations of positivism, which prioritizes empirical evidence, objectivity, and logical reasoning in establishing universal laws of social behavior (Creswell & Plano Clark, 2018). In contrast, postpositivism acknowledges these limitations and emphasizes the significance of subjectivity, interpretation, and context in scientific inquiry. It recognizes that social and cultural factors influence knowledge and that objective truth is challenging to achieve. Postpositivists value critical thinking, consider multiple perspectives, and rely on empirical evidence to comprehend the world. The utilization of a postpositivist paradigm in this study signifies an approach that maintains a critical mindset, acknowledging the inherent limitations and biases in data collection. Furthermore, postpositivism is relevant to educational research as it enables scientifically conducted inquiries that yield reliable and valid results (Creswell & Plano Clark, 2004). Moreover, the study's data is quantifiable, allowing the identification of behavioral patterns that can be analyzed for trends and insights. It is important to note that employing a postpositivist perspective in this study does not disregard the influence of social and cultural factors. Rather, it recognizes the intricate interplay between objective observations and subjective interpretations, prompting careful consideration of these complexities during data

analysis and interpretation. This was achieved by administering a questionnaire to the respondents, accompanied by the writing of a narrative. Together, the results and findings were triangulated, as both the quantitative and the qualitative data were quantifiable and presented as valuable findings.

3.2.2 Interpretivist paradigm for the qualitative strand

The *qualitative research* component was planned, interpreted and analysed by applying an interpretivist paradigm. Features of the interpretivist paradigm include the discovery of reality and multiple truths by looking at participants' points of view and acknowledging that individuals have subjective perceptions of their world and lived experiences (Cohen *et al.*, 2018; Willis, 2007). The pioneers of the interpretivist paradigm did not support the notion that there was one universal existence of truth, but believed, instead, that multiple ways of knowing existed and there was no right or correct method of acquiring knowledge (Thanh & Thanh, 2015). An interpretivist paradigm was applied to this part of the research process because the researcher was in pursuit of exploring the role of Intermediate Phase teachers' metacognitive awareness and worldviews in the process of their own self-directed learning. This was achieved by reading the participants' narratives regarding these concepts and by analysing the data using *a priori* codes.

The research approach and design are discussed next.

3.3 Research approach

This study adopted a mixed-methods approach, as the combination of quantitative and qualitative data collection and analysis procedures provided a more robust and dynamic exploration of the research problem compared to collecting and analysing only one set of data (Cohen *et al.*, 2018; Johnson *et al.*, 2007). Characteristics of a mixed-methods approach include the fusion of quantitative and qualitative data collection and analysis methods within the convergent parallel research design and philosophical stance (Schoonenboom & Johnson, 2017). Consequently, the quantitative strand of the study highlighted the relationship between the variables and measured the levels of self-directedness, worldviews and metacognitive awareness of Intermediate Phase teachers, whereas the qualitative strand of the research explored these relationships and honoured the expressions of the participants through their narratives. Creswell and Plano Clark (2018) hint that the mixed-methods approach is a natural way to conduct research, as the combination of quantitative and qualitative knowledge and facts permeates people's daily lives. Consequently, the combination of statistics (results from

the closed-ended questionnaires), supported by the findings from the teachers' narratives, provided a comprehensive insight of the research problem.

3.4 Research design

The researcher adopted a mixed-methods research approach with an embedded convergent parallel mixed-methods design for the study (see Figure 3-1). A convergent parallel mixed-methods design signified the collection and analysis of two databases (quantitative and qualitative) separately, after which the results were triangulated and interpreted. The order in which the data were collected (quantitative before qualitative or vice versa) did not have an impact on the final results, because one type of data did not depend on the findings of the other, as per the explanation of a convergent parallel design by Creswell and Plano Clark (2018).

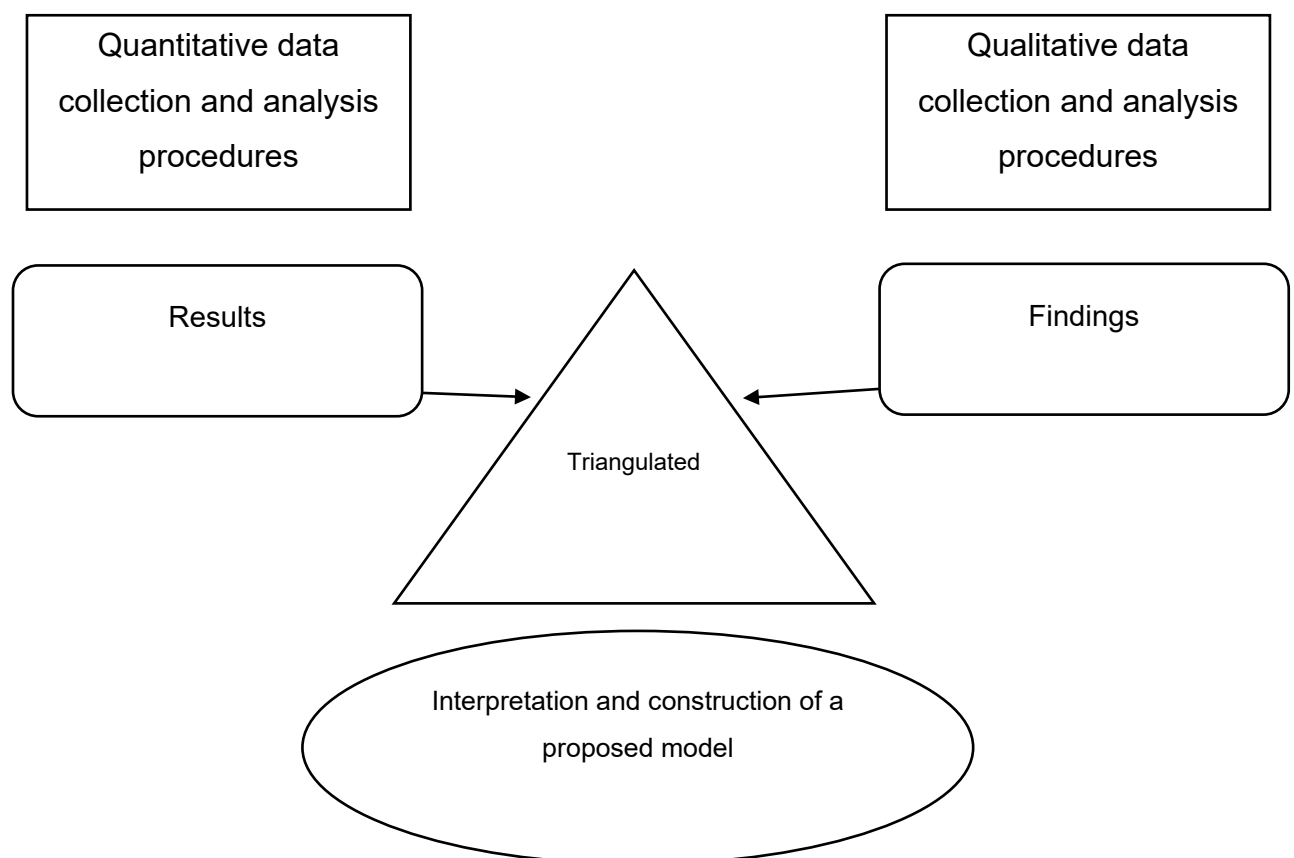


Figure 3-2: The convergent parallel mixed-methods design.

Source: Adapted from Creswell and Plano Clark (2018)

In line with the pragmatist philosophy that underpinned this research approach, the intent of the design supported the belief that both sets of data provided a more vigorous and nuanced

comprehension of the research problem than either data set in isolation (see Schoonenboom & Johnson, 2017). The justification for choosing the convergent parallel design for the study was as follows: (i) both sets of data were of equal importance (QUAN + QUAL) for addressing the research questions; (ii) the data sets were analysed separately from each other, using the appropriate quantitative and qualitative analytic procedures; (iii) the results were compared and interpreted to fully comprehend the dimensions of the research problem; and (iv) the convergent parallel design was applied for corroboration and validation purposes to explain quantitative results with qualitative findings and vice versa. Therefore, the researcher analysed the data from the closed-ended questionnaires quantitatively and the findings from the narratives qualitatively. The results and the findings were triangulated to evaluate in what ways the quantitative results and the qualitative findings converged or diverged.

In the next section, the population and sampling strategies for the two independent strands are discussed.

3.5 Population and sampling

Leedy and Ormrod (2014) describe a population as a group of people with similarities in attributes and features that a researcher deems necessary to include in a research study. For this study, the population (N = approx. 1 000) included all Intermediate Phase teachers from a private school group in South Africa from which the quantitative (n = approx. 200, as advised by a North-West University statistician) and qualitative (n = 12) samples were drawn. The demographic background included all nine provinces of South Africa, as there were schools from this group across the country. Some provinces might have more or fewer schools than their counterparts. The population included teachers from different cultural backgrounds who typically taught learners between the ages of nine and 12 years. The teachers' primary language of instruction was either English or Afrikaans for all subjects as per the language policy of the private school group. The Intermediate Phase teachers were aged between 21 and 65, and all of them had a valid South African teaching degree, diploma or certificate that qualified them to teach in the Intermediate Phase.

3.5.1 Contextual background of respondents or participants

In March 2020, South Africa entered a national lockdown,⁴ which meant that schools were forced to close (Macupe, 2020). This private school group was a Microsoft school during the time of this research, which meant all teachers and learners had access to all the features and

⁴ The national lockdown referred to the time in South Africa in March 2020 when schools were forced to close indefinitely due to the worldwide Covid-19 pandemic. Learners and teachers were not allowed on to school property; hence, teaching and learning were affected, as teachers could not make physical contact with their learners.

applications within Microsoft (e.g. Word, Excel, Teams and PowerPoint); thus, learning could continue remotely.⁵ Learners and teachers who were enrolled at the school also had a Microsoft Office account. All the applications within Microsoft were designed to improve online teaching and learning and assisted learners and teachers in engaging with core curriculum material.

The lockdown period was a very challenging time for the teachers from this private school group because not all teachers were equipped with basic digital skills (e.g. uploading and downloading content, making PowerPoint presentations for lessons or scheduling online Teams meetings). Also, many teachers had never been exposed to an online approach, as it had never been necessary to teach learners who were not physically in a classroom. To enable teachers to manage the (new) demands of online teaching, the company encouraged teachers to join and attend online lessons (on a designated Teams group) regarding asynchronous and synchronous teaching, as part of their professional development. These online learning sessions or online presentations were focused on helping teachers to orientate themselves in a digital context by including links, extra reading material and resources to empower teachers to teach remotely.

During these online sessions, teachers were taught various skills and techniques. These included the following: how to upload and download content (digital worksheets, exercises or revision booklets); how to set assignments (formal and informal) for their learners digitally; how to search for information and sources on the internet to set a test or assignment for their learners; how to create a class team group (within Teams) to communicate with the learners and other staff members; how to schedule meetings with learners (within Teams), how to share links and videos; how to download videos from the internet; how to create links from OneDrive to Teams or OneNote (a digital workbook); how to design appropriate PowerPoint presentations; how to download an attendance register (after the lesson had been taught); how to record a lesson (and retrieve it from Stream); how to use Forms in the place of a written test; and how to create fun activities by using Quizlet and using Office Lens as a “scanner” to insert text, pictures or graphs when setting an assignment because texts from prescribed textbooks could not be photocopied and handed out, as no one was at school.

The remote learning approach continued for the rest of the 2020 school year. When the various grades could return to school (a phased-in approach was followed), this private school group continued with a hybrid approach. Teachers with co-morbidities had the option of

⁵ Teaching remotely refers to an online approach to teaching learners who were not physically in a classroom. Teaching and learning continued via a technological device – either a laptop, a tablet or a cell phone. Lessons were made available for learners to continue with the curriculum. A blended learning approach was adopted: synchronous learning (live online classes where the learners and teacher got together) and asynchronous learning (learners had to download lessons and do self-study).

teaching remotely from home, while teachers who could go back to school did so. Thus, from July 2020 until the first week of December 2020, all teachers followed a hybrid learning approach. Coping with online learners, as well as “real” learners within the classroom, posed some challenges, as teachers did not always know how to teach online learners and face-to-face learners simultaneously. At times, teaching was difficult because not all learners at home had uncapped data, and so, they missed lessons. Teachers were encouraged to record their lessons for these learners. Not all learners within this private school group owned a technological device; consequently, many teachers designed lesson material and engaged with the learners via WhatsApp and e-mail. This was not ideal, but at least there was some interaction between the teachers and the learners with basic curriculum material.

The inclusion criteria for both the quantitative and the qualitative components included the following: (i) teachers must teach any grade in the Intermediate Phase; (ii) teachers must be full-time employees at this private school group; and (iii) teachers must have a valid education degree or diploma that qualifies them to teach in the Intermediate Phase. The following teachers were excluded from this study, for both the quantitative and the qualitative components: (i) teachers who do not currently teach in the Intermediate Phase; (ii) teachers who do not teach at this specific private school group; (iii) administrative staff or substitute staff; and (iv) in-service students who do not have a valid South African qualification in education for the Intermediate Phase.

3.5.2 Population and sampling schemes

Table 3-1 provides details regarding the quantitative and qualitative sampling schemes applied in the study.

Table 3-1: Overview of the applicable quantitative and qualitative sampling schemes.

	Quantitative strand	Qualitative strand
Population	All Intermediate Phase teachers from a specific private school group in South Africa (N = approx. 1 000)	All Intermediate Phase teachers from a specific private school group in South Africa (N = approx. 1 000)
Sample	Approximately 200 (as advised by a North-West University statistician) respondents who teach in the Intermediate Phase of this private school group (n = approx. 200)	Eight to 12 participants who teach in the Intermediate Phase of this private school group
Sampling scheme	Purposive non-random sampling technique (availability sampling)	Convenient and purposive sampling (availability sampling)

As the non-probability quantitative sample was not based on the principle of randomness and could, therefore, not correctly hypothesise about the population, the researcher decided to

include a qualitative sample as well, as suggested by Creswell and Plano Clark (2018). Together, both samples were deemed necessary to yield a greater understanding of the research problem.

The quantitative and qualitative sampling techniques as applied in the study are discussed next.

3.5.3 Quantitative sampling techniques

A purposive non-random sampling technique was applied to this study because respondents were selected for a specific purpose (see Taherdoost, 2016). The main reason for choosing the sampling scheme was to focus on explicit features of the population (Intermediate Phase teachers) that would best assist the researcher to answer the research questions (Taherdoost, 2016). In this case, the respondents (n = approx. 200, as advised by a North-West University statistician) included Intermediate Phase teachers from a specific private school group in South Africa who agreed to take part in the study. The sample size was determined based on the reliability measures of the instruments used (e.g. the number of items in each instrument multiplied by the number of subscales), as advised by the North-West University statistics consultant. This sampling technique was applied by inviting the Intermediate Phase respondents from all the schools in the particular private school group to complete a voluntary online questionnaire on Google Forms.

3.5.4 Qualitative sampling techniques

The qualitative sampling technique required a flexible and pragmatic approach; therefore, convenient and purposive sampling was applied as suggested by Etikan *et al.* (2016). Convenience sampling aided the researcher in collecting information from participants who were accessible and available to her and ensuring that the information gained was representative of the population from which the sample was drawn (see Etikan *et al.*, 2016). Purposeful sampling was also applied, as the participants were selected with a specific purpose in mind (see Maree, 2016). In addition, the participants' accounts maximised the researcher's exploration of the problem, based on their knowledge and experience. The qualitative sample included eight to 12 participants who were invited to write a narrative with guided prompts regarding their metacognition and worldviews in the process of their self-directed learning.

The sample size was based on research done by Guest *et al.* (2006) and Sandelowski (2010), who believe that the size of a qualitative sample should not be too small, as this would make it difficult to achieve data saturation and information redundancy. Also, the sample size should not be too large, as this would hamper the undertaking of deep analysis. Guest *et al.* (2006)

specifically indicate that 12 participants are needed for an interview. In the case of this study, the researcher knew she was not conducting interviews, but rather a narrative inquiry. During an interview, a researcher usually poses specific questions (relating to the research questions) guided by prompts to explore participants' opinions, stories and reflections about a specific phenomenon (Maree, 2016). Similarly, by applying a narrative inquiry for this research, the researcher posed specific questions relating to the research to explore the participants' opinions, stories and reflections about a specific phenomenon. Therefore, the researcher deemed 12 participants' accounts as enough data.

3.6 Data collection methods

According to Creswell and Plano Clark (2018), data collection methods for a convergent parallel design involve gathering quantitative and qualitative data during a single phase. Thereafter, the databases are analysed separately, and then the results or findings are compared and interpreted. For this study, the quantitative and qualitative data were collected two weeks apart. Thus, the questionnaire (see Addendum C) was sent out first via e-mail, followed by the narrative (see Addendum E) two weeks later, also via e-mail. The reason for this was that the researcher did not want to overwhelm the participants with two questionnaires simultaneously, as teachers have a lot of school administration to complete. There was no specific reason for sending out the quantitative instrument first because the order in which the data were gathered did not matter as per the convergent parallel design. Figure 3-3 explains how the recruitment process materialised for both strands of the research.

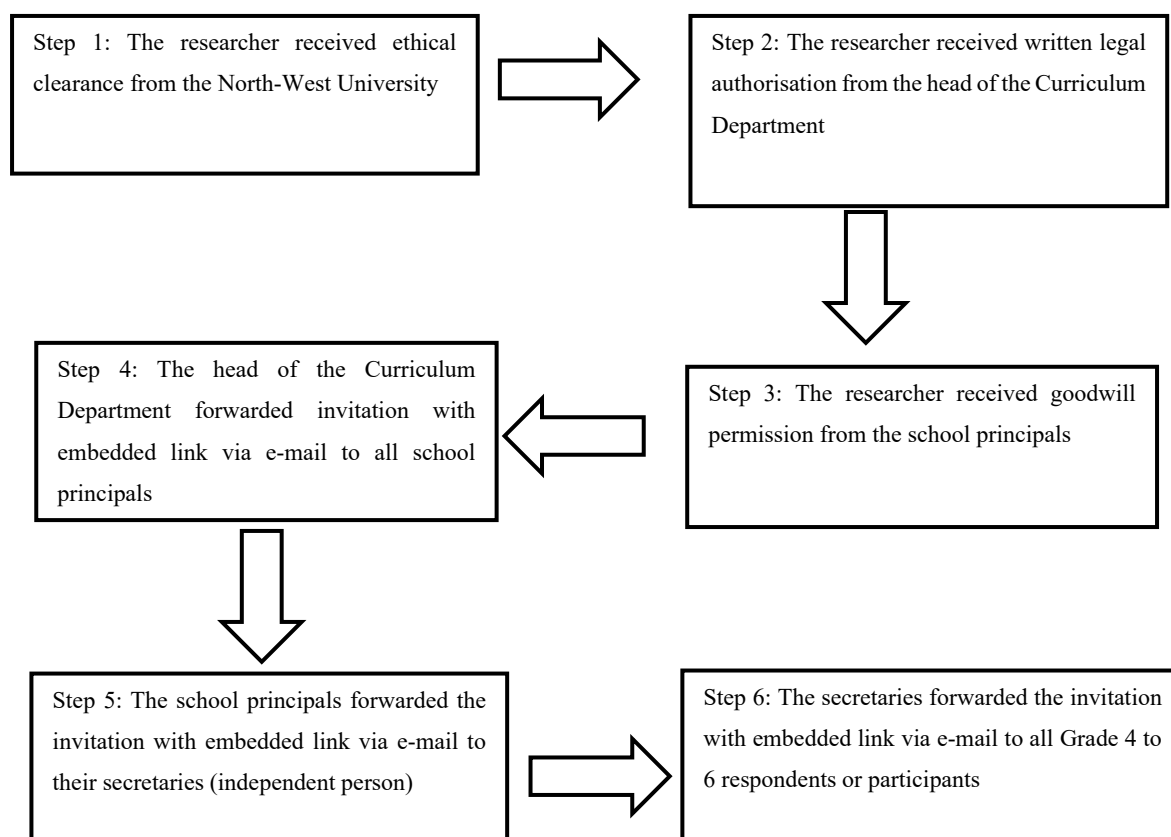


Figure 3-3: Recruitment process.

First, the researcher received ethical clearance from the North-West University. This was followed by receiving written legal authorisation from the head of the Curriculum Department of the specific private school group to invite Intermediate Phase teachers to take part in the research. Goodwill permission was obtained from all school principals, after which the researcher forwarded a letter with the embedded link (to Google Forms) via e-mail to the head of the Curriculum Department. The head of the Curriculum Department then forwarded the letter via e-mail to the participating school principals, who, in turn, forwarded the letter via e-mail to their secretaries. The secretaries were identified as independent persons who forwarded the letter via e-mail to the respondents or participants. Once the respondents or participants received the e-mail, they could choose whether they wanted to complete the questionnaire or write the narrative. The recruitment process was the same for both strands of the research.

3.6.1 Quantitative data collection method

The data collection method for the quantitative strand of the study entailed answering three standardised closed-ended questionnaires, which were combined into one questionnaire (see Addendum C). The researcher did not design the questionnaires herself, except for the

biographical details section. The first instrument was Khiat's (2015) learning diagnostic tool regarding self-directed learning, the second instrument was the worldview test developed by De Witt *et al.* (2016) and the last instrument was Balcikanli's (2011) metacognitive awareness inventory for teachers.

The questionnaire comprised four sections relating to the research questions. As recommended by Rule and John (2011), careful consideration was given to ensure clear and unambiguous instructions and questions to make sure the respondents understood what was expected of them, as the researcher was not physically present when the questionnaire was administered. An online questionnaire as a data collection method was applied to this study because all respondents from this specific private school group (i) had access to an active e-mail address registered within the company, (ii) owned a laptop and (iii) had access to the internet. The advantages of applying an online questionnaire included the following: (i) to eliminate bias and partiality; (ii) the respondents could complete the questionnaire in their own time; (iii) it was a low-cost method because no paper had to be printed or posted; and (iv) the questionnaire could be completed across all nine provinces.

3.6.2 Quantitative research instruments

An online questionnaire was compiled using the instruments in Table 3-2. Respondents (from the population N = approx. 1 000) had to respond to the items as statements on the online questionnaire on a Google Forms platform (see Addendum C) as explained in Section 3.6. Next, the four sections in the quantitative research instrument are described in more detail. Table 3-2 is an overview of the quantitative research instruments administered for this study.

Table 3-2: Overview of the quantitative research instruments.

Instrument	Section	Author	Number of items	Likert scale	Reliability of instrument	Reliability of instrument applied in the study
Biographical instrument	1	Compiled by the researcher for this study	6	Not applicable	Not applicable	Not applicable
Learning diagnostic tool	2	Khiat (2015)	26	5-point scale	0,77	0,70
Worldview test	3	De Witt <i>et al.</i> (2016)	17	Most = 1 Least = -1 Neutral = 0	0,70	0,51
MAIT	4	Balcikanli (2011)	24	5-point scale	0,81	0,73

The first section entailed six biographical questions (part of Addendum C), namely (i) age group, (ii) years' experience of teaching in the Intermediate Phase, (iii) primary language of instruction, (iv) the province where the respondent taught, (v) the grade(s) taught and (vi) the

subject(s) taught. Biographical details were included in the questionnaire because these were needed to calculate effect sizes to compare the similarities and differences between the respondents across the aforementioned criteria (i-vi). This would aid the researcher to calculate practical and visible differences between the variables, namely biographical details, self-directed learning, worldviews and metacognitive awareness.

The second section was concerned with self-directed learning, and Khiaat's (2015) instrument, obtained in his paper *Measuring self-directed learning: a tool for adult learners*, was applied. The aim of Khiaat's (2015) study was to help adult learners to identify and expand their existing self-directed learning strategies. Thus, a diagnostic tool was designed to help adult learners to distinguish between their strengths and limitations in self-directed learning. The researcher chose this instrument for the current study because it was a short version compared to other instruments that measured self-directed learning and was regarded as reliable ($\alpha = 0,77$). This section consisted of 26 items, and a five-point Likert scale was applied, namely: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; 5 = *strongly agree*. Table 3-2 shows the alpha coefficients of the items of 0,5 or higher, indicating reliable internal consistency between the 26 items as applied for this study. The overall alpha coefficient for self-directed learning for the study was 0,70.

The third section entailed the standardised worldviews test, as developed by De Witt *et al.* (2016). This instrument was chosen because it was reliable ($\alpha = 0,70$) and was based on academic research regarding one's worldview and behaviour. It consisted of 17 items with four statements each. The respondents had to select the statement they most agreed with, and the statement they least agreed with. According to De Witt *et al.* (2016), the results of the worldview test are calculated by applying a three-point Likert scale (e.g. 0 = *did not choose*; -1 = *least agree*; and 1 = *most agree*) to summarise the subscales, that is, *ontology*, *epistemology*, *axiology*, *anthropology* and *societal vision*. Table 3-2 shows the alpha coefficients of the items of 0,5 or higher, indicating reliable internal consistency between the 17 items as applied for this study.

The last section of the questionnaire entailed the MAIT or Metacognitive Inventory for Teachers, developed by Balcikanli (2011). This section consisted of 24 items, and a five-point Likert scale was applied: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; and 5 = *strongly agree*. This instrument was chosen because it was considered reliable ($\alpha = 0,81$) in determining teachers' metacognitive awareness. Table 3-2 shows the alpha coefficients of the items of 0,5 or higher, indicating reliable internal consistency between the 24 items as applied for this study. The overall alpha coefficient value for metacognitive awareness for the study was 0,73.

The following section provides more information regarding qualitative data generation.

3.6.3 Qualitative data collection method

Intermediate Phase participants (from the population $N = 62$ approx. 1 000) were invited to complete a narrative (see Addendum E) with guided prompts on Google Forms. All Intermediate Phase teachers from the population were invited, not only teachers who completed the quantitative questionnaire that had been sent out first. An online questionnaire was chosen because (i) the researcher could capture multiple facets of the phenomenon, (ii) a narrative inquiry aided the discovery of additional data to be analysed and interpreted to understand the research problem in more depth, (iii) it was an accessible method to reach many participants, (iv) Covid-19 regulations were adhered to and (v) it was not costly to the researcher or the participants.

The researcher chose this specific method, as the participants' perspectives (regarding their metacognition and worldviews in the process of their self-directed learning) would inform the research questions. Data were collected from participants who were specifically involved and immersed in everyday life experiences in the context of the study, as advised by Creswell and Plano Clark (2018). Consequently, these participants provided valuable insight into the way they perceived their teaching world, which would enable the researcher to make interpretations about their views regarding their self-directed learning, their accompanying worldview and their metacognitive awareness. The first 12 completed narratives received were decoded as part of the qualitative strand of the research.

3.6.4 Qualitative research instrument

McAlpine (2016) and Huber *et al.* (2013) mention that narrative writing is one of many qualitative methodologies that can be applied to collect and analyse data. Narrative writing as a data collection method was applied in this study because it revealed how individuals, in this case Intermediate Phase teachers, made sense of experiences and actions in their teaching environment. Furthermore, the researcher was privy to the teachers' past and present experiences and future plans and actions, as suggested by Huber *et al.* (2013). Narrative writing as a collection method was applied by inviting the participants to write a brief narrative (see Addendum E) regarding their experiences with self-directed learning (Part A, accompanied by 10 prompts), their worldview on teaching and learning (Part B, accompanied by five prompts) and their metacognitive awareness (Part C, accompanied by six prompts). No double-barrelled questions and no leading questions (to lead respondents to a specific answer) were posed.

3.7 Data analysis procedures

As per the convergent parallel design, the researcher analysed the quantitative and qualitative data strands separately, following the appropriate data analysis methods. Both data sets were triangulated by merging the quantitative results and qualitative findings, as suggested by Creswell and Plano Clark (2018).

3.7.1 Quantitative data analysis

Data were obtained from Google Forms, which generated a Google Sheets document that captured the data in real time from the completed questionnaires. During the quantitative data analysis, this raw quantitative data set was converted from Google Sheets into a Microsoft Excel format (e.g. .xls). Numeric values were assigned to each response from the questionnaires according to the applicable Likert-type scale. For instance, *1 = Strongly disagree*. Statistical analysis was then conducted in consultation with a statistical consultant of the North-West University. The statistical analyses for the study were done by using SAS (2000) and SPSS (2009) to inspect the data for trends through both descriptive and inferential statistics.

3.7.2 Descriptive statistics

For purposes of reporting, the analysis of the results included reliabilities, a description of the standard population in terms of the respondents' age group, years of teaching experience in the Intermediate Phase, the primary language of instruction at the school, the province where the respondents taught, the grade(s) the respondents taught and the subject(s) the respondents taught. This was followed by descriptive statistics (e.g. mean scores, standard deviations and effect sizes) to explore the relationship between the three main constructs of self-directed learning, worldviews and metacognitive awareness of Intermediate Phase teachers in a private school setting. According to Pallant (2013), Ellis *et al.* (2003) and Cohen (1988), the guidelines for interpretation of Cohen's *d*-value for effect sizes are as follows: (i) 0,2 = small effect; (ii) 0,5 = medium effect; and (iii) 0,8 = large effect.

3.7.3 Inferential statistics

To make inferences and interpretations from the data, ANOVAs were calculated to compare differences in population means. The researcher also tested the equality of variances of the variables through Levene's test. This T-test was used because it allowed the testing of specific assumptions. For purposes of reporting and the sake of completeness, *p*-values were calculated. Correlations were determined by calculating Spearman's rho (a non-parametric test) as correlation coefficients to determine the nature of the relationship between the

constructs, namely self-directed learning, worldviews and metacognitive awareness; for example, determining the relationship between a teacher's level of self-directed learning and his or her worldview. Table 3-4 indicates the *r*-value to determine whether the relationship is weak, moderate or strong.

Table 3-3: Spearman's rho values (Pallant, 2013).

Correlation	Rho values
Weak relationship	$r = 0,1$
Moderate relationship	$r = 0,3$
Strong relationship	$r = 0,5$

Structural equation modelling was used to find models, if any, that could illustrate the relationship between the worldviews and metacognitive awareness of the respondents and their self-directed learning. No generalisation beyond the target population was made because no random sampling was done. Refer to Addendum A as an illustration of how each research question necessitated these statistical techniques.

3.7.4 Qualitative data analysis

Looking at reality from an interpretivist paradigm, reality is interpreted as ever-changing, as people shape and construct multiple realities in their own minds, within the context in which they live (Thanh & Thanh, 2015). In addition, the different participants in the study reflected and described various perspectives of their own experiences and creations of reality during the narrative. Consequently, reality emerged from the gathered data through the specified methods of data collection and data analyses as selected by the researcher. The data analysis method commenced with the researcher reading through the narratives to gain a general understanding of the teachers' experiences, as suggested by Trochim (2006). After this, the researcher wrote analytical memos to record her initial thoughts. She then applied *a priori* codes to facilitate qualitative inquiry by applying Saldaña's (2015) codes-to-theory model to code the data into meaningful categories and establish themes to make valuable inferences about the findings (see Maree, 2016). *A priori* code analysis refers to a set of already existing codes within data, that is, codes that were developed before examining the current data (Saldaña, 2015). The application of *a priori* codes as indicators of relevant themes gathered in the narrative inquiry enabled the researcher to best appreciate the participants' untainted and first-hand experiences regarding their metacognitive awareness and worldviews in the process of their self-directed learning. Thereafter, the qualitative data were summarised in table form indicating the codes and themes.

The researcher used Table 3-4 to code the data by hand into meaningful analytical units to profile the themes for later discussion. The description of every code enabled her to refer to the codes to make sure she did not get confused with the various codes, as more than one code pertained to more than one piece of data. The codes follow the logical sequencing of the concepts, as discussed in Chapter 2, that is, self-directed learning, worldviews and metacognitive awareness.

Table 3-4: Overview of the codes-to-theory model applied for the three concepts.

Overview of the codes-to-theory model applied for self-directed learning		
A priori codes	Category	Description
AM	“Assignment management	Refers to the teacher’s ability to select appropriate information when setting an examination or a test for the learners in the specific subject or grade.
OLP	Online learning proficiency	Refers to the teacher’s ability to learn from online video lectures or webinars.
SM	Stress management	Refers to a teacher’s ability to handle academic stress in an educational environment.
TP	Technical proficiency	Refers to a teacher’s ability to operate basic computer programmes to type class notes or access the internet.
PM	Procrastination management	Refers to the teacher’s ability to manage deadlines.
ODP	Online discussion proficiency	Refers to the teacher’s ability to cope in online discussion platforms relating to teaching and learning courses or self-development courses.
SLP	Seminar learning proficiency	Refers to the teacher’s ability to learn new information during seminars or lectures.
CC	Comprehension competence	Refers to the teacher’s ability to understand readings and make study notes (plan, monitor and evaluate) during training sessions and to keep track of what they know (self-knowledge) or do not know relating to subject matter or new teaching approaches.
EM	Examination management	Refers to the teacher’s ability to plan a lesson for a formal class visit or to do well in an online examination or assignment
TM	Time management”	Refers to the teacher’s ability to utilise class time effectively (planning) and set up personalised learning goals (monitor) for what he or she wants to achieve that day (evaluate).
Overview of the codes-to-theory model applied for worldviews		
A priori codes	Category	Description
O	“Ontology	What is the nature of teaching in my world?
E	Epistemology	What is valid knowledge, and what is not?
Ax	Axiology	What is the meaning of life?
An	Anthropology	What is my role as a teacher?
S	Societal vision”	How do we collectively envision our social life?
Overview of the codes-to-theory model applied for metacognitive awareness		
A priori codes	Category	Description
PI Plan	“Metacognitive regulation	Involves planning, monitoring and evaluating a learning task.
M Monitor		
Ev Evaluate		

D	Declarative	Metacognitive knowledge"	Taught knowledge about cognitive processes; in other words, knowledge that can be applied to control and support thinking processes.
P	Procedural		
C	Conditional		

In line with Maree's (2016) description of data analysis methods, the researcher knew that qualitative research was a process, rather than an event and thus made space for some form of fluidity during the execution of the project. Also, *a priori* codes were a deductive application; hence, data that could not be coded were evaluated at a later stage to conclude their worth to the research and to determine whether the data should represent a new category or not (see Mayring, 2004). After both sets of data had been analysed and coded, the researcher drew up a joint display table to help her look for common concepts across the results (see Table 5-2). This was followed by comparing the quantitative results and qualitative findings for the concepts, which facilitated the researcher to understand in what ways the results confirmed or disconfirmed one another. This is discussed in more detail in Chapter 6.

3.8 Mixed-methods validity

According to Johnson and Christensen (2019), the term "validity" can refer to both quantitative and qualitative data strands, as both approaches agree that validity serves to check the quality of the data, the results and the researcher's interpretation of the results. It is, therefore, important to address validity checks in both strands of data that are in conjunction with the convergent parallel design (Creswell & Plano Clark, 2018). To this end, validity in both strands of the study was achieved by employing strategies to reduce threats to validity. This was done by creating parallel questions to address the same constructs or concepts. Doing so also aided the point of an interface when the quantitative and qualitative data were combined. Another strategy to reduce threats to validity entailed developing a joint display during the data analysis integration where the quantitative results and qualitative findings were placed side by side. This facilitated the discussion about insinuations and truthful assessments from the combined data (see Creswell & Plano Clark, 2018). The data are discussed in detail in Chapter 6.

3.8.1 Quantitative validity

Validity and reliability are the two main criteria for evaluating quantitative research (Heale & Twycross, 2015; Leavy, 2017). Validity refers to the extent a measure purports to measure what it is supposed to measure (Leavy, 2017). In the current study, validity was achieved by implementing specific strategies. Firstly, face validity was attained by ensuring that the respondents knew (at face value with the questionnaire) which constructs were examined (see Leavy, 2017) and what the questionnaire was about. Secondly, construct validity was achieved by ensuring the scores received from the respondents were significant indicators of the

constructs (self-directed learning, worldviews and metacognitive awareness) being measured (see Johnson & Christensen, 2019). The researcher knew that a questionnaire alone could not accurately measure these constructs; therefore, a narrative inquiry was also done to validate and corroborate results, which increased the internal validity (see Creswell & Plano Clark, 2018). Thirdly, statistical validity was achieved by applying appropriate statistical techniques to analyse the data. Lastly, external validity was achieved by generalising *only* to the specific population of the study from which the sample was drawn, that is, Intermediate Phase teachers from this specific private school group in South Africa (see Johnson & Christensen, 2019).

Quantitative reliability refers to the accuracy of an instrument in yielding consistent scores (Heale & Twycross, 2015). Reliability was established by selecting reliable quantitative instruments (see Table 3-3) and appropriate statistical techniques to analyse the quantitative data (see Section 3.6.1). For the current study, the researcher chose standardised scales and questionnaires that have already been used in other research, confirming the validity and consistency of these measuring tools. Cronbach's alpha values from all three instruments were greater than or equal to 0,70, indicating a high level of internal consistency in which each test's items measured a single construct (see Johnson & Christensen, 2019).

The way in which trustworthiness was achieved in the qualitative strand is discussed next.

3.8.2 Qualitative validity

During the qualitative phase of the research, the researcher focused on the issue of validity, or as it is more commonly known in qualitative research, trustworthiness. Trustworthiness is achieved in a study by ensuring that the findings represented an authentic reflection of reality by checking to what extent the information was credible, transferable, dependable and confirmable (Creswell & Plano Clark, 2018). In qualitative research, trustworthiness remains a challenge, as different researchers have different perceptions of reality, with the result that in this study, the findings could not be generalised to the population, as the sampling scheme was too small ($n = 8-12$) and not representative of the population ($N = \text{approx. } 1\,000$). The researcher ensured trustworthiness by taking into consideration Guba's (as cited in Maree, 2016) criteria for trustworthiness. The criteria for trustworthiness include credibility and dependability, transferability, confirmability, triangulation and reflexivity.

Credibility and dependability deal with the congruency of study findings with the literature (Maree, 2016); in this case, a convergent parallel approach was an appropriate and dependable method to uncover the research question and the purpose of the study. Transferability is obtained by inviting the reader to make connections between the research problem and the participants' accounts (Johnson & Christensen, 2019; Maree, 2016). In this

study, transferability was achieved by providing a comprehensive background and context of the study and inviting participants (Intermediate Phase teachers) who were best suited to the context being studied (see Lincoln & Guba, 1985). Convenient and purposive sampling was selected to ensure the transferability of the study.

Confirmability refers to the extent to which the findings are shaped by individuals' perceptions and experiences and not by the researcher's own beliefs and predispositions (Maree, 2016). Triangulation was used in this study to reduce researcher bias and ensure that the findings were not influenced by the researcher's background, perceptions, and personal epistemologies regarding the research questions (see Johnson & Christensen, 2019). To reduce researcher bias, continuous self-reflection was exercised during the research process by reflecting on the research questions, reading additional literature on the main concepts and exploring various teaching strategies in the researcher's classroom to evaluate her progress and understanding of metacognitive awareness and worldviews in the development of self-directed learning. These methods are in line with Saldaña's (2015) analytical memos.

To follow is a discussion on how the data were triangulated.

3.9 Triangulation

Triangulation is achieved by searching for convergence or divergence of the results obtained by using multiple methods (quantitative and qualitative) of data collection and data analysis (Johnson & Christensen, 2019). Ideally, the researcher wanted all the results to corroborate, as this would seemingly answer the research questions. However, Farmer *et al.* (2006) suggest that triangulation helps a researcher to gain an exhaustive view of the research problem because divergent results can also enrich explanations and findings rather than leave the researcher perplexed. Thus, triangulation strategies helped the researcher in this study to understand the problem holistically and completely. Triangulation was aided by describing the participants' background fully (age, years of teaching experience, the primary language of instruction, grade(s) taught) and including verbatim accounts for purposes of reporting to help the reader make connections to the participants' life stories and context-bound situation to which the findings were relevant, as suggested by Johnson and Christensen (2019).

3.10 Ethical issues

3.10.1 Ethical clearance

To obtain ethical approval from North-West University, the researcher had to submit an ethics application outlining the purpose of the research as well as the research questions and

objectives. A detailed account was given regarding what was expected from the respondents or participants, risks and precautions, benefits for the respondents or participants, informed consent, legal authorisation, goodwill permission, an announcement of the study results to the respondents or participants, the management, storage and destruction of data, the monitoring of the research and the justifiability of the empirical and statistical procedures for the quantitative strand.

The North-West University classified this study as low-risk for the following reasons: (i) there was a valid research design in place; (ii) privacy and confidentiality were applied; (iii) there was no conflict of interest; (iv) there was no direct or indirect harm to any of the participants; (v) no participants came face to face with the researcher, thus Covid-19 procedures did not apply; and (vi) there was no handling of paper, as recruitment was done by e-mail.

3.10.2 Legal authorisation, goodwill permission and informed consent

The researcher approached the head of the Curriculum Department of the private school group to explain the purpose of the research after receiving ethical clearance from North-West University. The head of the Curriculum Department of the private school group granted written legal authorisation. This was followed by gaining goodwill permission via e-mail (as per EduRec documentation) from the principals of the 59 schools in the private school group. To limit power relationships between the researcher and the respondents or participants, as suggested by Jelsma and Clow (2005), recruitment was done by an independent person, as described in Figure 3-3. Each individual gave informed consent electronically before completing the quantitative and qualitative questionnaires.

3.10.3 Anonymity, privacy and confidentiality

Privacy was ensured by treating all data and the identity of all the respondents or participants as confidential and anonymous. Because no personal information was requested at any point during the research, the researcher had no access to personal information or records about the respondents or participants. The respondents or participants were given a code number or pseudonym during all discussions with the supervisors and for purpose of reporting. Confidentiality of the quantitative data was ensured by treating the data as confidential; only the researcher, the supervisors and the statistician had to access to the quantitative data. The statistician of the North-West University was requested to sign a confidentiality document as per EduRec guidelines. Furthermore, the confidentiality of the qualitative data was ensured by treating the data as confidential, and the qualitative data was only accessible to the researcher and the supervisors.

3.10.4 Risks

There were no foreseeable physical or legal risks in the study. A possible negative consequence was that the respondents or participants had to buy more data if they did not have internet access at home. Also, some respondents or participants might experience frustration about completing the questionnaires, as it took time away from their schoolwork, other school-related administration or family time.

3.10.5 Instruments

The questionnaires for both strands of the study were free of bias and rude or discriminatory remarks. There were no biographical questions regarding race, gender, religion or sexual preference. Other ethical issues concerning the process were carefully managed within the context of the study; for example, the researcher carefully explained (i) that any involvement in the research study was voluntary and anonymous (see Addenda B and D) and (ii) that any respondent or participant could withdraw from the research at any time without providing a reason.

3.11 Conclusion

The empirical research process set in place to test the conceptual-theoretical model, as proposed in Chapter 2, was discussed in detail in Chapter 3. The discussion included a justification for employing a mixed-methods approach situated within a pragmatist paradigm and a plan to test how the conceptual-theoretical model would translate into teaching practice. Both research strands were described, including data collection and analysis for each strand. The chapter concluded with the researcher's role in terms of validity and trustworthiness as they related to the study.

Chapter 4 Analysis of quantitative data

4.1 Introduction

The methodology and research design were discussed in Chapter 3. The quantitative findings are presented in Chapter 4. The analyses of the results include reliabilities, descriptive statistics (e.g. mean scores, standard deviations and effect sizes) and inferential statistics (e.g. Spearman's rho and structural equation modelling) to explore the relationship between the three main constructs of self-directed learning, worldviews and metacognitive awareness of Intermediate Phase teachers in private school settings. The interpretation of the results will be discussed and triangulated with the qualitative data analysed in Chapter 5 and the conceptual-theoretical framework in Chapter 6. The results presented in Chapter 4 were obtained by administering an online questionnaire (consisting of three standardised questionnaires) to Intermediate Phase teachers (Grades 4-6) in 47 sampled schools across South Africa.

4.1.1 Overview of the quantitative part of the study

The statistical analyses for this study were done by using SAS (2020) and SPSS (2009). Chapter 4 discusses the instruments' validity (4.2) and reliability (4.2), followed by a discussion of the descriptive statistics (4.2) to profile the respondents' biographical details in terms of their age group, years of teaching experience in the Intermediate Phase, the primary language of instruction at the school, the province where the respondents teach, the grade(s) they teach, and the subject(s) they teach. Furthermore, mean scores, standard deviations, effect sizes, and correlations were calculated to identify relationships between the constructs, and structural equation modelling assisted the researcher in developing a model to illustrate the relationship between Intermediate Phase teachers' worldviews and metacognitive awareness and their self-directed learning.

The primary research question in the study was:

What role do private school Intermediate Phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning?

Table 4-1 provides a brief overview of the secondary research questions, the associated variables of each construct, the data collection method and the specific data analysis method.

Table 4-1: Overview of the quantitative data analysis and statistical procedures.

Secondary research questions	Secondary research questions	Variables	Data collection method	Section	Data analysis method
Secondary Research Question 1	What is the relationship, if any, between self-directed learning and Intermediate Phase teachers' worldviews, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Self-directed learning components and worldview components	Khiaat's (2015) learning diagnostic tool and the worldview test of De Witt <i>et al.</i> (2016)	6.5.1.1 3.7.2	Spearman's rho and ANOVAs
Secondary Research Question 2	What is the relationship, if any, between Intermediate Phase teachers' worldviews and metacognitive awareness, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Worldview components and metacognitive awareness components	Worldview test of De Witt <i>et al.</i> (2016) and MAIT		
Secondary Research Question 3	What is the relationship, if any, between Intermediate Phase teachers' metacognitive awareness and their self-directed learning, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Metacognitive awareness components and self-directed learning components	MAIT and Khiaat's (2015) learning diagnostic tool		
Secondary Research Question 4	What model, if any, can illustrate the relationship between the worldviews and metacognitive awareness of Intermediate Phase teachers and their self-directed learning?	Components of worldviews, metacognitive awareness, and self-directed learning	Goodness of fit	6.6.1 3.7.1.2	SEM

In the sections that follow, the respondents' biographical information, averages and the standard deviations of each variable are discussed.

4.1.2 Description of the biographical information

Descriptive statistics were used to describe, summarise, and comprehend the main characteristics of the study's population. This was accomplished by describing the frequency of each variable, as well as its mean and standard deviation.

The biographical information of respondents who indicated that they wanted to take part in this study is provided below. Altogether, 142 respondents from 47 of the 59 schools of the specified private school group in South Africa participated in the study. The biographical information includes the teachers' age groups, the number of years of teaching experience in the Intermediate Phase, the primary language of instruction, the province where the respondents reside and the subjects taught.

4.1.3 Respondents' age groups

The ages of the respondents varied from 20 to over 60, as indicated in Figure 4-1.

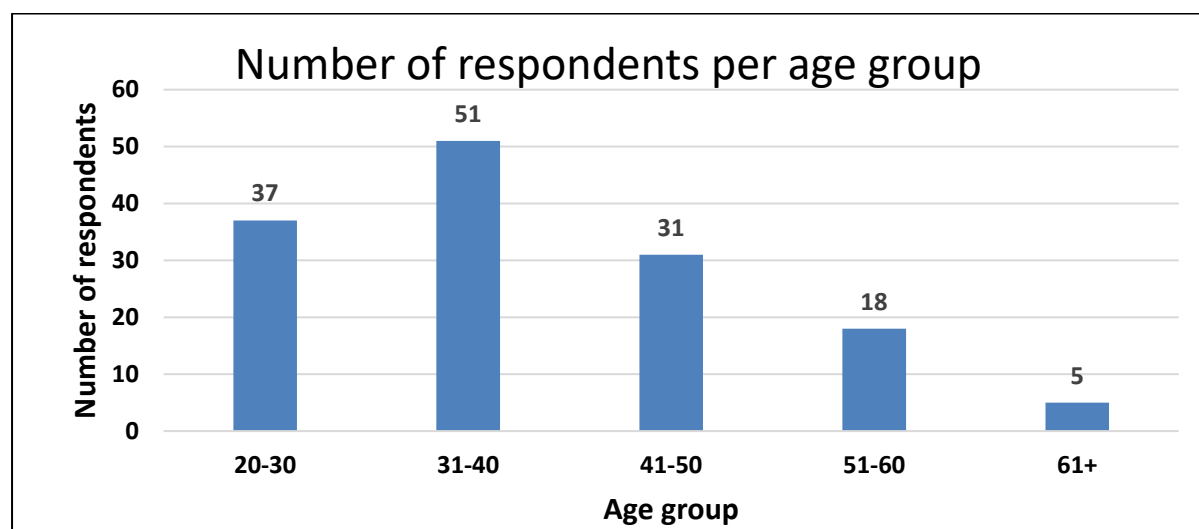


Figure 4-1: Respondents' age groups.

Figure 4-1 refers to the different age groups of the teachers as reflected in the Intermediate Phase of the specified private school group in South Africa. The data show a variation in the ages of the respondents from the age group of 20 to 30 years to 61+ years. This represents a wide range of teachers' understanding of metacognition and worldviews as part of self-directed learning. Thirty-seven respondents indicated they were between 20 and 30, and five respondents were in the oldest age bracket of 61 years and older. The largest age bracket includes ages between 31 and 40 and contains 51 respondents. All the respondents answered the question concerning their age bracket.

The respondents differed in the number of years spent in the Intermediate Phase, as indicated in the next section.

4.1.4 Number of years of teaching experience in the Intermediate Phase

The respondents' number of years of teaching experience refers to the number of years spent in the Intermediate Phase teaching learners aged nine to twelve. Table 4-2 shows the respondents' years of Intermediate Phase teaching experience.

Table 4-2: Years of teaching experience in the Intermediate Phase.

Years of teaching experience	Number of respondents	Percentage
Less than nine years	80	57,97%
10-19	35	25,36%
20-29	17	12,32%
More than 30 years	6	4,35%
Total	138	100%

At the time of the study, the number of years these teachers had spent in the Intermediate Phase ranged from five months to 36 years. Of the 142 respondents, three individuals did not answer the question "*Indicate your years of experience in the Intermediate Phase*", and one respondent indicated "*has gone much better than anticipated*"; hence, 138 respondents correctly indicated their number of years of teaching experience in the Intermediate Phase.

Pallant (2013) states that it is rare that one receives all the data one requires, as some respondents may choose to omit questions or misunderstand a question. There was no visible pattern of missing data in the biographical sections; therefore, the researcher thinks that some respondents did not want to indicate their number of teaching years or simply thought a sentence instead of a number would suffice. Only one respondent indicated the least number of years, five months, whereas six respondents indicated they had more than 30 years of teaching experience in the Intermediate Phase. From the data, it is seen that 80 respondents indicated that they had less than nine years of teaching experience in the Intermediate Phase. This means that a total of 57,97% of the respondents likely have not experienced the four policy cycle changes since 1994. These changes include experience in the traditional curriculum, followed by Outcomes-Based Education, Curriculum 2005 and the *Revised National Curriculum Statement* in 2002, which became known as the *National Curriculum Statement Grades R-12* and was implemented in 2012. The number of respondents that indicated they had 20 years or more experience in the Intermediate Phase was 23; thus, 16,65% of the respondents have most likely experienced all four policy changes regarding education. This may imply that these teachers have an established and set view of teaching and learning. The 138 respondents have a total of 1 411,50 years of teaching experience, with

an average of 1 411,50 years of teaching experience. in the Intermediate Phase is 10,22 years.

4.1.5 Primary language of instruction

According to the language policy of the private school group, the primary language of instruction is English and/or Afrikaans, depending on the school size and demographic background. Table 4-3 indicates the number of teachers who spoke Afrikaans as the primary language of instruction compared to the number of teachers who spoke English as the primary language of instruction. All of the teachers answered the question on the language of instruction.

Table 4-3: Primary language of instruction.

Language	Number of teachers	Percentage
Afrikaans	30	21,13 %
English	112	78,87 %
Total	142	100%

Thirty teachers indicated Afrikaans as the primary language of instruction compared to 112 who stated that they used English as the primary language of instruction. Some of the schools are parallel-medium schools, meaning both Afrikaans and English are taught at the Home Language level, but this depends entirely on the demographic background and province of the school. The data indicate that English is the chosen language of instruction across most schools in the private school group.

4.1.6 Number of respondents per province

Schools from all nine provinces in South Africa volunteered to take part in the study, and all 142 respondents indicated their province. Figure 4-2 depicts the total number of respondents by province.

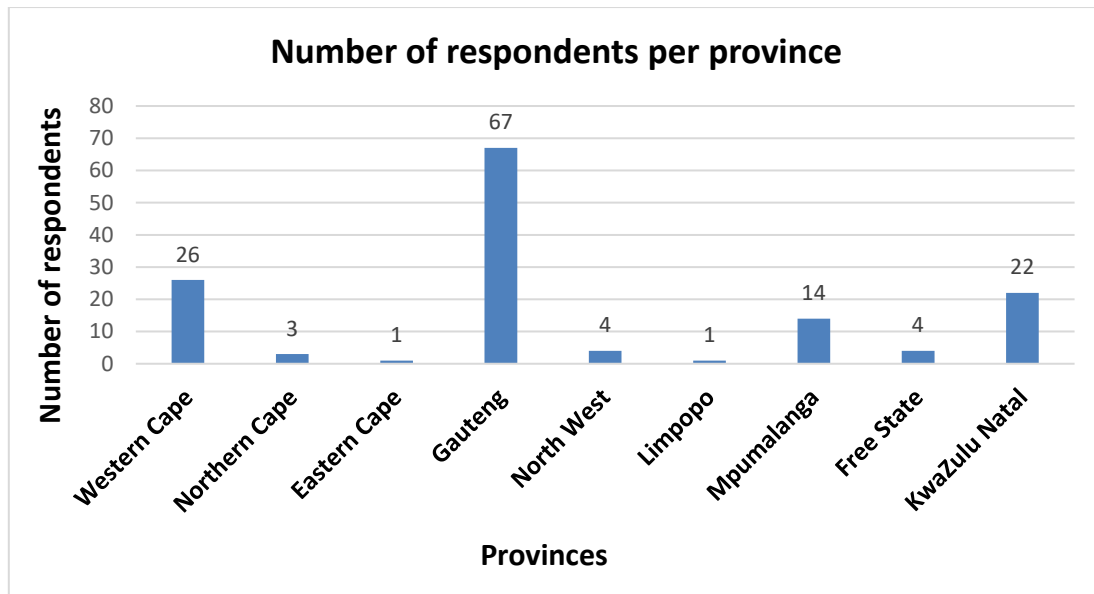


Figure 4-2: Number of respondents per province.

Gauteng has the highest number of respondents ($n = 67$), as most of the schools that form part of the private school group are in Gauteng. Gauteng comprises a total percentage of 47,18% compared to the Eastern Cape and Limpopo, which both have one respondent each. The Western Cape ($n = 26$) comprises 18,31%, and KwaZulu-Natal ($n = 22$) covers 15,48%. Two provinces have four respondents each; these are North-West and the Free State, followed by the Northern Cape with three respondents.⁶

4.1.7 Grades taught by the respondents

All the respondents ($n = 142$) answered the question relating to the grade they teach. Figure 4-3 indicates the grades the respondents teach.

⁶ As there were so few respondents in some of the provinces, the biographical data were not included in the model's design.

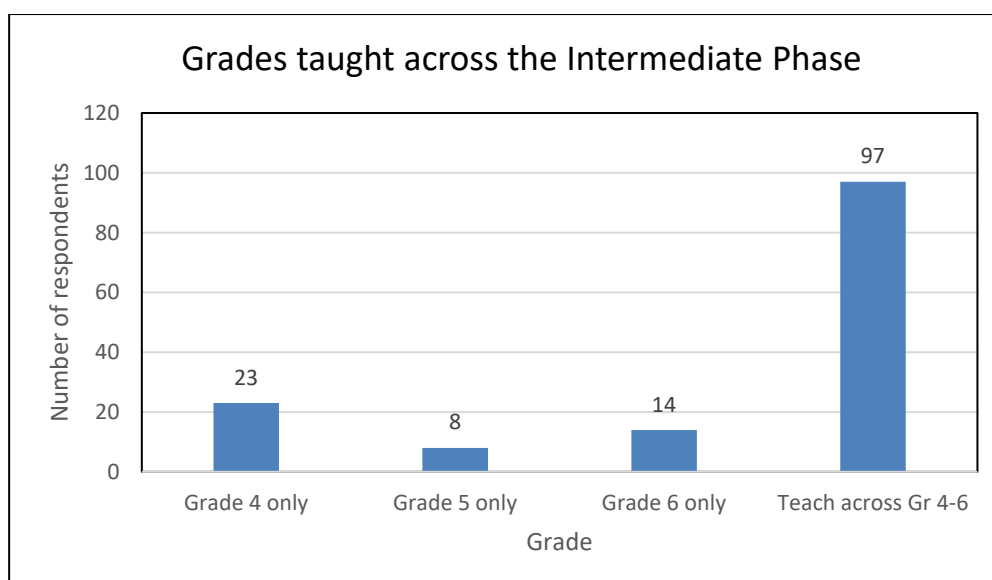


Figure 4-3: Grades the respondents teach.

On the questionnaire, there were four options for the respondents to choose from, that is, *Grade 4 only*, *Grade 5 only*, *Grade 6 only* or *I teach across all grades (Grades 4-6)*. From the data, it is noted that 23 respondents teach *Grade 4 only*, eight respondents teach *Grade 5 only* and 14 respondents teach *Grade 6 only*. Most of the respondents ($n = 97$) teach *across the phase*, meaning, they teach Grade 4, 5 and 6 learners. There are various reasons why teachers teach across the phase. Some of the reasons may be that the school is small in size and one teacher teaches, for example, all the language classes, someone else teaches all the mathematics classes and someone else teaches all the social science or natural science classes. Alternatively, some schools support subject teaching, that is, a proficient teacher is employed to teach specialised subjects across the phase, such as robotics, information technology, music, art and maybe even mathematics and languages.

4.1.8 Subjects taught by the respondents

The respondents were requested to indicate the subjects they taught. The subjects included in the tick list were as follows: *English Home Language*, *English First Additional Language*, *Afrikaans Huistaal*, *Afrikaans Eerste Addisionele Taal*, *Natural Science and Technology*, *Robotics*, *History*, *Geography*, *IT (Information Technology)*, *Art*, *Life Skills*, *Physical Education*, *Music* and *Mathematics*.

The number of respondents teaching one, two, or three to five, or six or more subjects is indicated in Table 4-4.

Table 4-4: Subjects taught by respondents.

Number of subjects taught	Number of respondents	Teaching across the phase	Teaching Grade 4, 5 or 6 only
Teaching one subject	55	36	19
Teaching two subjects	35	24	11
Teaching three to five subjects	35	27	8
Teaching six or more subjects	11	7	4
Total respondents	136	94	42
Percentage	100%	69,12%	30,88%

Of the 142 respondents, six teachers did not indicate their subject choice; thus only 136 teachers completed this section. From the data, it seemed that most teachers ($n = 55$) taught one subject. In terms of the grade they taught, 36 of the 55 teachers taught one subject across the Intermediate Phase; thus, 19 teachers taught only *Grade 4*, *Grade 5* or *Grade 6*. The number of respondents who taught two subjects is 35, of which 24 taught across the phase; so, 11 teachers taught only *Grade 4*, *Grade 5* or *Grade 6*. The number of respondents who taught between three to five subjects is 35, of which 27 taught across the phase; so, only eight teachers taught *Grade 4*, *Grade 5* or *Grade 6*. There were 11 teachers who taught six or more subjects, of which seven taught across the phase; thus, four teachers taught only *Grade 4*, *Grade 5* or *Grade 6*. Of the 136 respondents, 69,12% of the teachers taught across the phase, whereas 30,88% taught a specific grade only.

4.2 Reliability, validity and descriptive statistics

The following section presents the reliability and validity of the instruments applied for the study to measure the respondents' self-directed learning, worldview and metacognitive awareness. The MAIT instrument developed by Balcikanli (2011) had been used in previous South African contexts (e.g. Jacobs, 2020). For self-directed learning, Khia's (2015) learning diagnostic tool was applied to measure the teachers' self-directed learning readiness. Khia's (2015) learning diagnostic tool had also been referred to in other South African studies, such as Du Toit-Brits (2018), as a reliable source. The worldview test developed by De Witt *et al.* (2016) was retrieved from the internet (<https://wvtest.com/>). This instrument was used to determine the worldview group of the respondents. When the website is accessed, it is evident that people from South Africa have completed the questionnaire to determine their worldview group. Table 4-5 provides a summary of the instruments, indicating the Likert-type scale, the Cronbach alpha values (α), the mean scores ($\bar{x}$) and standard deviations (s). These were calculated to determine (i) the level of self-directed learning the Intermediate Phase teachers could exhibit, (ii) the worldview the Intermediate Phase teachers could exhibit and (iii) the level of metacognitive awareness the Intermediate Phase teachers could exhibit.

Table 4-5: Instrument reliability and descriptive statistics.

Subscales	Cronbach alpha (α)	Minimum	Maximum	Mean ($\bar{x}$)	Std. deviation (s)
SDL: five-point Likert-type scale					
SDL	0,70*				
Assignment management	0,65	3,00	5,00	4,28	0,58
Online learning proficiency	0,71	1,00	4,00	1,93	0,75
Stress management	0,51	1,00	5,00	2,87	0,94
Technical proficiency	0,83	1,00	5,00	1,65	0,77
Procrastination management	0,60	1,00	4,00	1,95	0,66
Online discussion proficiency	0,74	1,00	4,00	1,83	0,69
Seminar learning proficiency	0,73	1,00	5,00	3,78	0,68
Comprehension competence	0,69	1,00	4,00	2,06	0,73
Examination management	0,73	2,00	5,00	4,18	0,65
Time management	0,82	1,00	5,00	3,76	0,76
MAIT: five-point Likert-type scale					
MAIT	0,73*				
Declarative knowledge	0,73	8,00	20,00	16,99	1,95
Procedural knowledge	0,69	9,00	20,00	15,89	2,21
Conditional knowledge	0,67	10,00	20,00	16,49	1,89
Planning	0,81	9,00	20,00	15,61	2,40
Monitoring	0,75	10,00	20,00	15,72	2,19
Evaluate	0,79	9,00	20,00	15,18	2,55
Worldview test: Most = 1; Least = -1; Neutral = 0					
Traditional worldview	0,73	-8,00	14,00	3,06	4,58
Modern worldview	0,70	-14,00	8,00	-4,64	4,20
Postmodern worldview	0,51⁷	-9,56	11,69	-0,08	3,46
Integrative worldview	0,51	-5,00	14,00	3,32	3,37

* Indicates the total score for the entire instrument

The constructs of self-directed learning, worldview and metacognitive awareness were measured independently by administering the standardised questionnaires as discussed in Chapter 3, § 3.7.2. The respondents responded to the statements on the three questionnaires.

⁷ Note: A3p (anthropology 3) contributed a correlation value of -0,08, -0,099 and 0,512 with the other worldviews. As A3p had a negative correlation, that item was removed from the scale.

The learning diagnostic tool (Khiat, 2015) and the MAIT (Balcikanli, 2011) were administered in the form of a five-point Likert-type scale. The scale was as follows: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; 5 = *strongly agree*. In addition, the worldview test responses were recorded according to a three-point Likert-type scale, namely: *agree most* = 1; *agree least* = -1; and in cases where no response was given, the value was regarded as *neutral* = 0, according to the guidelines provided by De Witt *et al.* (2016).

From the data, it would seem the largest worldview group comprises traditionalists (n = 64), followed by the integrative worldview (n = 47), then the postmodern worldview (n = 19) and, lastly, the modern worldview (n = 7).

4.3 Comparison to biographical data

4.3.1 Effect sizes and statistical significance

Inferential statistics were applied to enable the researcher to make assumptions and predictions from the data about the population. In this study, as random sampling was not applied, the results cannot be generalised. *P*-values were reported for the sake of completeness, as the emphasis was on the interpretation of the effect sizes. For the purpose of this study, only large and medium effects were reported, in addition to the means for groups in homogeneous subsets using harmonic means sample size to see whether group sizes were unequal. Where the difference between group means is large enough to have a practical or visible effect in the sample population, effect sizes indicate practical significance. To determine the differences between group means, Cohen's effect sizes were calculated (see Cohen, 1988). Despite the fact that the meaning of effect sizes varies depending on context (Ellis *et al.*, 2003), the standard interpretation offered by Cohen (1988) and Pallant (2013) was used in this study: 0,2 represents a small effect, 0,5 represents a medium effect, and 0,8 represents a large effect.

4.3.2 Effect sizes for the language of instruction and self-directed learning

Table 4-6 reports the group statistics with *p*-values and effect size (Cohen's *d*) for the language of instruction concerning self-directed learning.

Table 4-6: T-test statistics for differences in the language of instruction and self-directed learning.

Variable: self-directed learning	Language of instruction	N	Mean	Std. deviation	p-value	Cohen's d-value
AM	English	111	4,35	0,56	0,025	0,52
	Afrikaans	30	4,05	0,63		
OLP	English	111	1,92	0,75	0,600	0,11
	Afrikaans	30	2,00	0,76		
SM	English	111	2,85	0,98	0,491	0,13
	Afrikaans	30	2,97	0,80		
TP	English	111	1,68	0,80	0,372	0,16
	Afrikaans	30	1,56	0,61		
PM	English	111	1,94	0,65	0,740	0,07
	Afrikaans	30	1,99	0,70		
ODP	English	110	1,78	0,69	0,119	0,34
	Afrikaans	30	2,02	0,72		
SLP	English	111	3,79	0,70	0,942	0,01
	Afrikaans	30	3,78	0,57		
CC	English	111	2,06	0,77	0,978	0,01
	Afrikaans	30	2,06	0,58		
EM	English	111	4,19	0,64	0,627	0,11
	Afrikaans	29	4,12	0,68		
TM	English	111	3,76	0,76	0,997	0,00
	Afrikaans	30	3,76	0,76		

"AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management"

An independent T-test was conducted to explore to what extent the language of instruction related to the Intermediate Phase teachers' self-directed learning. The responses indicated two groups (Group 1 = English; Group 2 = Afrikaans). *Assignment management* was the only variable with a p -value smaller than 0,05 ($p = 0,025$), indicating a statistically significant difference. There was no other significant difference between the two language groups. Cohen's d -value indicated a medium effect ($d = 0,52$; $p = 0,025$), suggesting a practical significance for *assignment management*, where Group 1 was more in agreement than Group 2 in terms of the relevance of information gathered for assignments and representing this information clearly. Furthermore, all other measurements indicated small to medium effects or differences between the two groups, suggesting that these groups were considered to be equal in terms of SDL, regardless of the language of instruction.

4.3.3 Effect sizes for the language of instruction and metacognitive awareness

Table 4-7 reports on group statistics with p -values and effect size (Cohen's d) for the language of instruction concerning metacognitive awareness.

Table 4-7: T-test statistics for differences in the language of instruction and metacognitive awareness.

Metacognitive awareness	Language of instruction	N	Mean	Std. deviation	p-value	Cohen's d-value
D	English	112	17,12	1,99	0,102	0,32
	Afrikaans	30	16,50	1,76		
P	English	112	16,09	2,06	0,085	0,43
	Afrikaans	29	15,15	2,65		
C	English	112	16,65	1,90	0,044	0,41
	Afrikaans	29	15,89	1,75		
PI	English	112	15,62	2,40	0,922	0,02
	Afrikaans	30	15,57	2,46		
M	English	112	15,89	2,16	0,086	0,38
	Afrikaans	29	15,07	2,27		
Ev	English	112	15,19	2,63	0,948	0,01
	Afrikaans	30	17,12	1,99		

"D = Procedural knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate"

An independent T-test was conducted to explore to what extent the language of instruction related to the Intermediate Phase teachers' metacognitive awareness. The responses indicated two groups (Group 1 = English; Group 2 = Afrikaans). There was no significant difference between the groups, although there was a statistically significant difference at the $p < 0,05$ level for *conditional knowledge* ($p = 0,044$). All measurements indicated small to medium effects or differences between the two groups, suggesting that these groups were considered to be equal in terms of metacognitive awareness, regardless of the language of instruction.

4.3.4 Effect sizes for the language of instruction and worldviews

Table 4-8 reports on group statistics with p -values and effect size (Cohen's d) for the language of instruction concerning worldviews.

Table 4-8: T-test statistics for differences in the language of instruction and worldviews.

Worldview	Language of instruction	N	Mean	Std. deviation	p-value	Cohen's d-value
Traditional	English	112	2,78	4,78	0,098	0,30
	Afrikaans	30	4,13	3,66		
Modern	English	112	-4,73	4,27	0,633	0,10
	Afrikaans	30	-4,33	3,97		
Postmodern2	English	112	0,09	3,54	0,237	0,23
	Afrikaans	30	-0,71	3,14		
Integrative	English	112	3,46	3,44	0,320	0,20
	Afrikaans	30	2,80	3,16		0,30

An independent T-test was conducted to explore to what extent the language of instruction related to the Intermediate Phase teachers' worldviews. The responses indicated two groups (Group 1 = English; Group 2 = Afrikaans). There was statistically no significant difference at

the $p < 0,05$ level in the worldview test scores for the groups. Cohen's d -value indicates a small effect for each worldview and corresponding language. This suggests that although the respondents were categorically different in terms of their worldview, these groups were considered to be consistent in terms of how their worldviews relate or apply to their teaching and learning experiences.

4.3.5 Analysis of variance

To determine whether the assumption of equal variance was rejected or not, the test for homogeneity of variance was conducted through Levene's test. If *Sig. (p)* is smaller than 0,05, the null hypothesis is rejected, but if *Sig. (p)* is greater than 0,05, the null hypothesis is not rejected. Overall, the null hypothesis of equal population variances was not rejected for the variables of *self-directed learning* and *metacognitive awareness* because the significance of Levene's test was greater than 0,05. To obtain information about the variables, ANOVA was calculated to determine any statistical differences between the means of the independent groups. Table 4-9 displays group statistics for teachers teaching at a specific grade level and demonstrates how the grade level influences (Cohen's d) the teachers' own process of developing self-directed learning.

Table 4-9: Group statistics of ANOVA and effect sizes for differences between grade level and self-directed learning.

SDL variable	Grade	N	Mean	Std. deviation	p-value	Cohen's d -value		
						Grade 4	Grade 5	Grade 6
AM	4	23	4,35	0,41	0,060			
	5	8	4,56	0,50		0,43		
	6	14	4,57	0,39		0,54**		
	4, 5 and 6	96	4,20	0,63		0,23	0,57**	0,58**
	Total	141	4,28	0,58				
OLP	4	23	1,96	0,74	0,095	4	5	6
	5	8	1,44	0,50		0,70*		
	6	14	1,67	0,68		0,39	0,34	
	4, 5 and 6	96	2,01	0,76		0,07	0,75*	0,45
	Total	141	1,93	0,75				
SM	4	23	3,09	1,03	0,192			
	5	8	2,50	0,80		0,57**		
	6	14	2,50	1,07		0,55**	0,00	
	4, 5 and 6	96	2,91	0,90		0,18	0,45	0,38
	Total	141	2,87	0,94				
TP	4	23	1,78	0,75	0,511			
	5	8	1,38	0,38		0,54**		
	6	14	1,50	0,79		0,36	0,16	
	4, 5 and 6	96	1,66	0,78		0,15	0,37	0,21
	Total	141	1,65	0,76				
PM	4	23	1,94	0,71	0,542			
	5	8	1,71	0,45		0,33		
	6	14	1,81	0,61		0,19	0,17	

SDL variable	Grade	N	Mean	Std. deviation	p-value	Cohen's d-value		
						Grade 4	Grade 5	Grade 6
ODP	4, 5 and 6	96	1,99	0,67	0,746	0,07	0,43	0,28
	Total	141	1,95	0,66				
	4	23	1,80	0,67				
	5	8	1,63	0,58		0,27		
	6	14	1,96	0,69		0,23	0,49	
	4, 5 and 6	95	1,84	0,72		0,05	0,29	0,18
SLP	Total	140	1,83	0,70	0,770			
	4	23	3,87	0,73				
	5	8	3,96	0,65		0,12		
	6	14	3,79	0,72		0,11	0,24	
	4, 5 and 6	96	3,75	0,66		0,16	0,31	0,05
CC	Total	141	3,78	0,68	0,446			
	4	23	2,17	0,78				
	5	8	2,00	0,80		0,22		
	6	14	1,79	0,70		0,50**	0,27	
	4, 5 and 6	96	2,08	0,72		0,12	0,10	0,42
EM	Total	141	2,06	0,73	0,596			
	4	22	4,25	0,65				
	5	8	4,44	0,50		0,29		
	6	14	4,14	0,72		0,15	0,41	
	4, 5 and 6	96	4,14	0,65		0,17	0,46	0,00
TM	Total	140	4,18	0,65	0,048			
	4	23	3,66	0,90				
	5	8	4,38	0,53		0,79*		
	6	14	4,00	0,59		0,38	0,64**	
	4, 5 and 6	96	3,70	0,73		0,04	0,93*	0,42
	Total	141	3,76	0,75				

*Large effect size reported on; **Medium effect size reported on

"AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC= Comprehension competence, EM = Examination management, TM = Time management"

A one-way analysis of variance was performed, as shown in Table 4-9, to determine how much the grade level groups differed in terms of self-directed learning. The responses indicated four groups: Grade 4, Grade 5, Grade 6 and teaching across the phase (i.e. Grades 4, 5 and 6). In Table 4-9, only *time management* proved statistically significant effects (where $p = 0,048$ and thus $p < 0,05$). For *time management*, the largest effect ($d = 0,93$) was found when comparing Grade 5 with Grades 4, 5, and 6 teachers' capacity for *time management*, as Grade 5 teachers had the highest mean for *time management*. A large effect ($d = 0,79$) was found between Grade 4 and Grade 5 teachers. The other variables measured show p -values of less than 0,05, indicating they are not statistically significant. However, a medium effect ($d = 0,64$) was found when comparing Grade 5 teachers with Grade 6 teachers. Overall, the results indicate that Grade 5 teachers reported a higher mean for *time management*.

For *online learning proficiency*, a medium effect ($d = 0,75$; $p = 0,095$) was found when comparing Grade 5 with Grade 4, 5 and 6 teachers' capacity for online learning. In addition, a medium effect ($d = 0,70$; $p = 0,095$) was found when comparing Grade 4 with Grade 5

teachers' capacity for online learning. Although the results indicate $p > 0,05$, the results are not statistically significant. In terms of *assignment management*, a medium effect ($d = 0,58$; $p = 0,060$) was found when comparing Grade 6 teachers with Grade 4, 5 and 6 teachers. Also, a medium effect ($d = 0,57$; $p = 0,060$) was found when comparing Grade 5 with Grade 4, 5 and 6 teachers, and lastly, a medium effect ($d = 0,54$; $p = 0,060$) was found when comparing Grade 4 with Grade 6 teachers. Overall, the groups indicate awareness of *assignment management*, although $p > 0,05$, indicating that the results are not statistically significant. For *stress management*, a medium effect ($d = 0,57$; $p = 0,192$) was found when comparing Grade 4 with Grade 5 teachers' capacity to handle stress in an academic environment. In addition, a medium effect ($d = 0,55$; $p = 0,192$) was found when comparing Grade 4 with Grade 6 teachers' capacity for stress management. The results are statistically non-significant, as $p > 0,05$. In terms of technical proficiency, a medium effect ($d = 0,54$; $p = 0,511$) was found when comparing Grade 4 with Grade 5.

The next section presents group statistic differences concerning the specific grade(s) the respondents teach and their metacognitive awareness.

Table 4-10: Group statistics of ANOVA and effect sizes for differences between grade level and metacognitive awareness.

Variable	Grade	N	Mean	Std. deviation	p-value	Effect sizes		
						Grade 4	Grade 5	Grade 6
D	4	23	17,61	1,78	0,069			
	5	8	18,00	1,69		0,22		
	6	14	17,36	1,39		0,14	0,38	
	4, 5 and 6	97	16,70	2,03		0,45	0,64**	0,32
	Total	142	16,99	1,95				
P	4	23	16,43	2,45	0,187			
	5	8	16,88	2,03		0,18		
	6	14	16,29	2,37		0,06	0,25	
	4, 5 and 6	96	15,63	2,13		0,33	0,59**	0,28
	Total	141	15,89	2,21				
C	4	23	16,87	1,94	0,024			
	5	8	18,00	2,39		0,47**		
	6	14	17,00	1,71		0,07	0,42	
	4, 5 and 6	96	16,20	1,80		0,34	0,75*	0,44
	Total	141	16,49	1,89				
PI	4	23	15,91	2,92	0,015			
	5	8	18,00	2,27		0,71*		
	6	14	15,93	2,20		0,01	0,91*	
	4, 5 and 6	97	15,29	2,21		0,21	1,20*	0,29
	Total	142	15,61	2,40				
Mo	4	23	16,65	2,46	0,017			
	5	8	17,13	2,03		0,19		

Variable	Grade	N	Mean	Std. deviation	p-value	Effect sizes		
						Grade 4	Grade 5	Grade 6
Ev	6	14	15,86	2,11	0,020	0,32	0,60**	
	4, 5 and 6	96	15,36	2,07		0,52**	0,85*	0,24
	Total	141	15,72	2,20				
	4	23	16,04	3,02				
	5	8	17,13	2,03		0,36		
	6	14	15,36	2,24		0,23	0,79**	
	4, 5 and 6	97	14,79	2,41		0,41	0,97**	0,23
	Total	142	15,18	2,55				

*Large effect size reported on; **Medium effect size reported on

"D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate"

Furthermore, a one-way analysis of variance was conducted to explore to what extent the grade level groups differed in terms of *metacognitive awareness*. Table 4-10 shows differences between the group means with statistically significant effect sizes with p -values between 0,015 and 0,187, with $p < 0,05$ for conditional knowledge, planning, monitoring and evaluating. A statistically practical, visible large effect ($d = 0,97$; $p = 0,020$) was found for *evaluation* when comparing Grade 5 with Grades 4, 5 and 6 teachers. Grade 5 teachers had the highest mean for *evaluation*. A large effect ($d = 0,79$; $p = 0,020$) was found between Grade 5 and Grade 6 teachers. For *monitoring*, a large effect ($d = 0,85$; $p = 0,017$) was found when comparing Grade 5 with Grades 4, 5 and 6 teachers' capacity for *monitoring*, whereas for Grade 5 compared to Grade 6, a medium effect ($d = 0,60$; $p = 0,017$) was found for *monitoring*. For *planning*, a large effect ($d = 1,20$; $p = 0,015$) was found when comparing Grade 5 with Grades 4, 5 and 6 teachers' capacity for *planning*, as Grade 5 teachers had the highest mean for *planning*. A large effect ($d = 0,91$; $p = 0,015$) with practical and visible significance was found between Grade 5 and Grade 6 teachers. In terms of *conditional knowledge*, a large effect ($d = 0,75$; $p = 0,024$) was found when comparing Grade 5 with Grades 4, 5 and 6 teachers, since Grade 5 teachers had the highest mean for *conditional knowledge*.

In terms of *procedural knowledge*, a medium effect ($d = 0,59$; $p = 0,187$) was found when comparing Grade 5 with Grade 4, 5 and 6 teachers' capacity to apply appropriate strategies when teaching their learners. In terms of *declarative knowledge*, a medium effect ($d = 0,64$; $p = 0,069$) was found when comparing Grade 5 with Grade 4, 5 and 6 teachers' capacity for declarative knowledge.

The following table reports on the group statistic differences concerning the grades the respondents teach and their worldview. In Table 4-11, the construct of worldview measured no large effects, with no statistical significance.

Table 4-11: Group statistics and effect sizes for differences between grade level and worldview.

Variable	Grade	N	Mean	Std. deviation	p-value	Effect sizes		
						Grade 4	Grade 5	Grade 6
T	4	23	4,04	3,93	0,467			
	5	8	4,25	4,74		0,04		
	6	14	1,93	5,92		0,36	0,39	
	4, 5 and 6	97	2,90	4,52		0,25	0,29	0,16
	Total	142	3,06	4,59				
Mo	4	23	-5,57	4,34	0,404			
	5	8	-6,13	4,32		0,13		
	6	14	-4,93	4,03		0,15	0,28	
	4, 5 and 6	97	-4,27	4,18		0,30	0,43	0,16
	Total	142	-4,65	4,20				
PMo2	4	23	-0,83	3,06	0,560			
	5	8	-0,13	3,23		0,22		
	6	14	0,83	3,01		0,55**	0,30	
	4, 5 and 6	97	-0,03	3,64		0,22	0,03	0,24
	Total	142	-0,08	3,46				
I	4	23	3,17	3,01	0,885			
	5	8	4,25	3,24		0,33		
	6	14	3,29	4,08		0,03	0,24	
	4, 5 and 6	97	3,29	3,40		0,03	0,28	0,00
	Total	142	3,32	3,38				

*Large effect size reported on; **Medium effect size reported on

"T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative"

A one-way analysis of variance was conducted to explore to what extent the grade level groups differed in terms of a worldview. No statistically significant differences were measured between the group means, suggesting that although the respondents were categorically different in terms of their worldview, these groups were considered to be consistent in terms of how they applied their worldview to their teaching and learning experiences. However, in terms of a postmodern worldview, when comparing Grade 4 with Grade 6, a medium effect ($d = 0,55$; $p = 0,560$) was found.

The next section presents the relationship and the extent of associations between the constructs of self-directed learning, worldview and metacognitive awareness. Table 4-12 reports on the associations between self-directed learning and worldview.

Table 4-12: Associations between self-directed learning and worldview.

SDL variable	Worldview	N	Mean	Std. deviation	p-value	Effect sizes		
						1	2	3
AM	1. Traditional	64	4,30	0,58	0,402			
	2. Modern	7	4,21	0,39		0,16		
	3. Postmodern	19	4,11	0,64		0,31	0,17	
	4. Integrative	46	4,37	0,57		0,11	0,27	0,42
	Total	136	4,29	0,58				
OLP	1. Traditional	64	1,90	0,72	0,969			
	2. Modern	7	2,05	0,76		0,19		
	3. Postmodern	19	1,95	0,75		0,06	0,13	
	4. Integrative	46	1,92	0,82		0,02	0,16	0,03
	Total	136	1,92	0,75				
SM	1. Traditional	64	2,83	0,91	0,388			
	2. Modern	7	3,43	0,67		0,66**		
	3. Postmodern	19	2,97	0,94		0,16	0,49	
	4. Integrative	46	2,79	1,05		0,03	0,60**	0,17
	Total	136	2,87	0,95				
TP	1. Traditional	64	1,62	0,72	0,814			
	2. Modern	7	1,90	1,32		0,21		
	3. Postmodern	19	1,63	0,64		0,01	0,21	
	4. Integrative	46	1,61	0,77		0,02	0,23	0,03
	Total	136	1,63	0,76				
PM	1. Traditional	64	1,88	0,67	0,308			
	2. Modern	7	1,95	0,62		0,11		
	3. Postmodern	19	2,21	0,74		0,45	0,35	
	4. Integrative	46	1,93	0,63		0,08	0,03	0,38
	Total	136	1,95	0,67				
ODP	1. Traditional	63	1,81	0,72	0,990			
	2. Modern	7	1,86	0,48		0,07		
	3. Postmodern	19	1,87	0,62		0,08	0,02	
	4. Integrative	46	1,83	0,75		0,02	0,04	0,06
	Total	135	1,83	0,70				
SLP	1. Traditional	64	3,82	0,67	0,867			
	2. Modern	7	3,90	0,53		0,13		
	3. Postmodern	19	3,72	0,55		0,15	0,34	
	4. Integrative	46	3,74	0,78		0,10	0,21	0,03
	Total	136	3,78	0,69				
CC	1. Traditional	64	2,09	0,67	0,435			
	2. Modern	7	2,07	1,13		0,02		
	3. Postmodern	19	2,21	0,79		0,15	0,12	
	4. Integrative	46	1,91	0,73		0,25	0,14	0,38
	Total	136	2,05	0,73				
EM	1. Traditional	63	4,13	0,66	0,198			
	2. Modern	7	3,86	0,90		0,31		
	3. Postmodern	19	4,18	0,69		0,07	0,36	
	4. Integrative	46	4,34	0,56		0,31	0,53**	0,22
	Total	135	4,20	0,65				
TM	1. Traditional	64	3,80	0,64	0,158			
	2. Modern	7	3,79	0,68		0,03		
	3. Postmodern	19	3,41	1,01		0,39	0,37	
	4. Integrative	46	3,86	0,76		0,07	0,10	0,45
	Total	136	3,77	0,75				

*Large effect size reported on; **Medium effect size reported on

“AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management”

In Table 4-12, the construct of worldview measured no large effects, with no statistical significance at the $p < 0,05$ levels, as effect sizes measured d -values between 0,01 and 0,66. However, in terms of *stress management*, Cohen's d -value indicated a medium effect ($d = 0,66$; $p = 0,388$) when comparing traditionalists with modernists, suggesting that modernists can manage stress better in an academic environment than traditionalists. A medium effect was also found between modernists and integratives ($d = 0,60$; $p = 0,388$). In addition, in terms of *stress management*, a medium effect ($d = 0,53$; $p = 0,198$) was indicated when comparing modernists with integratives, suggesting that integratives feel more confident regarding lesson preparation for formal and informal class visits and moderation.

Table 4-13 illustrates the associations between the respondents' worldview and their metacognitive awareness.

Table 4-13: Associations between the respondents' worldview and their metacognitive awareness.

	Worldview	N	Mean	Std. deviation	p-value	Effect sizes		
						1	2	3
D	1. Traditional	64	17,13	1,63	0,580			
	2. Modern	7	17,14	2,61		0,01		
	3. Postmodern	19	16,42	1,57		0,43	0,28	
	4. Integrative	47	16,96	2,34		0,07	0,07	0,23
	Total	137	16,97	1,94				
P	1. Traditional	64	15,56	1,93	0,101			
	2. Modern	7	16,43	2,64		0,33		
	3. Postmodern	19	15,37	2,81		0,07	0,38	
	4. Integrative	46	16,48	2,14		0,43	0,02	0,39
	Total	136	15,89	2,20				
C	1. Traditional	64	16,55	1,90	0,791			
	2. Modern	7	16,43	1,81		0,06		
	3. Postmodern	19	16,09	1,98		0,23	0,17	
	4. Integrative	46	16,59	1,86		0,02	0,09	0,25
	Total	136	16,49	1,88				
PI	1. Traditional	64	15,69	2,17	0,195			
	2. Modern	7	13,71	3,59		0,55**		
	3. Postmodern	19	15,84	3,13		0,05	0,59**	
	4. Integrative	47	15,70	2,08		0,01	0,55**	0,04
	Total	137	15,61	2,39				
M	1. Traditional	64	15,76	2,19	0,910			
	2. Modern	7	15,14	2,34		0,26		
	3. Postmodern	19	15,74	1,82		0,01	0,25	
	4. Integrative	46	15,63	2,33		0,06	0,21	0,05
	Total	136	15,68	2,18				
Ev	1. Traditional	64	15,52	2,41	0,186			
	2. Modern	7	14,29	2,81		0,44		
	3. Postmodern	19	14,21	2,72		0,48	0,03	
	4. Integrative	47	15,21	2,50		0,12	0,33	0,37
	Total	137	15,17	2,52				

*Large effect size reported on; **Medium effect size reported on

“D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate”

In Table 4-13, the construct of worldview measured no large effects, with no statistical significance at the $p < 0,05$ levels, as effect sizes measured d -values between 0,01 and 0,59. For *planning*, a medium effect size ($d = 0,59$; $p = 0,195$) was found when comparing modernists' capacity for *planning* with that of postmodernists, as postmodernists had the highest mean for planning. In addition, a medium effect ($d = 0,55$; $p = 0,195$) was found between modernists and integratives and between traditionalists and modernists ($d = 0,55$; $p = 0,195$) in terms of capacity for planning.

4.4 Correlations using Spearman's rho

Spearman's rho is a non-parametric test used to determine the nature of the relationship between variables. In preparation for the proposed model, Spearman's rho was calculated to determine possible correlations between the subscales in order to answer the secondary research questions (see Table 4-1). Spearman's rho values for interpretation, as adapted from Pallant (2013), were applied as follows: a weak relationship is indicated as an r -value of 0,1, a moderate relationship is indicated as $r = 0,3$ and a strong relationship is indicated when $r = 0,5$. It appears from the data that there were some significant correlations between the variables, although weak correlations were also apparent. Due to the pragmatist philosophy that the researcher holds, these results are interpreted and discussed in Chapter 6 when the data are triangulated.

The correlations are represented in Table 4-14 below.

Table 4-14: Correlations between metacognitive awareness, self-directed learning and worldview groups.

			Metacognitive awareness						Self-directed learning										Worldviews			
Variables	Age	Exp	D	P	C	PI	M	Ev	AM	OLP	SM	TP	PM	ODP	SLP	CC	EM	TM	T	Mo	PMo2	I
D	0,044	0,114	1,000																			
P	0,007	0,110	0,545**	1,000																		
C	0,102	0,225**	0,597**	0,666**	1,000																	
PI	0,215*	0,305**	0,386**	0,443**	0,517**	1,000																
M	0,122	0,126	0,349**	0,524**	0,534**	0,537**	1,000															
Ev	0,103	0,146	0,410**	0,465**	0,478**	0,581**	0,706**	1,000														
AM	-0,079	0,082	0,292**	0,348**	0,302**	0,185*	0,197*	0,185*	1,000													
OLP	0,066	-0,181*	-0,422**	-0,352**	-0,361**	-0,307**	-0,277**	-0,216*	-,328**	1,000												
SM	-0,227**	-0,198*	-0,200*	-0,046	-0,148	-0,192*	-0,162	-0,093	-0,065	0,206*	1,000											
TP	0,298**	0,060	-0,290**	-0,220**	-0,229**	-0,137	-0,176*	-0,173*	-0,245**	0,464**	0,200*	1,000										
PM	0,033	-0,138	-0,331**	-0,193*	-0,261**	-0,250**	-0,170*	-0,230**	-0,270**	0,479**	0,348**	0,586**	1,000									
ODP	0,105	-0,052	-0,395**	-0,284**	-0,307**	-0,139	-0,271**	-0,251**	-0,251**	0,474**	0,221**	0,445**	0,450**	1,000								
SLP	0,027	0,067	0,326**	0,332**	0,294**	0,191*	0,306**	0,265**	0,343**	-0,436**	-0,169*	-0,369**	-0,432**	-0,362**	1,000							
CC	0,112	-0,049	-0,180*	-0,123	-0,094	-0,117	-0,092	-0,125	-0,240**	0,448**	0,295**	0,386**	0,442**	0,381**	-0,340**	1,000						
EM	-0,033	0,045	0,332**	0,297**	0,306**	0,150	0,096	0,134	0,321**	-0,437**	-0,126	-0,243**	-0,341**	-0,454**	0,176*	-0,355**	1,000					
TM	0,050	0,218**	0,436**	0,371**	0,373**	0,510**	0,254**	0,371**	0,325**	-0,394**	-0,178*	-0,304**	-0,479**	-0,294**	0,355**	-0,311**	0,375**	1,000				
T	0,061	0,078	0,033	-0,081	0,065	0,118	0,140	0,230**	0,022	-0,058	-0,099	-0,022	-0,170*	-0,110	0,044	0,017	-0,113	0,092	1,000			
Mo	-0,036	-0,025	-0,091	-0,022	-0,074	-0,132	-0,094	-0,102	-0,195*	0,174*	0,168*	0,049	-0,031	0,052	-0,030	0,053	-0,013	-0,023	-0,241**	1,000		
PMo2	0,113	0,023	-0,133	-0,125	-0,107	0,022	0,025	-0,121	-0,017	0,156	-0,055	0,119	0,156	0,079	-0,109	0,048	-0,011	-0,145	-0,384**	0,022	1,000	
I	-0,016	0,025	0,101	0,115	0,118	0,045	0,136	0,150	0,076	-0,036	-0,022	-0,094	-0,049	-0,067	0,098	-0,024	0,094	0,040	-0,195*	-0,207*	0,090	1,000

** Correlation is significant at the 0,01 level (2-tailed); * Correlation is significant at the 0,05 level (2-tailed)

"D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate

AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management

T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative"

4.4.1 Correlations between age and years of teaching experience

This section reports on the correlations between age and years of teaching experience respectively and metacognitive awareness, self-directed learning and worldview. Table 4-15 indicates small to large relationships between age and experience with the constructs. Age is associated with specific aspects of self-directed learning and metacognitive awareness, but there seems to be small insignificant relationships between age and experience with a worldview.

Table 4-15: Correlations between age and years of teaching experience with the main constructs.

	Variables	Age	Experience
Metacognitive awareness	D	0,044	0,114
	P	0,007	0,110
	C	0,102	0,225**
	PI	0,215*	0,305**
	M	0,122	0,126
	Ev	0,103	0,146
Self-directed learning	AM	-0,079	0,082
	OLP	0,066	-0,181*
	SM	-0,227**	-0,198*
	TP	0,298**	0,060
	PM	0,033	-0,138
	ODP	0,105	-0,052
	SLP	0,027	0,067
	CC	0,112	-0,049
	EM	-0,033	0,045
	TM	0,050	0,218**
Worldview	T	0,061	0,078
	Mo	-0,036	-0,025
	PMo2	0,113	0,023
	I	-0,016	0,025

** Correlation is significant at the 0,01 level (2-tailed); * Correlation is significant at the 0,05 level (2-tailed)

"D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate; AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management, T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative"

There is a significant correlation between the respondents' *conditional knowledge* and years of teaching *experience* ($r = 0,225$; $p < 0,01$). Also, *age* ($r = 0,215$; $p < 0,05$) and *experience* ($r = 0,305$; $p < 0,01$) associate well with the respondents' ability to plan. There is a significant correlation between the respondents' *age* and *technical proficiency* ($r = 0,298$; $p < 0,01$) and the respondents' years of *experience* and their *online learning proficiency* ($r = -0,181$; $p < 0,05$). The respondents' ability to handle stress in an academic environment seems to rely on their *age* ($r = -0,227$; $p < 0,01$) and years of teaching *experience* ($r = -0,198$; $p < 0,05$). In

addition, the respondents' years of *experience* seem to help the respondents with their ability to manage their *time* ($r = 0,218$; $p < 0,01$). Furthermore, there are no relationships between age and experience in terms of a worldview.

4.4.2 Correlations between metacognitive awareness and self-directed learning

The relationship between metacognitive awareness and self-directed learning was investigated using Spearman's rank order correlations. Overall, Table 4-16 presents positive and negative significant correlations between the constructs.

Table 4-16: Spearman's rank order correlations for the variables of metacognitive awareness and self-directed learning.

Variables	Metacognitive awareness					
	Metacognitive knowledge			Metacognitive regulation		
	D	P	C	PI	M	Ev
AM	0,292**	0,348**	0,302**	0,185*	0,197*	0,185*
OLP	-0,422**	-0,352**	-0,361**	-0,307**	-0,277**	-0,216*
SM	-0,200*	-0,046	-0,148	-0,192*	-0,162	-0,093
TP	-0,290**	-0,220**	-0,229**	-0,137	-0,176*	-0,173*
PM	-0,331**	-0,193*	-0,261**	-0,250**	-0,170*	-0,230**
ODP	-0,395**	-0,284**	-0,307**	-0,139	-0,271**	-0,251**
SLP	0,326**	0,332**	0,294**	0,191*	0,306**	0,265**
CC	-0,180*	-0,123	-0,094	-0,117	-0,092	-0,125
EM	0,332**	0,297**	0,306**	0,150	0,096	0,134
TM	0,436**	0,371**	0,373**	0,510**	0,254**	0,371**

** Correlation is significant at the 0,01 level (2-tailed); * Correlation is significant at the 0,05 level (2-tailed)

"D = Procedural knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate

AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management"

4.4.3 Correlations between metacognitive knowledge and self-directed learning

The results indicate correlations between the variables of *metacognitive knowledge* and *self-directed learning*. For instance, there is a positive strong correlation between *declarative knowledge* and *time management* ($r = 0,436$; $p < 0,01$) and a moderate positive correlation with *examination management* ($r = 0,332$; $p < 0,01$), *assignment management* ($r = 0,292$; $p < 0,01$) and *seminar learning proficiency* ($r = 0,326$; $p < 0,01$). This suggests that increased awareness of declarative knowledge can result in an increased capacity for seminar learning proficiency, time, assignment and examination management. There also exists a negative moderate to strong relationship between *declarative knowledge* and *online learning proficiency* ($r = -0,422$; $p < 0,01$), *online discussion proficiency* ($r = -0,395$; $p < 0,01$) and

procrastination management ($r = -0,331$; $p < 0,01$). This negative relationship implicitly implies that an increase in declarative knowledge may result in a decrease in the capacity for online learning and discussion proficiency, as well as procrastination management.

In addition, there exists a moderate positive relationship between *procedural knowledge* and *assignment management* ($r = 0,348$; $p < 0,01$), *seminar learning proficiency* ($r = 0,332$; $p < 0,01$), *time management* ($r = 0,371$; $p < 0,01$) and *examination management* ($r = 0,297$; $p < 0,01$). This implies that an increase in procedural knowledge can assist teachers' capacity for managing assignments, seminar learning proficiency, time management and examination management. Furthermore, there exists a negative moderate relationship between *procedural knowledge* and *online learning proficiency* ($r = -0,352$; $p < 0,01$) and *online discussion proficiency* ($r = -0,284$; $p < 0,01$). This negative relationship implies that an increase in procedural knowledge can result in a decrease in the capacity of teachers' online learning proficiency and online discussion proficiency.

In terms of *conditional knowledge*, there exists a positive moderate correlation with *assignment management* ($r = 0,302$; $p < 0,01$), *examination management* ($r = 0,306$; $p < 0,01$) and *time management* ($r = 0,373$; $p < 0,01$). This positive relationship suggests that an increase in teachers' capacity for conditional knowledge can increase their capacity for assignment, examination and time management. There is a negative moderate relationship between *conditional knowledge* and *online learning proficiency* ($r = -0,361$; $p < 0,01$), *online discussion proficiency* ($r = -0,307$; $p < 0,01$) and *seminar learning proficiency* ($r = -0,294$; $p < 0,01$). This implies an increase in conditional knowledge, which may result in a decrease in teachers' capacity for online learning proficiency, online discussion proficiency and seminar learning proficiency.

4.4.3.1 Correlations with metacognitive regulation and self-directed learning

In terms of *metacognitive regulation*, a positive strong correlation exists between *planning* and *time management* ($r = 0,510$; $p < 0,01$) and between *monitoring* and *seminar learning proficiency* ($r = 0,306$; $p < 0,01$) and *time management* ($r = 0,371$; $p < 0,01$). For the variable of *evaluation*, there exists a positive moderate relationship between *time management* ($r = 0,372$; $p < 0,01$) and *seminar learning proficiency* ($r = 0,265$; $p < 0,01$). The positive relationship suggests an increased awareness of the subordinate levels of metacognitive regulation, which may result in increased capacity for time management and seminar learning proficiency.

A moderate negative relationship exists between *planning* and *online learning proficiency* ($r = -0,307$; $p < 0,01$) and *planning* and *procrastination management* ($r = -0,250$; $p < 0,01$). Furthermore, a negative moderate relationship exists between *monitoring* and *online learning proficiency* ($r = -0,277$; $p < 0,01$) and between *evaluation* and *procrastination management* ($r = -0,230$; $p < 0,01$), as well as *online discussion proficiency* ($r = -0,251$; $p < 0,01$). The negative relationship implicitly implies an awareness of the subordinate levels of metacognitive regulation, which may result in a decreased awareness of online learning proficiency, procrastination management and online discussion proficiency. From the data, it would seem that all aspects related to computer-based activities have weak correlations with metacognitive regulation and self-directed learning.

4.4.4 Worldview and the variables of metacognitive awareness

In this section, the association between the teachers' worldview and metacognitive awareness is discussed.

Table 4-17: Spearman's rank order correlations between a worldview and metacognitive awareness.

Variables	Metacognitive awareness					
	D	P	C	PI	M	Ev
T	0,033	-0,081	0,065	0,118	0,140	0,230**
Mo	-0,091	-0,022	-0,074	-0,132	-0,094	-0,102
PMo2	-0,133	-0,125	-0,107	0,022	0,025	-0,121
I	0,101	0,115	0,118	0,045	0,136	0,150

**Correlation is significant at the 0,01 level (2-tailed). * Correlation is significant at the 0,05 level (2-tailed).

"D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate, T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative"

In terms of *metacognitive awareness* and a worldview, there are positive and negative weak associations, but these are too low to report on. There exists a positive moderate relationship between a *traditional worldview* ($r = 0,230$; $p < 0,01$) and the variable of *evaluation* as part of *metacognitive regulation*.

In the next section, the association between a person's worldview and self-directed learning is discussed.

4.4.5 Self-directed learning and worldview

Overall, Table 4-18 presents correlations that are both positive and negative between the variables of a worldview and self-directed learning. These relationships suggest possible associations between a worldview and self-directed learning.

Table 4-18: Spearman's rank order correlations between self-directed learning and worldview.

Variables	Self-directed learning									
	AM	OLP	SM	TP	PM	ODP	SLP	CC	EM	TM
T	0,022	-0,058	-0,099	-0,022	-0,170*	-0,110	0,044	0,017	-0,113	0,092
Mo	-0,195*	0,174*	0,168*	0,049	-0,031	0,052	-0,030	0,053	-0,013	-0,023
PMo2	-0,017	0,156	-0,055	0,119	0,156	0,079	-0,109	0,048	-0,011	-0,145
I	0,076	-0,036	-0,022	-0,094	-0,049	-0,067	0,098	-0,024	0,094	0,040

** Correlation is significant at the 0,01 level (2-tailed); * Correlation is significant at the 0,05 level (2-tailed)

"AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management

T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative"

In terms of a *traditional worldview*, there exists a negative weak correlation with *procrastination management* ($r = -0,170$; $p < 0,05$). In terms of a *modern worldview*, there exists a positive but weak relationship with *online learning proficiency* ($r = 0,174$; $p < 0,05$) and *stress management* ($r = 0,168$; $p < 0,05$), and a negative weak relationship with *assignment management* ($r = -0,195$; $p < 0,05$). In terms of a *postmodern worldview* and an *integrative worldview*, there are no significant correlations.

4.5 Structural equation modelling

The purpose of the research was to identify what role metacognitive awareness and worldviews played in the process of self-directed learning for Intermediate Phase teachers. To do so, a conceptual-theoretical model was sketched in Chapter 2, indicating possible relationships between the three constructs. The last section of Chapter 4 focuses on four proposed models to describe the relationships between metacognitive awareness, worldviews and self-directed learning to evaluate the extent to which the initial conceptual-theoretical framework supports the data.

Figure 4-1 presents the initial conceptual-theoretical framework of the main constructs. Self-directed learning consisted of 10 subscales as per Khia's (2015, 11) learning diagnostic tool. These were labelled "*assignment management, online learning proficiency, stress management, technical proficiency, procrastination management, online discussion proficiency, seminar learning proficiency, comprehension competence, examination*

management and time management". Worldviews consisted of four groups, namely "*traditional, modern, postmodern and integrative*" (De Witt *et al.*, 2016,102). Each group was subdivided into five subscales, namely "*ontology, epistemology, axiology, anthropology and societal vision*" (De Witt *et al.*, 2016,102). Metacognitive awareness consisted of two domains, namely *metacognitive knowledge*, and *metacognitive regulation*. Metacognitive knowledge included three types of knowledge, namely "*declarative, procedural and conditional knowledge*", whereas metacognitive regulation referred to skills such as "*planning, monitoring and evaluating*". (Balcikanli, 2011, 1323)

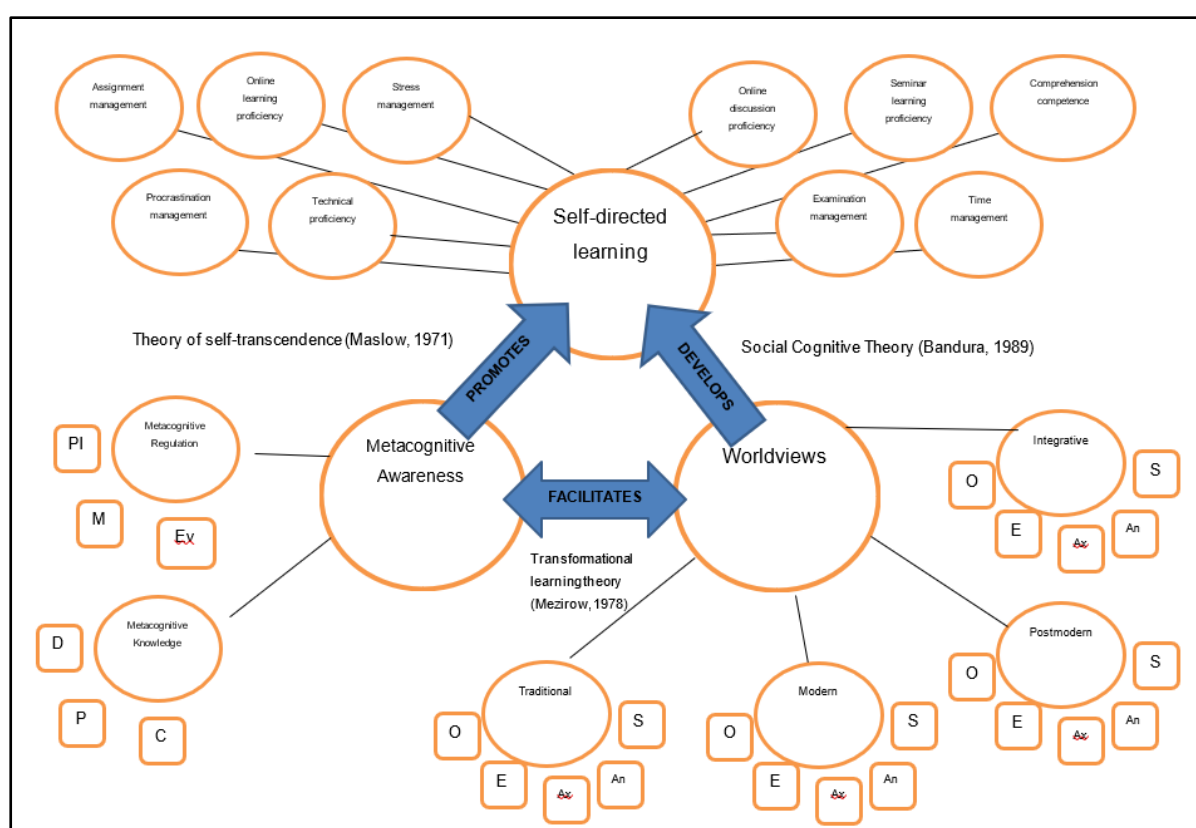


Figure 4-4: Conceptual-theoretical model illustrating the links between the constructs.

In the pursuit of developing an appropriate model to examine the role that metacognitive awareness and worldviews play in the process of self-directed learning, the reliability of the three constructs was calculated and reported as Cronbach alpha values, as factor analysis was not done. Table 4-19 indicates the reliability and inter-item correlation of the constructs for a model fit.

Table 4-19: Reliability and mean inter-item correlations of the two self-directed learning domains (visible and affective).

Construct	Variable	Domain with number of items		Mean inter-item correlations	Cronbach alpha (α)
Self-directed learning	OLP, SM, TP, PM, ODP, CC	SDL 1 Visible domain	6	0,371	0,77
	AM, SLP, EM, TM	SDL 2 Affective domain	4	0,307	0,64

"AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management"

Cronbach alpha values for all 10 items of self-directed learning were initially calculated as $\alpha = 0,195$, with a mean inter-item correlation of 0,015, which is regarded as low. Thus, some items were removed and recalculated, and as a result, self-directed learning was divided into two parts, that is, SDL 1 ($\alpha = 0,765$) and SDL 2 ($\alpha = 0,637$). For the study, the researcher renamed SDL 1 as the "visible domain" of self-directed learning and SDL 2 as the "affective domain" of self-directed learning.

4.5.1 The two domains of self-directed learning

Self-directed learning was split into two parts after the reliability was calculated. SDL 1, henceforth known as the *visible domain of self-directed learning*, contained the following subscales: "online learning proficiency, seminar learning proficiency, technical proficiency, procrastination management, online discussion proficiency and comprehension competence". SDL 2, henceforth known as the *affective domain of self-directed learning*, included the following subscales: "assignment management, seminar learning proficiency, examination management and time management". Although all 10 qualities of self-directed learning were noticeable, the visible domain seems to include more visible elements, for example deciding to participate in online discussions, a teacher's technical proficiency level when operating basic computer programs and a teacher's conscious decision to procrastinate tasks. Even though the affective domain also includes visible elements, the four subscales of the affective domain form part of a person's locus of control and affective beliefs about a task. An individual may have control over how assignments are managed, the ability to learn new information and skills, planning lessons and managing one's time.

The following section discusses the four models proposed to explain the relationship between the three main constructs. According to Hancock and Mueller (2010), the chi-square test is used to determine the model's goodness of fit. Mueller (1996) proposes dividing the chi-square test statistic by degrees of freedom, yielding a value of (CMIN/DF) 4,463. This value can be thought of as a good model fit. Furthermore, Mueller (1996) asserts that values greater than 0.09 indicate a good overall fit for a comparative fit index (CFI). The two-factor model had a relatively acceptable CFI of 0.87, while the root mean square error of approximation (RMSEA)

was 0.09, with a 90% confidence interval [CI] of [0,08; 0.10]. Models with RMSEA values of 0.10 or higher, according to Blunch (2008), should not be accepted.

4.5.2 Model 1: Metacognitive awareness of self-directed learning

The parameter summary for Model 1 includes 20 variances, 38 regression weights, one covariance, 20 means and 18 intercepts, equalling 97 free parameters. All *p*-values for self-directed learning and metacognitive awareness are less than 0,05, indicating statistical significance. Table 4-20 illustrates the standardised regression estimates and the *p*-values for the structural model for the relationship between metacognitive awareness and self-directed learning.

Table 4-20: Standardised regression estimates for the relationship between metacognitive awareness and self-directed learning.

			Standardised regression estimate	<i>p</i> -value ⁸
Visible domain	←	Knowledge	-0,0896	***
Affective domain	←	Knowledge	1,282	***
Visible domain	←	Regulation	0,367	0,044
Affective domain	←	Regulation	-0,480	0,022

At the *p* 0.05 level, the structural model shows that all subscales of metacognitive knowledge and metacognitive regulation correlate with all visible and affective domains of self-directed learning. Figure 4-5 shows the measurement model after the standardised regression estimates were transposed into a Word document.

⁸ *** indicates a *p*-value less than 0,05.

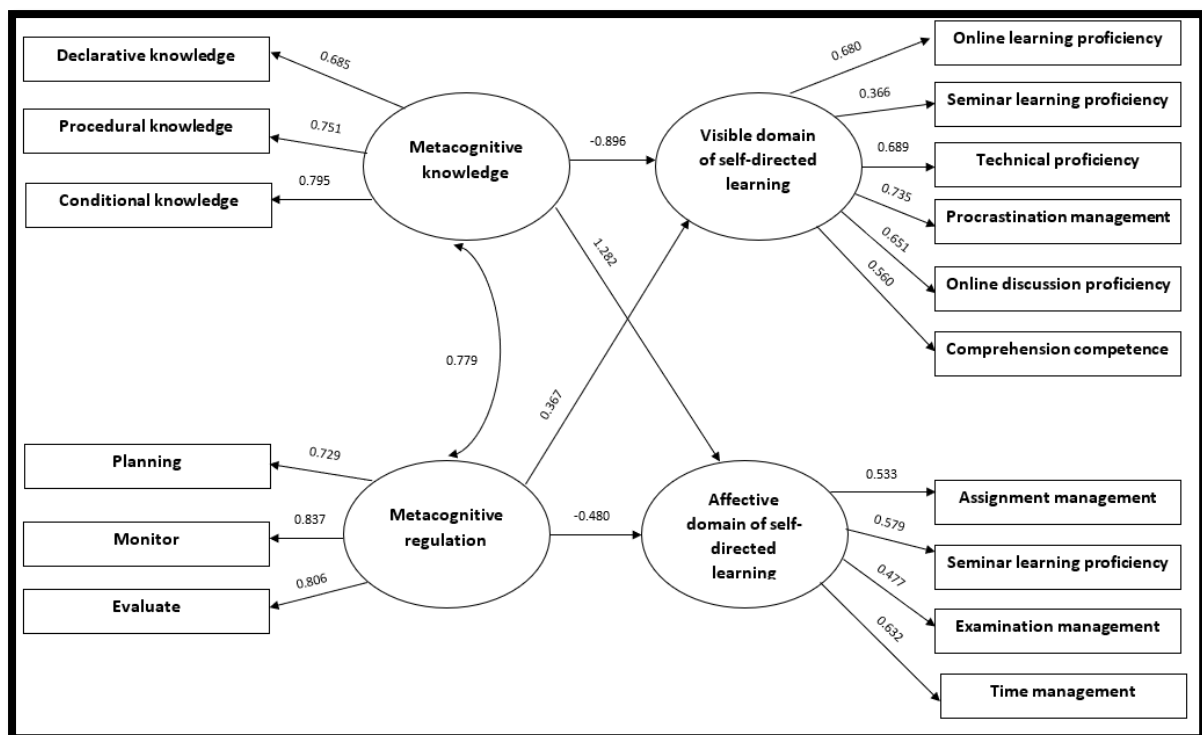


Figure 4-5: Model 1: Metacognitive awareness of self-directed learning.

Self-directed learning is conceptualised as a transitional process that includes a teacher's ability (and desire) to learn independently as he or she considers, thinks about and then directs specific actions towards achieving specific learning goals. These actions may be practically visible but are governed by an individual's level of metacognitive knowledge (knowledge of a task) and affective beliefs (motivation and attitude) about the task. Metacognitive knowledge and metacognitive regulation collectively form metacognitive awareness, which refers to a teacher's understanding of a task, knowledge of a task and knowledge of how to monitor oneself during the task so that it can be completed. There is a constant invisible interplay between metacognitive regulation (monitoring myself) and metacognitive knowledge (what strategy do I need to execute this task?) to motivate an individual to take action to become more self-directed. According to Figure 4-5, there is covariance and correlation between the unobserved variables of *knowledge* and *regulation* (0,779). Therefore, Model 1 is deemed a good fit with CMIN/DF (1,687), CFI (0,913) and RMSEA (0,055) with 90% CI [0,040; 0,069].

In the next section, the second model regarding the relationship between a teacher's worldview and self-directed learning is discussed.

4.5.3 Model 2: Worldview and self-directed learning

Model 2 is focused on the role of a worldview in self-directed learning. The parameter summary for Model 2 includes 16 variances, 34 regression weights, six covariances, 16 means and 16 intercepts, equalling 88 free parameters. Table 4-21 illustrates the standardised regression estimates and the p -values for the structural model for the relationship between the different worldviews and self-directed learning.

Table 4-21: Standardised regression estimates for the relationship between worldviews and self-directed learning.

			Standardised regression estimate	p -value ⁹
Visible domain	←	Traditional	0,122	0,423
Visible domain	←	Modern	-0,231	0,091
Visible domain	←	Postmodern2	0,212	0,123
Visible domain	←	Integrative	0,482	***
Affective domain	←	Traditional	-0,091	0,631
Affective domain	←	Modern	0,218	0,201
Affective domain	←	Postmodern2	-0,180	0,292
Affective domain	←	Integrative	-0,324	0,052

The structural model regarding worldview and its relationship with self-directed learning indicates that only an integrative worldview has a significant correlation to the visible domain ($p = 0,000$) of self-directed learning and to the affective domain ($p = 0,052$) of self-directed learning. The standardised regression estimates were transposed into a Word document to illustrate the measurement model as Figure 4-6.

⁹ *** indicates a p -value less than 0,05.

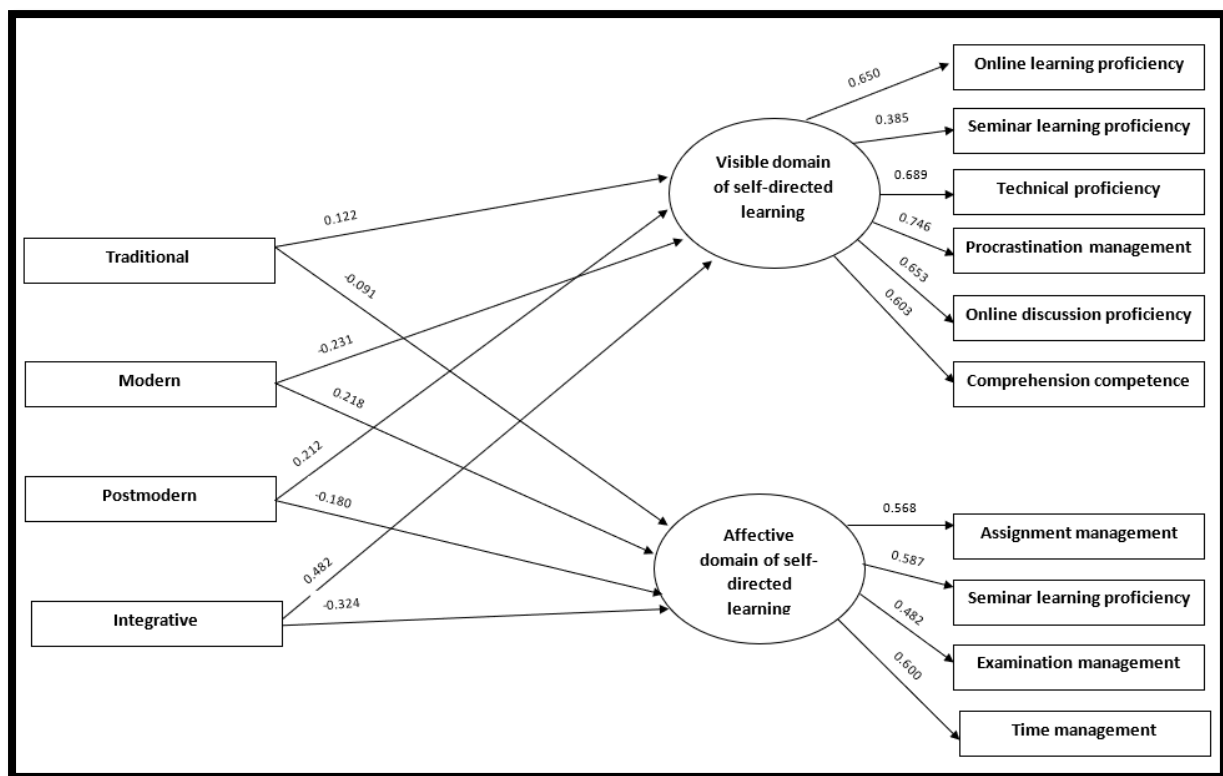


Figure 4-6: Model 2 on worldviews and self-directed learning.

Figure 4-6 indicates the relationship between an integrative worldview and self-directed learning. As previously stated, a worldview denotes a view or outlook of the world that aids one to understand and interpret one's lived experiences. A worldview may include a set of truths of living that serve as the foundation for particular beliefs, cognition and behaviour. Teachers also have worldviews that affect the way in which they teach and learn. The strongest relationship exists between the *integrative* worldview and the visible domain of self-directed learning, as an integrative teacher is most likely characterised as someone who is more flexible in teaching methods and teaching approaches than, say, a traditionalist teacher, who may be less adaptable and more set in his or her ways, thus not wanting to explore or model self-directed learning. The model is deemed a good fit with CMIN/DF (1,790), CFI (0,855) and RMSEA (0,059) with 90% CI [0,041; 0,076].

In the next section, the third model regarding the relationship between an integrative worldview, metacognitive awareness and self-directed learning is discussed.

4.5.4 Model 3: Worldview, metacognitive awareness and self-directed learning

Model 3 is focused on the role of all statistically significant aspects of worldview and metacognitive awareness combined in one model on self-directed learning. The parameter summary for the model includes 21 variances, 41 regression weights, three covariances, 21 means and 19 intercepts, equalling 105 free parameters. Table 4-22 illustrates the standardised regression estimates and the p -values for the structural model for the relationship between the integrative worldview, metacognitive awareness and self-directed learning.

Table 4-22: Standardised regression estimates for the relationship between an integrative worldview, metacognitive awareness and self-directed learning.

			Standardised regression estimate	p -value ¹⁰
Visible domain	←	Knowledge	-0,784	***
Affective domain	←	Knowledge	0,239	***
Visible domain	←	Regulation	-0,372	0,173
Affective domain	←	Regulation	0,487	0,053
Visible domain	←	Integrative	-0,301	***
Affective domain	←	Integrative	0,806	0,013

The structural model regarding the role of an integrative worldview and metacognitive awareness on self-directed learning indicates that the visible and affective domains have a significant effect on metacognitive knowledge at the $p < 0,05$ levels. The p -values for regulation are greater than 0,05; therefore, they are not statistically significant. In addition, an integrated worldview has a significant correlation with both the visible and affective domains of self-directed learning at the $p < 0,05$ levels. The standardised regression estimates were transposed into a Word document to illustrate the measurement model as Figure 4-7.

¹⁰ *** indicates a p -value less than 0.05

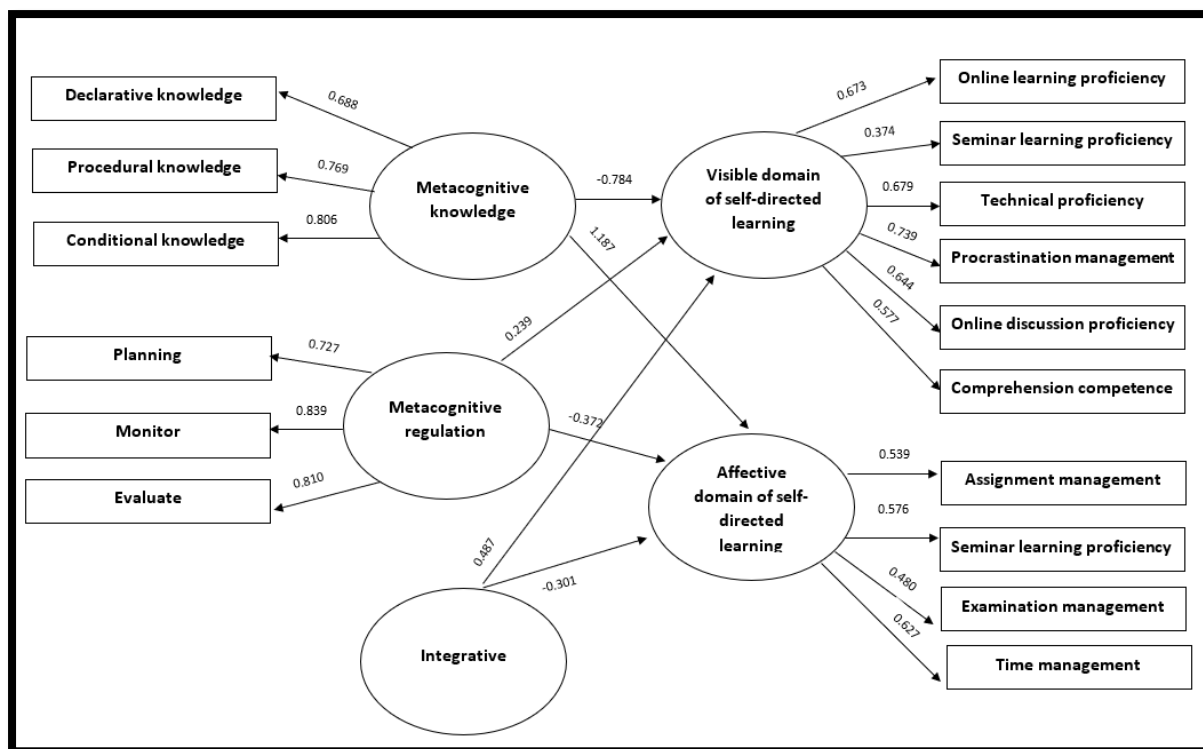


Figure 4-7: Model 3 on integrative worldview, metacognitive awareness and self-directed learning.

Figure 4-7 indicates the relationship between integrative worldview and metacognitive awareness in both domains of self-directed learning. This model suggests that metacognitive knowledge plays a unique role in the development of self-directed learning. The model is deemed a good fit with CMIN/DF (1,583), CFI (0,918) and RMSEA (0,051) with 90% CI [0,036; 0,064].

4.5.5 Model 4: Integrative worldview, metacognitive knowledge and self-directed learning

Model 4 is focused on the statistically significant relationships from Model 3. Table 4-23 illustrates the standardised regression estimates and the *p*-values for the structural model for the relationship of an integrative worldview, metacognitive knowledge and self-directed learning.

Table 4-23: Standardised regression estimates for the relationship between an integrative worldview, metacognitive knowledge and self-directed learning.

Regression weights			Standardised regression estimate	p-value ¹¹
Visible domain	←	Knowledge	-0,564	***
Affective domain	←	Knowledge	0,874	***
Visible domain	←	Integrative	0,463	***
Affective domain	←	Integrative	-0,268	0,017

Similar to Model 3, the structural model (Model 4) regarding metacognitive awareness and its relationship with self-directed learning indicates that metacognitive knowledge contributes to the visible and affective domains of self-directed learning at the $p < 0,05$ levels. In addition, an *integrative worldview* has a significant unique contribution with the visible and affective domains of self-directed learning at the $p < 0,05$ levels. The standardised regression estimates were transposed into a Word document to illustrate the measurement model as Figure 4-8.

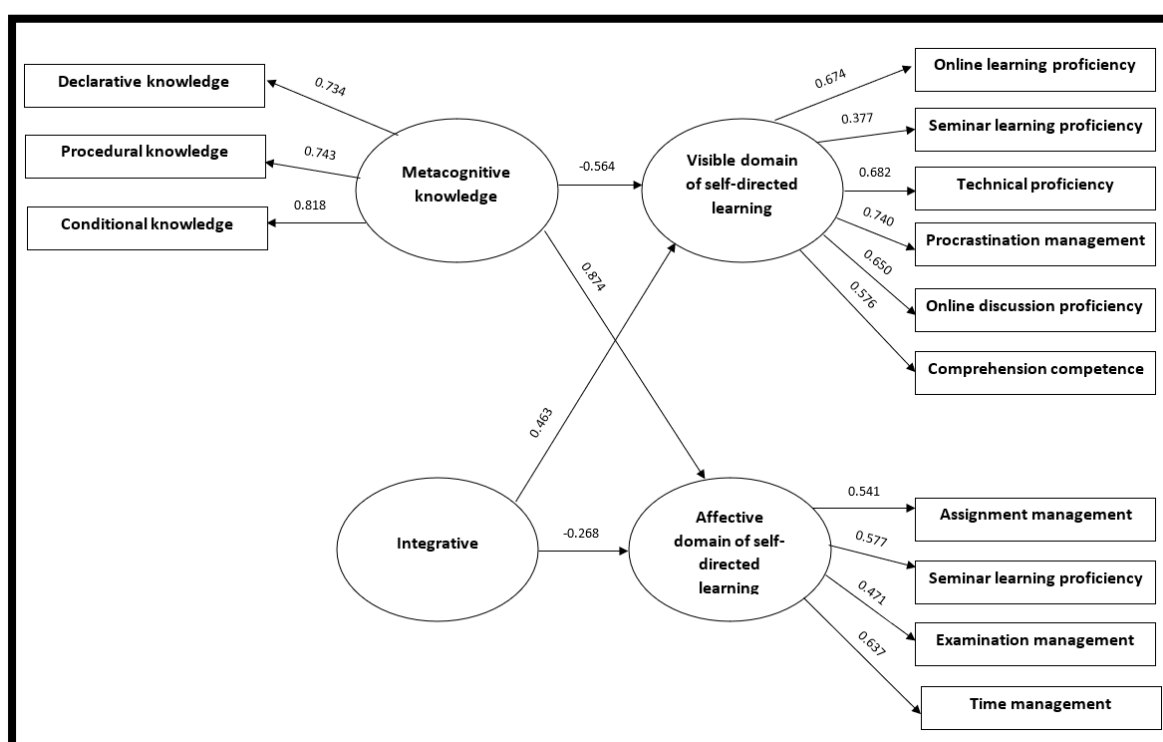


Figure 4-8: Model 4 on integrative worldview, metacognitive knowledge and self-directed learning.

¹¹ *** indicates a p -value less than 0,05.

Model 4 indicates that metacognitive knowledge and an integrative worldview are conducive to the advancement of self-directed learning. As teachers become aware (gain knowledge) of their thoughts and beliefs, they can apply that knowledge to become self-directed. An integrative worldview is also conducive to self-directed learning, as integrative teachers are more willing to adapt to new ways of teaching and learning, including altering their thoughts and beliefs and maybe even altering their teaching style to facilitate their own self-directed learning. Model 4 is deemed a fit, with CMIN/DF (1,362), CFI (0,948) and RMSEA (0,040) with 90% CI [0,016; 0,058].

4.6 Summary

The quantitative strand of the study was the focus of Chapter 4. This included an in-depth discussion of the reliabilities of the three standardised instruments as well as the respondents' biographical profiles. This was followed by a presentation of the mean scores and standard deviations to provide a basis for comparison. Furthermore, ANOVAs were calculated to determine statistical differences between the group means and were reported as *d*-values and *p*-values. The last part of the chapter included Spearman's rank order correlations to identify possible relationships between the constructs in pursuit of a model. The chapter concluded with four possible models to answer the primary research question. The interpretation of the results is discussed and triangulated in Chapter 6.

Chapter 5 Analysis of the qualitative data

5.1 Introduction

In Chapter 5, the qualitative findings of the research are presented. The sample size (13 Intermediate Phase teachers), data collection method (writing a narrative), and data analysis process (a priori codes) were all consistent with qualitative methods of inquiry, allowing the researcher to best investigate the phenomenon of Intermediate Phase teachers' metacognitive awareness and worldviews as they engaged in self-directed learning. The qualitative data included logical sequences relating to the three main concepts, namely self-directed learning, worldviews and metacognitive awareness. This chapter concludes with a synthesis of the analysed qualitative data, which are triangulated in Chapter 6 in order to interpret the significance of the findings concerning the primary research question and the secondary qualitative questions.

5.2 Research questions

The primary research question in the study was as follows:

What role do private school Intermediate Phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning?

The qualitative findings were obtained from the narratives written by 13 participants. The question prompts were centred on the three main concepts to explore the participants' views. The researcher compiled Table 5-1 as a summary from Chapter 2 to remind the reader of the qualitative part of the study. The table includes the secondary research questions, the dimensions of the concepts and the data collection and data analysis methods applied in the study in support of answering the primary research question.

Table 5-1: Overview of the qualitative data analysis.

Qualitative data analysis	Secondary research question		Dimensions	Data collection method	Data analysis method
	Secondary research question 1	What aspects of self-directed learning do Intermediate Phase teachers become aware of?	• “Assignment management • Online learning proficiency • Stress management • Technical proficiency • Procrastination management • Online discussion proficiency • Seminar learning proficiency • Comprehension competence • Examination management • Time management”	Narrative	<i>A priori</i> codes
	Secondary research question 2	What aspects of worldviews do Intermediate Phase teachers become aware of?	• Ontology • Epistemology • Axiology • Anthropology • Societal vision		
	Secondary research question 3	What aspects of metacognitive awareness do Intermediate Phase teachers become aware of?	• Metacognitive regulation • Metacognitive knowledge		

In order to answer the primary research question and the secondary qualitative questions, the three main concepts were explored and reflected upon from “within”, in terms of the teachers’ inner experiences as narrated by the teacher participants themselves. After reading the narratives, the researcher applied *a priori* codes to the data to better understand and explore the dimensions of each concept as reflected and experienced by each participant. Although each concept was analysed individually, they were not regarded as rigid and exhaustive, but rather as concepts with some sort of fluidity indicating significant overlaps.

5.3 Findings and their relationship with the conceptual-theoretical framework

The research focus of Chapter 5 was to condense the raw data from the narratives into meaningful sentences and show their value in terms of the primary research question and the secondary qualitative research questions. The data were collected via an online questionnaire

(writing a narrative) containing prompts, as stipulated in Addendum E. The questionnaire was conceptualised into three parts according to the conceptual-theoretical framework (see Figure 5-1). Part A consisted of 10 prompts related to self-directed learning, Part B consisted of five prompts related to worldviews, and Part C consisted of six prompts related to metacognitive awareness. Figure 5-1 is based on the preliminary conceptual-theoretical framework (see Chapter 2, Figure 2-5) and is intended to guide the reader. Furthermore, Figure 5-1 has been updated to show the related dimensions of each participant's concept and phrase. Each concept is numbered in the order in which it appears in the following sections.

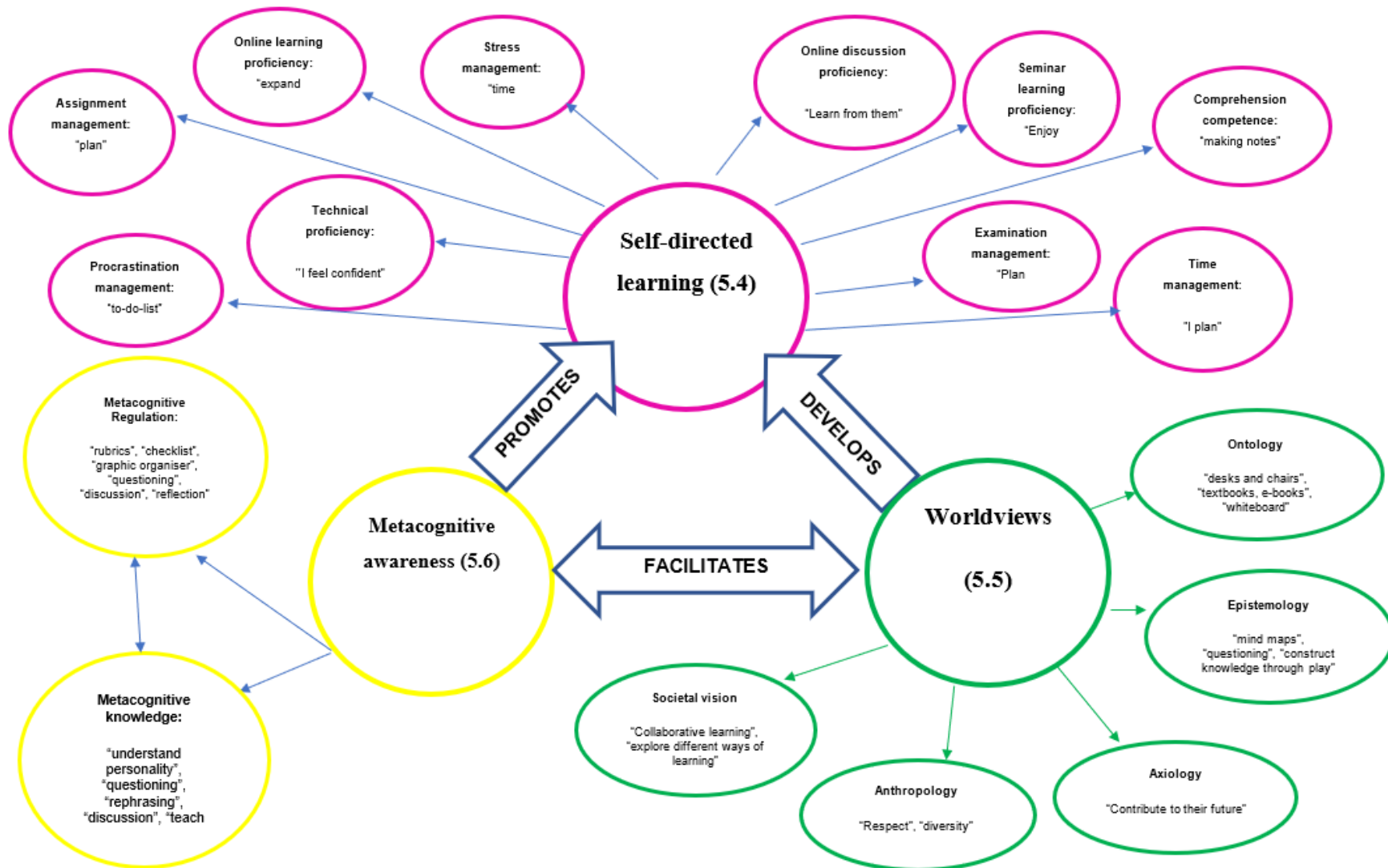


Figure 5-1: The dimensions of the conceptual-theoretic framework.

Tables 5-2, 5-3 and 5-4 serve to capture the analysed categories and identified themes in the sections that follow, as they deductively reflect Saldaña's (2015) code-to-theory model in conjunction with Table 3-5 (see Chapter 3) used for the analysis. In addition, the four Cs of Cohen *et al.* (2018), namely coding, categorising, comparing and concluding, were also applied to analyse the data and explore the complexity of the phenomenon. The same data analysis process was followed for all three parts of the narrative. Tables 5-2, 5-3 and 5-4 include a frequency indicator (Hz) next to each theme as a description of the number of times the same or similar phrases were identified in the participants' responses. For ease of reference, "P" indicates the participant, followed by "L", indicating the line reference, and then "p", indicating the page number.

5.4 Findings from Part A: The theme of self-directed learning

To explore how the participants viewed self-directed learning, a pre-set questionnaire designed by Khiat (2015) was applied to the study. The aim of Khiat's (2015) study was to help adult learners to identify and expand their existing self-directed learning strategies; therefore, Khiat (2015) developed a diagnostic tool consisting of 10 dimensions. The 10 dimensions were explored in the current study.

Table 5-2 concerns the theme of self-directed learning. Each dimension, as proposed by Khiat (2015), was analysed, and the main phrases or words were recorded. Following Table 5-2 is a presentation of the findings.

Table 5-2: Summary of the profile of the theme "self-directed learning".

The theme of self-directed learning				
A priori codes	Subcategory (dimension)	Prompt	Themes emerging from each category	Frequency (Hz)
AM	"Assignment management	"Prompt 1: Assignment management refers to the ability to plan, do and score well in tutor-marked assignments and group-based assignments". For example, I can plan and complete tasks relating to my subject using Teams / One Note applications within Microsoft Office. When reflecting on your own teaching experience, how do you manage your assignments?	"plan", "keep to dates", "keeping track", "plan ahead of time"	10
OLP	Online learning proficiency	"Prompt 2: Online learning proficiency refers to the ability to learn from online synchronous and asynchronous lectures and video lectures". For example, when I watch online tutoring videos, I can use the newly acquired knowledge to further my understanding of the subject matter. When reflecting on your own teaching experience,	"time constraints", "keep updated", "improved", "expand knowledge base"	3 4

The theme of self-directed learning				
A priori codes	Subcategory (dimension)	Prompt	Themes emerging from each category	Frequency (Hz)
		how do you manage your online learning proficiency?		
SM	Stress management	"Prompt 3: Stress management refers to the ability to handle academic stress". For example, I can manage my time between school and my family life / I get demoralised when I cannot handle everything I have to do. When reflecting on our own teaching experience, how do you manage your stress?	"prioritise", "plan", "time management"	8
TP	Technical proficiency	"Prompt 4: Technical proficiency refers to the ability to operate basic computer programs". For example, I know how to operate the basic functions of Microsoft Word and Teams to design worksheets for my learners / I feel intimidated and scared when I use the internet. When reflecting on your own teaching experience, how do you manage your technical proficiency?	"I do not have technical difficulties", "I have the ability", "I feel confident"/"high standard"	9
PM	Procrastination management	"Prompt 5: Procrastination management refers to the ability to manage procrastination in learning". For example, I do not find excuses not to complete tasks / I always lose my to-do list and work only towards deadlines. When reflecting on your own teaching experience, how do you manage procrastination?	"to-do-list" "work ahead" "completed on time" "time management" "do not postpone"	4 3 2 1 2
ODP	Online discussion proficiency	"Prompt 6: Online discussion proficiency refers to the ability to do well in online discussion forums". For example, I enjoy online discussions regarding content to be taught / online discussions are difficult to follow and understand / I am comfortable with online discussions. When reflecting on your own teaching experience, how do you manage your online discussion proficiency?	"enjoy online discussions regarding the content being taught" "do not enjoy online discussions" "questions clearly formulated" "learn from them / feel comfortable"	4 2 1 4
SLP	Seminar learning proficiency	"Prompt 7: Seminar learning proficiency refers to the ability to learn during seminars". For example, I enjoy additional training opportunities to further my knowledge / I enjoy learning from my colleagues and reflecting on my teaching practices / I think these seminars waste my time – I know enough. When reflecting on your teaching experience, how do you manage your seminar learning proficiency?	"I enjoy learning opportunities from seminars" "timing"	9 2
CC	Comprehension competence	"Prompt 8: Comprehension competence refers to the ability to understand readings and make study notes". For example, I can make notes during training sessions and keep track of what I know and what I do not	"making notes" "do own research"/ "google" "ask questions"	11 4 1 3

The theme of self-directed learning				
A priori codes	Subcategory (dimension)	Prompt	Themes emerging from each category	Frequency (Hz)
		know to further my teaching practice / I do not understand how to use notes from seminars and apply them in my teaching-learning context. When reflecting on your own teaching experience, how do you manage your comprehension competence?	"use recordings"	
EM	Examination management	"Examination management refers to the ability to plan, do and score well in examinations". For example, I can manage my emotions during class visits and try not to get too stressed / I don't get worked up at all. When reflecting on your own teaching experience, how do you manage examination management?	"I get nervous"/	2
			"I stress"	4
			"I am relaxed"	2
			"manage my emotions"	3
TM	Time management	"Time management refers to the ability to utilise time effectively". For example, I plan my class time, and I know how to manage my time. I set personalised targets (goals) I wish to achieve / I tend to waste time and lose many hours during my day. When reflecting on your teaching experience, how do you manage your time?	"plan beforehand"	
			"I set goals"	5
			"I do reflection"	1
			"I plan"	10
			"unexpected events waste time"	4

5.4.1 Assignment management (AM)

Prompt 1 was interpreted differently by various participants. Firstly, some teachers read this as the teacher designing assignments for their learners as a way to keep track of their progress. They gave responses such as *"edited to the needs of my learners"* (P1L1p1), making sure there is a *"clear learning outcome"* (P2L2p1), *"it is crucial that I teach the skills to the learners before assessing them"* (P10L2p1) and *"it is a good way of keeping track and to assess how learners are coping"* (P6L1p1). Secondly, some teachers interpreted this as managing the assignment with the learners in a physical classroom together, for example *"working through an assignment bit by bit"* (P4L3p1) or *"I know the learners, so their skill level is always at the back of my mind"* (P11L3p1). Thirdly, some teachers interpreted this prompt in terms of classroom management, as evident in the following phrases: *"assignments managed timely by means of Teams"* (P1L1p1), *"I keep to dates"* (P5L1p1), *"provide them online, hard copy"* (P12L1p1), *"working in advance"* (P3L1p1) and *"plan and complete tasks using Microsoft Office"* (P4 L1p1). The words "plan", "plan beforehand", "keeping track" and "keep to dates" were used in most of the participants' accounts. The dimension of assignment management contains aspects of the *learner* and the *teacher*. Thus, the art of teaching calls for teachers to be mindful of their own teaching behaviour to become self-directed.

5.4.2 Online learning proficiency (OLP)

Two teachers interpreted the second prompt as how they manage online learning for their learners, not themselves. Participant 2 wrote, *"content is uploaded as a video"* (P2L6p1) and *"video lectures explain all work clearly, but a physical teacher is required to assure the learner that he/she is doing it right and understanding what he/she must do next is correct"* (P9L9-11p1). Three teachers mentioned that time was an issue. Participant 6 explained that *"lectures are recorded so you are able to view them when desired"* (P6L8p1), and Participant 8 stated, *"I attend webinars whenever possible"* (P8L4p1). Participant 10 wrote, *"I used to watch webinars during the lockdown, but now time is a constraint"* (P10L5p1). Most teachers were optimistic about their online learning proficiency, such as Participant 1 who wrote, *"assisting me with new ideas to teach the learners"* (P1L3p1), and Participant 3 who explained, *"online tutoring videos have helped me get to understand and get comfortable with online teaching"* (P3L3p1). Furthermore, Participant 7 stated, *"I like to keep updated with new apps and developments in the teaching world"* (P7L6p1). Participants 11 and 13 were optimistic as they reported, *"I have improved in this area and actually enjoy it!"* (P11L11p1) and *"expand my knowledge base and also helps you to be aware of and make use of different techniques to engage with learners"* (P13L3-4p1).

5.4.3 Stress management (SM)

The teachers had various strategies for dealing with stress. Participants 2 and 3 explained that they adopted a pragmatic way of dealing with stress – *"I ensure that the tasks I choose to do match the time available. This results in tasks being completed"* (P2L8p1) and *"I make sure that all that needs to be done for work, I do it at work"* (P3L5-6p1). Participant 4 relied on *"close relationships"* and *"exercise"* to help relieve the stress (P4L10-11p1). Similarly, Participant 7 relied on Sundays as *"a rest day and family day"* (P7L11p1). Two participants mentioned that learners' parents caused a lot of stress – *"the concern and stress from parents interfering with school academics"* (P1L5p1) and *"I sacrifice myself to keep all parties satisfied"* (P5L4p1). Participant 5 did not indicate how stress was managed, but rather what contributed to stress. Participant 6 had a humorous way of coping with stress; it seemed that consuming *"copious amounts of chocolate"* (P6L10p1) helped in this regard. Participant 6 also indicated that goal setting might be of some value, although teachers were faced with many tasks and *"unrealistic deadlines"*. This idea was echoed by Participant 8 who wrote the following: *"[I]t is difficult because there is not enough time to balance work and home life. Work goes home and home life tends to suffer"* (P8L7p1). Participant 11 indicated absolutely no work stress and noted, *"You don't work a day in your life if you love what you do!"* (P11L12p1). Eight of the participants

indicated that *“planning”*, *“time management”* and *“prioritise”* helped them to manage their stress levels.

5.4.4 Technical proficiency (TP)

Most of the teachers indicated they were very proficient at using basic computer skills and designing their worksheets. They were aware of their technical proficiency and how using basic computer skills enhanced their teaching reality. The following responses were given: *“I often create videos from PowerPoint presentations”* (P7L12p1), *“the majority of lessons link up with a PowerPoint presentation”* (P6L15p1) and *“practice makes perfect!”* (P10L10p1). No participants expressed a fear of technology; instead, they indicated that they embraced the challenge and new knowledge it presented. Participant 1 wrote, *“I excel once I understand how and where to find the information”* (P1L7p1), and Participant 2 declared, *“[I will] ask someone to help me”* (P2L10p1). Furthermore, the participants mentioned that they *“explore”* (P4L12p1) and *“enjoy the challenge”* (P8L7p1). Participant 9 was very bold and indicated that the basic functions of MS Word were *“part of everyday life”* (P9L28p2).

5.4.5 Procrastination management (PM)

Three participants indicated that they planned to minimise stress to create a *“lighter load during the school day”* (P6L17p2). Participant 4 wrote, *“tasks are done before deadlines”* (P4L14p1), similar to Participant 12 who preferred to *“complete tasks ahead of time”* (P12L7p1) and *“working in advance”* (P3L10p1). Participant 3 believed that keeping *“a calendar close by”* (P3L11p1) helped to manage procrastination, similar to Participant 2 who used a *“to-do list”* to manage tasks (P2L11p1). Participant 7 indicated that when it came to creative writing, she or he procrastinated, but other tasks got done on time (P7L14p1). This may be due to a lack of motivation or inadequate time management.

5.4.6 Online discussion proficiency (ODP)

Four teachers interpreted this prompt as the teacher being taught. Participant 1 reported that online discussions were helpful regarding *“content being taught”* or *“meetings that need to be done online”* (P1L10-11p1). Participant 6 indicated that online discussions were a *“good way to gather insights”* (P6L19-20p2) regarding different people’s approaches to a particular task. Participant 2 interpreted this prompt as the teacher doing the actual teaching; thus, online proficiency was managed by making sure that *“questions are clearly formulated”* and *“practical tasks are built-in [sic] to keep learners engaged in the learning process”* (P2L13-14p2). Similarly, Participant 9 indicated that one needed to *“push the smaller children to overcome the fear of online discussions”* (P9L35p3) and added that he or she managed online discussion

proficiency by providing a safe and structured online environment for the learners. Participant 4 indicated less enjoyment for online discussions, as there were *“too many distractions”* (P4L16p2) and consequently, staying focused became a problem. This idea was echoed by Participant 12 who preferred *“discussions in person”* (P12L8p1). Participant 10 was the only participant who indicated, *“I do not join online discussion forums”* (P10L12p1).

5.4.7 Seminar learning proficiency (SLP)

Most participants expressed a positive attitude towards learning from online seminars. Participant 1 enjoyed *“training and additional information being shared”* (P1L12p1). This was echoed by Participants 3, 11 and 12 who declared that most of what was taught in online discussions could be applied in their teaching practice. Participant 2 indicated that *“mind-maps”* helped to consolidate what was learned, provide feedback and share with other colleagues to implement what was taught (P2L15p2). According to Participant 4, seminars can be very *“drawn out and exhausting”* and a *“personal learning session”* is of more value (P4L18p2). This participant also commented on the subcategory of online learning proficiency and stated that she or he battled to remember everything being taught online and preferred to learn something *“at that moment”* (P4L6p1) when he or she needed to know it. This participant preferred a more personalised approach to his or her learning. Participants 5 and 8 indicated that they enjoyed learning from seminars but stated that *“timing is important. Not the end of term”* (P5L10p1). Participant 8 reported that he or she enjoyed *“relevant seminars”*, but *“I do not have time for them as my day pressures are overwhelming”* (P8L11p1). Participant 9 was the only participant to comment on seminar learning proficiency in terms of lessons for learners that should be *“vibrant and interesting for children”* (P9L44p3). All of the other participants interpreted this prompt in terms of *their* seminar learning proficiency.

5.4.8 Comprehension competence (CC)

Eleven of the participants indicated that they *“make notes”* to help them comprehend a topic. Participant 13 asked questions and enjoyed *“doing research on a topic by myself also to help to understand certain aspects I know less about”* (P13L15-16p2) to aid their comprehension competence. Participant 2 used Google to look up unfamiliar words, in conjunction with taking notes and using *“highlighters to emphasize key matters”* (P2L18p2). Participant 3 indicated that he or she went *“back to recordings”* when *“I get confused for some reason”* (P3L17p2), similar to Participant 8 who stated that *“recordings of webinars were necessary to revise pertinent information”* (P8L13p2). Participant 9 specifically indicated that it was a *“conscious decision to learn more and totally understand what it is I am learning or what I need to understand”* (P9L48-49p3).

5.4.9 Examination management (EM)

Participants 7 and 8 indicated that they could *“manage their emotions”* during a class visit, and Participant 8 specifically noted that preparation was the key (P8L12p2). Participant 3 also suggested that *“being well prepared and creative”* helped to be less nervous and that one should treat the class visit as *“a learning curve”* (P3L18-19p2). Participant 9 viewed a class visit as an opportunity to learn from the situation *“to better myself”* (P9L50p3). Participants 10 and 13 both indicated that they appreciated *“constructive feedback”* (P10L18p2), as this would *“give me better insight into what to change or do differently to become a better teacher”* (P13L19p2). Participant 1 was the only participant to interpret this prompt as referring to learners who might engage in naughty behaviour during a test (P1L15-17p2).

5.4.10 Time management (TM)

From the narratives, it seemed that most of the teachers were capable of planning, managing and monitoring their time to the best of their ability. Three participants indicated that even though they planned their class time, external factors might impinge on their ability to finish the lessons with the time available. The following examples were provided: *“a student that falls and requires your attention”* (P9L55-56p4); *“often unexpected events or some changes and this can affect the teaching hours”* (P12L17-18p2); and when *“a learner does not understand the topic”* (P13L23p2). Some participants set goals for themselves, and others planned their lesson time and *“match tasks to the time available”* (P2L22p2). It was evident that all the participants did some form of planning, whether it was utilising the *“timetable”* (P4L27p2) or making use of monitoring systems to help them plan their time – the *“alarm clock”* (P4L28p2) or a *“calendar”* (P3L20p2).

5.4.11 In summation

Self-directed learning is a ubiquitous concept in literature, as it has many definitions and interpretations. Arkan *et al.* (2016) refer to self-directed learning as a learning goal for education and a learning skill to be mastered during learning processes. According to Van der Walt (2019), self-directed learning is not a mechanistic process, but rather one where individuals choose to engage in the learning process. From the narratives, it was evident that most of the teacher participants were aware of aspects of their self-directed learning. Participant 9 explained that it is a *“conscious decision to learn more and totally understand what it is I am learning or what I need to understand”* (P9L48-49p3). Participant 4 preferred to learn something *“at that moment”* (P4L6p1) when he or she needed to know it, and Participant 13 enjoyed *“doing research on a topic by myself also to help to understand certain aspects I know less about”* (P13L15-16p2).

In reference to the data from the narratives, Figure 5-2 aims to highlight the 10 dimensions of self-directed learning as proposed by Khiat (2015).

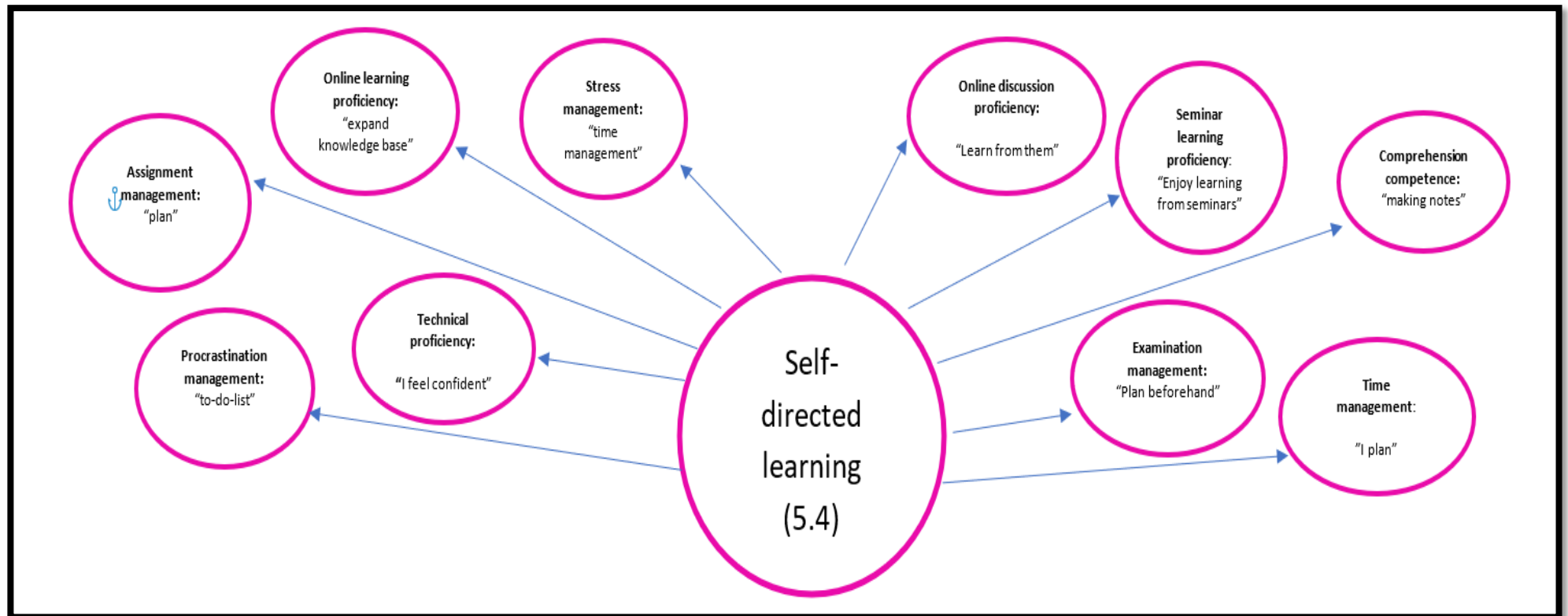


Figure 5-2: Interactive dimensions of self-directed learning.

The researcher argues that self-directed learning does not have a mechanical and rigid quality but is, instead, a flowing process encompassing various continuous and flexible dimensions, as is evident from the narratives. For this study, self-directed learning was conceptualised as an inherent process that might not be visible or tangible at first, as personal beliefs (worldviews) are applied and challenged to formulate (new) learning goals and strategies that facilitate the capacity to become aware of one's own knowledge and the regulation of knowledge (metacognition). This eventually includes the altering of one's thoughts and beliefs regarding teaching strategies, teaching developments and, most importantly, the development of self.

In the next section, the second theme, worldviews, is discussed.

5.5 Findings from Part B: The theme of worldviews

The current study was conducted in light of research done by De Witt *et al.* (2016) which suggests four non-scientific worldview groups present in the Western world. These are labelled as “*traditional, modern, postmodern and integrative*” (De Witt *et al.*, 2016, 102). Each worldview group is composed of five dimensions, namely “ontology” (O), “epistemology” (E), “axiology” (Ax), “anthropology” (An) and “societal vision” (S) (De Witt *et al.*, 2016, 102). Each dimension was explored from “within” through the narratives to “see” the world through the participants’ eyes. Table 5-3 is a summary of the five dimensions embedded within each worldview. The most pertinent quotations are provided.

Table 5-3: Summary of the profile of the theme “worldviews”.

A priori codes	Subcategory (dimension)	Prompt	Themes emerging from each category	Frequency (Hz)
O	Ontology	Prompt 1: Describe the environment in your classroom. For example, desks, chairs, interactive whiteboards, blackboards, textbooks/digital textbooks, etc.	“desks, chairs, whiteboard” “learners’ devices/digital textbooks” “desks spaced out due to Covid regulations”/“social distancing”	12 7 4
E	Epistemology	Prompt 2: How do you facilitate the acquisition of knowledge in your classroom? For example, knowledge should be learned, and memorised / knowledge is constructed through interactive play and dialogue.	“make connections”/“link to previous experiences” “knowledge should be made practical”/ “knowledge created through play” “various strategies”	5 8 5

A priori codes	Subcategory (dimension)	Prompt	Themes emerging from each category	Frequency (Hz)
Ax	Axiology	Prompt 3: Why did you decide to become a teacher? For example, my mom was a teacher / I wanted to contribute to society.	“amazing teacher in high school”/“positive experience” “love children” “contribute to their future” “bursary” “brother/sister a teacher” “family”	3 4 3 2 4 2
An	Anthropology	Prompt 4: How do you integrate different cultures into your classroom? For example, everyone can share their religious opinions or talk about their culture’s celebrations without fear of marginalisation.	“share opinions” “diversity is important”	12 4
S	Societal vision	Prompt 5: What is your vision for teaching? For example, a more uniform teaching system / A more digital platform.	“uniform and digital” “more digital platform” “combination of digital and traditional/physical” “holistic”/“different styles of teaching”	3 2 3 6

5.5.1 Ontology (O)

From the narratives, it was clear that most of the participants taught in a well-equipped classroom with desks, chairs, a teacher’s desk, posters on the wall and a functional whiteboard. Participant 1 stated that the environment “*allows me to interact with the learners in a functional manner*” (P1L20p3), and Participant 2 mentioned that the desks were “*organised in a way that promotes collaborative learning*” (P2L25p3). Three participants specifically mentioned Covid-19 regulations and that the classrooms were arranged to promote social distancing. This seemed frustrating for Participant 3, who mentioned that learners sat individually in the classroom due to Covid-19 regulations, “*but it is essential that learners sit in groups and interact with one another*” (P3L22p3). The teachers made use of hard copy textbooks or e-books. Participant 13 mentioned that “*there are online learners as well*” (P13L25p3), although no mention of online learners was made by the other participants.

5.5.2 Epistemology (E)

From the narratives, it seemed that most of the teachers favoured a practical approach to knowledge acquisition by employing various strategies to help learners to construct new knowledge and consolidate what they have learned. These strategies included helping the learners make connections (P2 and P3), linking knowledge to previous experiences, creating “*knowledge through play*” (P4L31p3), making “*mind-maps* and “*quiz notes*” (P1L22p3) and

applying questioning and discussion opportunities (P2L27p3; P5L17p2; P8L20p3). None of the participants believed that knowledge was only learned and memorised. Rather, some concepts needed to be learned, but they felt that it was more important for learners to understand what they were learning than merely memorising random facts.

5.5.3 Axiology (Ax)

From the narratives, it emerged that there were various reasons why the participants had chosen a teaching career. Three participants indicated they had a positive experience with a teacher during their school career (P3L29p3; P3L27p3; P5L19p2). Others indicated that they “*love children*” and wanted to “*contribute to their future*”, and that this had been their motivation for studying to become a teacher (P1L23p3; P2L29p3; P4L34p3; P5L18p2). Four participants indicated they came from a family of teachers or had a family member who was a teacher, and this motivated them to go into teaching. Participant 9 said that she became a teacher because “*it was said to be the best job for a woman in my years*”, (P9L64P5), but she elaborated further on this statement and declared that she loved teaching and believed she played an integral role in children’s lives. Only two participants indicated that they had received bursaries (P10L28p3; P8L21p3) and that was why they had become teachers. It seemed as if most of the participants loved and enjoyed teaching and had a positive experience somewhere in their lives from a previous teacher who had made an impact on them and their choice to become a teacher. None of the participants seemed negative about their choice of career.

5.5.4 Anthropology (An)

None of the teachers expressed a negative attitude towards integrating different cultures in the classroom. It seemed as if all the participants encouraged learners to “*share opinions*” (P1L31-32p5), “*show and tell something from my culture*” (P2L31-32p3) or engage in “*constructive conversations like religion and culture*” (P6L31p3). There was no evidence to suggest that any of the participants viewed diversity as negative, although one participant expressed some fear and anxiety regarding sharing religious opinions, as they “*are frowned upon by the parents, therefore that discussion is being dodged as much as possible*” (P1L26p3).

5.5.5 Societal vision (S)

From the narratives, various opinions regarding a societal vision for teaching were evident. Some participants believed that a “*uniform and digital*” platform would be the best way forward, whereas others believed a combination of digital teaching and traditional teaching methods

should be incorporated. Most participants indicated that one should focus on the learner as a holistic being and incorporate different teaching styles to suit the needs of the learners, their age and developmental level. Participant 2 wrote that one should “*create more opportunities for creative, critical and collaborative learning experiences*” and that opportunities for “*self-assessment*” (P2L33p3) were more valuable than too many formal assessments. This idea was reiterated by Participant 5, who explained that “*we must work with what is in our hands ... learners’ abilities, background, and age*” (P5L23p2). Participant 8 also believed that teachers should “*incorporate different styles of teaching to reach all learners and appeal to different learning styles*” (P8L24p3). None of the participants expressed the idea that technology as part of teaching should be abolished. However, they made it clear that one must not lose sight of children as human beings and said that “*human touch/personal relationship*” was indeed essential to develop “*holistic human beings and not just merely fact remembering beings*” (P13L35p3).

Following on the data from the narratives, Figure 5-3 aims to highlight the five dimensions contained within each worldview group.

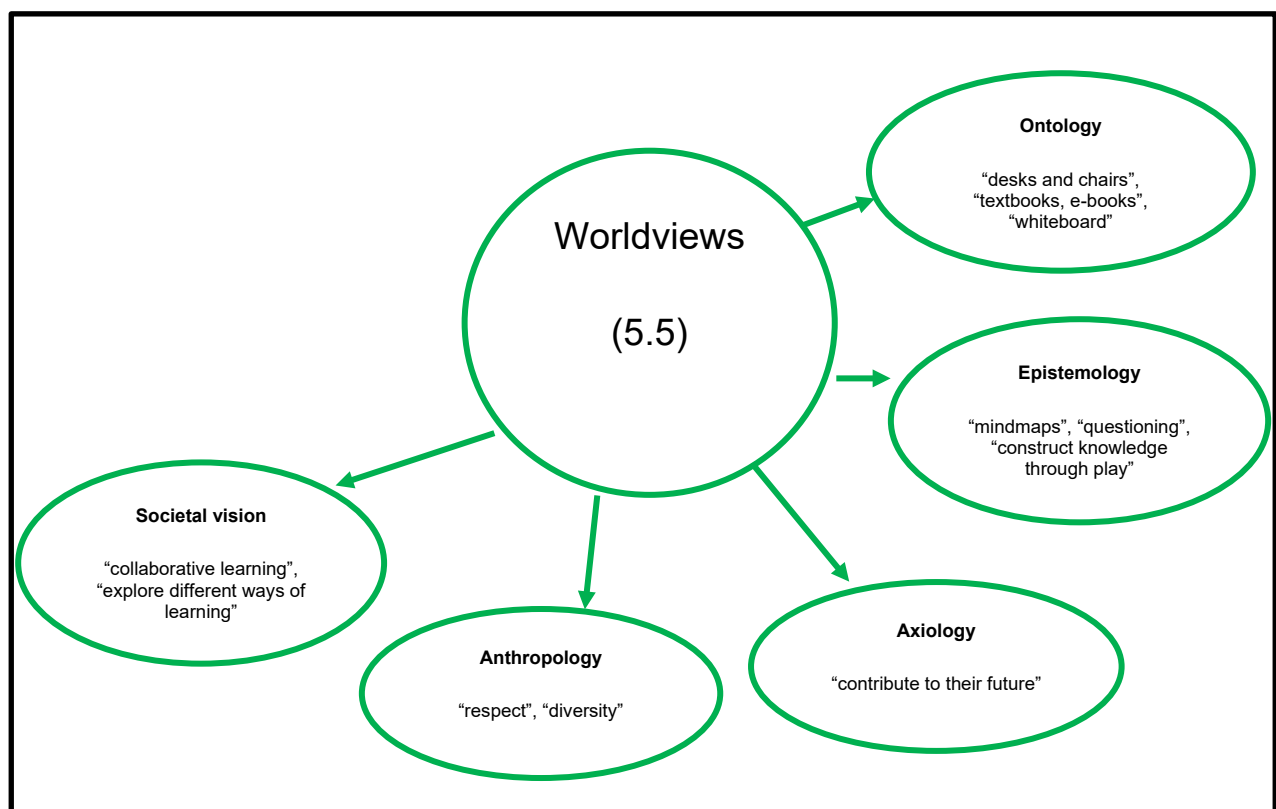


Figure 5-3: Interactive dimensions of the worldview groups.

The categorisation of the worldviews is discussed next.

5.6 Categorising worldviews

Aerts *et al.* (1994) describe a worldview as a reasonable and rational set of concepts that allow people to establish an extensive comprehension of their world (ontology), thus aiding one to understand one's lived experiences. Johnson *et al.* (2011) point out that humans must have a worldview, as they have questions about their existence and identity. Teachers also have worldviews, whether they are aware of their beliefs or not, and these beliefs regarding one's reality (ontology), knowledge and knowing (epistemology), values (axiology), their role as a teacher (anthropology) and a vision for teaching (societal vision) influence the way in which they teach. While reading the narratives and tabulating the participants' accounts, the researcher came to realise that the existence of the worldview groups operates and comes to expression in and interfaces with teachers' everyday classroom behaviour, curriculum choices and decisions.

The following sections aim to provide a broad overview of the primary assumptions and beliefs of each worldview group, that is, *traditional (T)*, *modern (M)*, *postmodern (PM)* and *integrative (I)* (De Witt *et al.* 2016). Each description is neither complete nor absolute but draws on general similarities of perspectives (De Witt, 2013). The researcher understands and interprets the four worldview groups from this nuanced perspective. However, it was evident from the data analysis that the teacher participants contained dimensions of all four worldview categories, as these seem to overlap rather than stand in isolation.

5.6.1 The category of traditional (T)

In an educational environment, a traditionalist teacher may be an individual who envisages a classroom with desks, chairs, prescribed textbooks and a writing board as being the only place where knowledge can exist. Twelve participants mentioned "*desks and chairs*" as their teaching environment, although this is the status quo at all the schools that form part of the private school group. According to Ackerman (2003), traditionalists tend to treat knowledge as truth; hence, learning opportunities include mainly memorisation, repetition, regurgitation and elaboration of target knowledge, as the focus of instruction is on the mastery of knowledge and content. Three participants indicated that knowledge should be "*learned and practised*" (P7L26p3; P9L61p5; P10L25p3) but immediately went on to explain that "*interactive play and dialogue*" were important to help learners understand and memorise what they have learnt.

5.6.2 The category of modern (Mo)

In an educational environment, a modernist teacher may include someone who is willing to incorporate different ways of thinking and doing, as there are multiple ways of teaching learners specific concepts. In so doing, a modernist teacher is likely to promote individuality by helping learners to develop an understanding of personal interests and goals. This can be done by facilitating classroom discussions where challenging topics are discussed. This was evident in some teacher participants' responses when they mentioned that *"everyone has the opportunity to share opinions"* (P1L25p3), *"link learning to a previous, personal experience"* (P2L27p3) and that *"children learn through exploration and discovery"* (P4L32-33p3).

5.6.3 The category of postmodern (PM)

In an educational environment, a postmodernist teacher will tend to acknowledge multiple perspectives of reality, since all people are unique and have different opinions and experiences (De Witt, 2013). A postmodernist teacher will likely foster the development of *"holistic human beings"* as opposed to *"merely fact remembering beings"* (P13L35p3). Moreover, they should use a combination of teaching styles and methods to *"suit their personality"* (P9L15p1). A postmodernist teacher is likely to facilitate critical thinking, the deconstruction of knowledge and reflection to challenge set knowledge and proposed truths (Duigan, 2019). Most of the teacher participants embraced the idea of collaboration and critical thinking and described it as follows: *"there are different ways learners use to acquire knowledge"* (P6L28p3); *"using the knowledge you have acquired and transcending it to the next level"* (P6L33p3); and *"create more opportunities for creative, critical and collaborative learning experiences"* (P2L33p3).

5.6.4 The category of integrative (I)

The category of integrative worldview is a combination and awareness of particular elements and beliefs from the previous worldviews. As people explore and engage in analytical thinking and reasoning, they can realise the existence of other forms of knowledge and truth, thereby embracing their limitations to create new insights for future thoughts (De Witt, 2013). In an educational environment, an integrative teacher represents someone who can adapt more easily to a different teaching environment than, for instance, a pure traditionalist who holds strong views on the nature of the teaching world. The following comments indicate that the teachers understood the importance of including a digital component in their teaching but also felt that a traditional approach to teaching and learning could not be forfeited: *"I incorporate traditional teaching methods, like writing on a board, with technology, like answering an online quiz"* (P4L39-40p3); *"it is important to have a calm environment where learners can learn and*

enjoy themselves” (P4L42p3); *“you work with what is in your hands ... learners’ abilities, background and age”* (P5L23p2); *“balance of traditional teaching and digital teaching”* (P6L33-34p3); and *“incorporate different styles of teaching to reach all learners and appeal to different learning styles* (P8L24-26p3). It is evident from the responses that the teacher participants value learners’ responses and do not see themselves as the harbingers of knowledge.

The theme of metacognitive awareness is elaborated on in the next section.

5.7 Findings from Part C: The theme of metacognitive awareness

The participants were given six prompts regarding metacognitive awareness. The first three prompts were related to metacognitive regulation (MR), which includes planning (PI), monitoring (M) and evaluation (Ev). The teachers were asked to explain how they would teach their learners the skills of planning, monitoring and evaluation. The next three prompts were related to metacognitive knowledge (MK). The teachers were asked to explain how they would teach their learners to identify their (the learners’) strengths and weaknesses with regard to knowledge of various strategies to apply when confronted with a task (declarative knowledge – D), how to apply different strategies (procedural knowledge – P) and how to teach learners which strategies to apply when and why (conditional knowledge – C).

Table 5-4 provides a summary of the dimensions of metacognitive awareness, that is, metacognitive regulation and metacognitive knowledge, as well as the subcategories of each dimension, as explored by the teacher participants. The most pertinent quotations are presented.

Table 5-4: Summary of the profile of the theme “metacognitive awareness”.

<i>A priori</i> codes	Subcategory	Prompt	Themes emerging from each category	Frequency (Hz)
Metacognitive regulation (MR)	PI	Plan	How do you teach learners to plan?	3
			“feedback” “rubrics”/“checklist”/ “reminder”	9
	M	Monitor	How do you teach learners to monitor themselves?	5
			“clear learning objectives”/“graphic organiser” “questioning”/ “discussion”	8
	Ev	Evaluate	How do you teach learners to evaluate themselves? For example, using a rubric/questionnaire/exit ticket.	2
			“mark own work” “reflection”/“ask questions” “rubrics”	6 4

A priori codes		Subcategory	Prompt	Themes emerging from each category	Frequency (Hz)
Metacognitive knowledge (MK)	D	Declarative knowledge	How do you teach learners to learn more about themselves? For example, their strengths and weaknesses with regard to knowledge of various strategies to apply when confronted with a task.	"understand personalities"/"personal learning style (self-knowledge)" "self-reflection checklists" "group discussions"	3 3 3
	P	Procedural knowledge	How do you teach learners to apply different strategies? For example, knowledge about how to use specific strategies, such as reasoning, decision making, problem solving, etc.	"questioning"/ "rephrasing"/"discussion" "teach steps"/"practice"/ "practice different strategies"/"diversity of tasks"	9 5
	C	Conditional knowledge	How do you teach learners to differentiate between the requirements of tasks? For example, which strategies to apply when and why .	"self-reflection"/"peer teaching" "teach reading strategies" "teach them what to do" "discussion"	3 2 6 6

5.7.1 Metacognitive regulation (MR)

From the narratives, it was evident that the teachers engaged in metacognitive regulation by various means. The responses for the subcategories were interconnected, as the teachers applied, for example, "*rubrics*", "*checklists*" and "*reminders*" as part of planning, monitoring and evaluation. Participant 5 indicated specifically that "*word banks and sentence construction together with the layout of a task*" (P5L26p3) helped learners to plan, and Participant 7 believed a "*mind map and graphic organizer*" (P7L32p4) assisted learners to plan and monitor their tasks. Participant 2 valued constructive feedback as the cornerstone of metacognitive regulation, coupled with questioning and providing clear learning objectives (P2L35-38p4). This was echoed by Participant 3, who wrote that to "*know the objective*" (P3L32p4) and to "*begin with the end in mind*" (P1L29p4) were imperative to help learners develop metacognitive regulation. Most of the teachers indicated that they taught learners to monitor and evaluate themselves by engaging in discussions with their teacher or peers by asking questions about the standard of their work and reflecting on what was done. The teachers used practical instruments, such as rubrics and checklists, to plan, monitor and evaluate their learners' work and progress or lack thereof. The participants' views suggest that planning, monitoring and evaluation as part of metacognitive regulation were not taught in silos, but rather facilitated holistically.

5.7.2 Metacognitive knowledge (MK)

From the narratives, it was evident that the teachers engaged in the promotion of metacognitive knowledge when teaching their learners. Three participants specifically commented on the *“learner’s preferred learning style”* (P2L41p4) or provided learners with questionnaires *“to learn more about their personalities”* (P1L40p4), as this would help them to develop self-knowledge regarding what they could and could not do. Some teachers preferred to teach the learners step by step how to use specific strategies – *“teach them in steps that they have guidelines to follow”* (P4L55-56p4). There was no evidence to suggest that the teachers forced their own will onto learners; instead, they indicated that they believed that teachers had to expose learners to a variety of techniques and ways so that the learners could choose for themselves which strategies worked best for them and which ones were less effective. Responses to this end were as follows: *“ask the learner how best they are going to approach the task”* (P2L41p4); *“if they understand the strategy, they will be able to apply it”* (P4L59p5); and *“hear what they think, how they think and assist”* (P5L31p3). When asked about his or her online learning proficiency (as part of self-directed learning), Participant 9 stated that learners needed to be taught different strategies and methods to “suit their personality” and that they needed “the assistance of an adult” (P9L15p1).

Fostering metacognitive knowledge was accompanied by class or group discussions, questioning and self-reflection. Furthermore, the teachers indicated that they set a variety of tasks to help learners to develop different skills for different tasks, as was the case with Participants 8 and 9. Participant 8 believed metacognitive knowledge could be facilitated by *“structure activities and assessments”* (P8L31p4) and by encouraging learners to apply various reading strategies when confronted with a task. Participant 9 explained that *“diversity of tasks and questions”* (P9L93p7) would help learners to understand and develop strategies for problem solving. Furthermore, this participant pointed out that the teacher must *“lead and encourage children to reason”* (P9L93p7). The data suggest that the teachers did not view the different types of knowledge (declarative, procedural and conditional) as separate entities, but rather understood metacognitive knowledge holistically.

5.7.3 In summation

Collectively, metacognitive regulation and metacognitive knowledge refer to the metacognitive experience of awareness. Gómez (2016) argues that metacognitive awareness is indicative of a teacher’s awareness of his or her comprehension of a task and the necessary skill to reflect on his or her knowledge to complete a task. In this study, metacognitive awareness refers to a teacher’s reflections that personify his or her being. These personal reflections

include an awareness of his or her thinking and knowing, worldview (beliefs and propositions), teaching strategies and teaching methods. From the narratives, it was clear that teacher participants were aware of aspects of their metacognitive awareness.

Following on the data from the narratives, Figure 5-4 highlights the dimensions of metacognitive awareness, which includes metacognitive regulation and metacognitive knowledge.

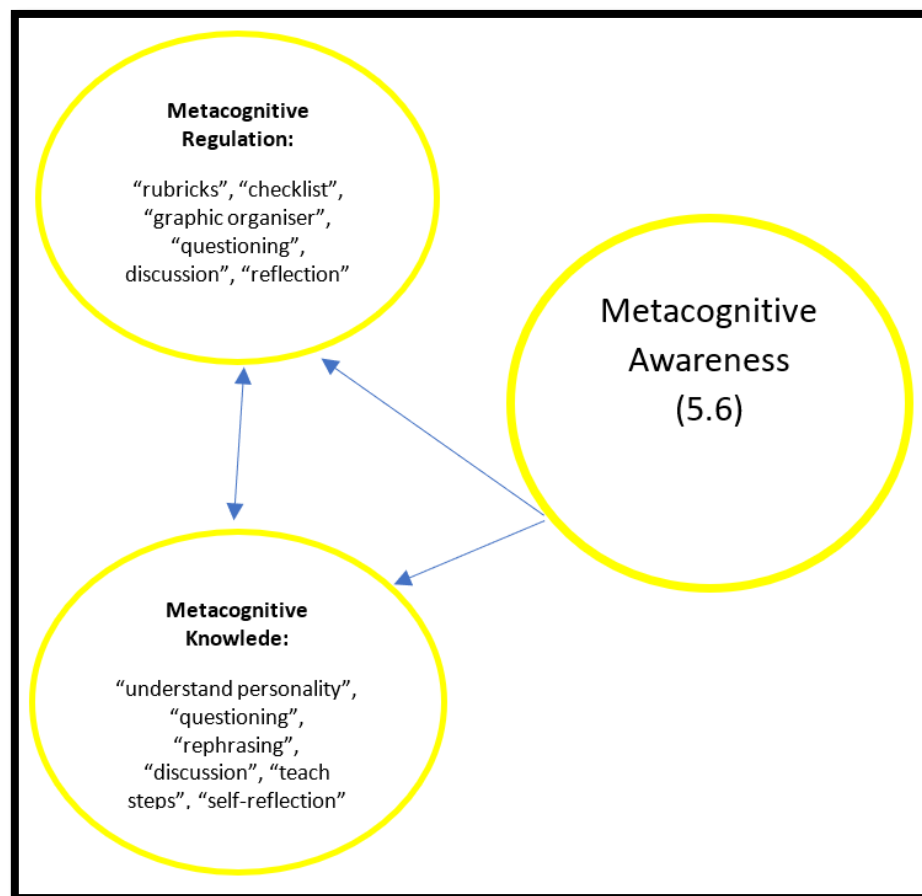


Figure 5-4: Dimensions of metacognitive awareness.

The subcategories of metacognitive regulation (planning, monitoring, and evaluation) and metacognitive knowledge (declarative, procedural, and conditional knowledge) are not specified separately because the subcategories appear to interact constantly. From the participants' accounts, it is suggested that there is an intangible yet constant interaction between metacognitive regulation and metacognitive knowledge as a teacher is confronted with various tasks and different ways in which they should be executed. Teachers' range of epistemological processes (methods) is exposed as they are grappling with knowledge about knowledge or pondering about thoughts, actions and behaviours (Papleontiou-Louca, 2003).

5.8 Synthesis

The primary research question, along with secondary qualitative questions, investigated the role of metacognitive awareness and worldviews in the process of self-directed learning in private school Intermediate Phase teachers. The concepts of self-directed learning, worldviews and metacognitive awareness appeared to be understood by most of the teacher participants. The data showed that the teachers were aware of the majority of aspects related to these three concepts. The interpretation of the findings is discussed and triangulated with the quantitative data (in Chapter 4) and the conceptual-theoretical framework in Chapter 6. By developing a greater awareness of one's worldview, it can be assumed that teachers would come to recognise they hold personal truths about their teaching world and that these truths may not be the same as those of other teachers. It is anticipated that, by reviewing and contemplating one's teaching experiences and personal assumptions, teachers would gradually become open to and aware of alternative teaching methods. The researcher argues that metacognition can facilitate the awareness that one's own worldview is just that – a worldview. Self-awareness may encourage teachers to bring to mind beliefs and values that form part of their worldview and support their teaching actions and choices.



Chapter 6 Discussion of results

6.1 Introduction

The purpose of this study was to investigate the role that metacognitive awareness and worldview play in the self-directed learning of Intermediate Phase teachers. Chapter 1 provided an overview of the research problem, key concepts, research questions and objectives, methodology, sampling techniques, and ethical considerations for a mixed-methods study. In Chapter 2, an overview of the literature was provided, key concepts with underlying dimensions were discussed, and the study was founded on a theoretical framework that was most relevant to the study's purpose. The second chapter concluded with a theoretical model proposed to clarify the relationship between the concepts of metacognitive awareness, worldview, and self-directed learning. The methodology and empirical design of the study were presented in Chapter 3, as well as the justification for a mixed-methods approach with a convergent parallel design. Due to the nature of a mixed-methods study, the quantitative data (Chapter 4) and qualitative data (Chapter 5) findings were presented separately to clarify and answer the research questions. In Chapter 6, the findings from Chapters 4 and 5 are combined as two data sets, informed by the conceptual-theoretical framework of the study and contextualised in the literature. This is done to provide a consolidated set of results and findings that are tabulated and triangulated to answer the primary research question. As a result, Chapter 6 provides a triangulated view of the data and answers the research questions.

6.2 Overview of the study

In reference to Figure 6-1, this study proposes a model to explore the interconnected nature of and the relationship between metacognitive awareness, worldview and self-directed learning. The population included all Intermediate Phase teachers from a private school group in South Africa from which the quantitative respondents and qualitative participants were invited. The samples represent teachers from different cultural backgrounds who taught learners between the ages of nine and 12 years of age. The teachers' primary language of instruction was either English or Afrikaans for all subjects as per the language policy of the private school group. The private school group was established in 1998 and follows the CAPS curriculum as prescribed by the Department of Basic Education (2012). Figure 6-1 depicts an overview of the research that was conducted.

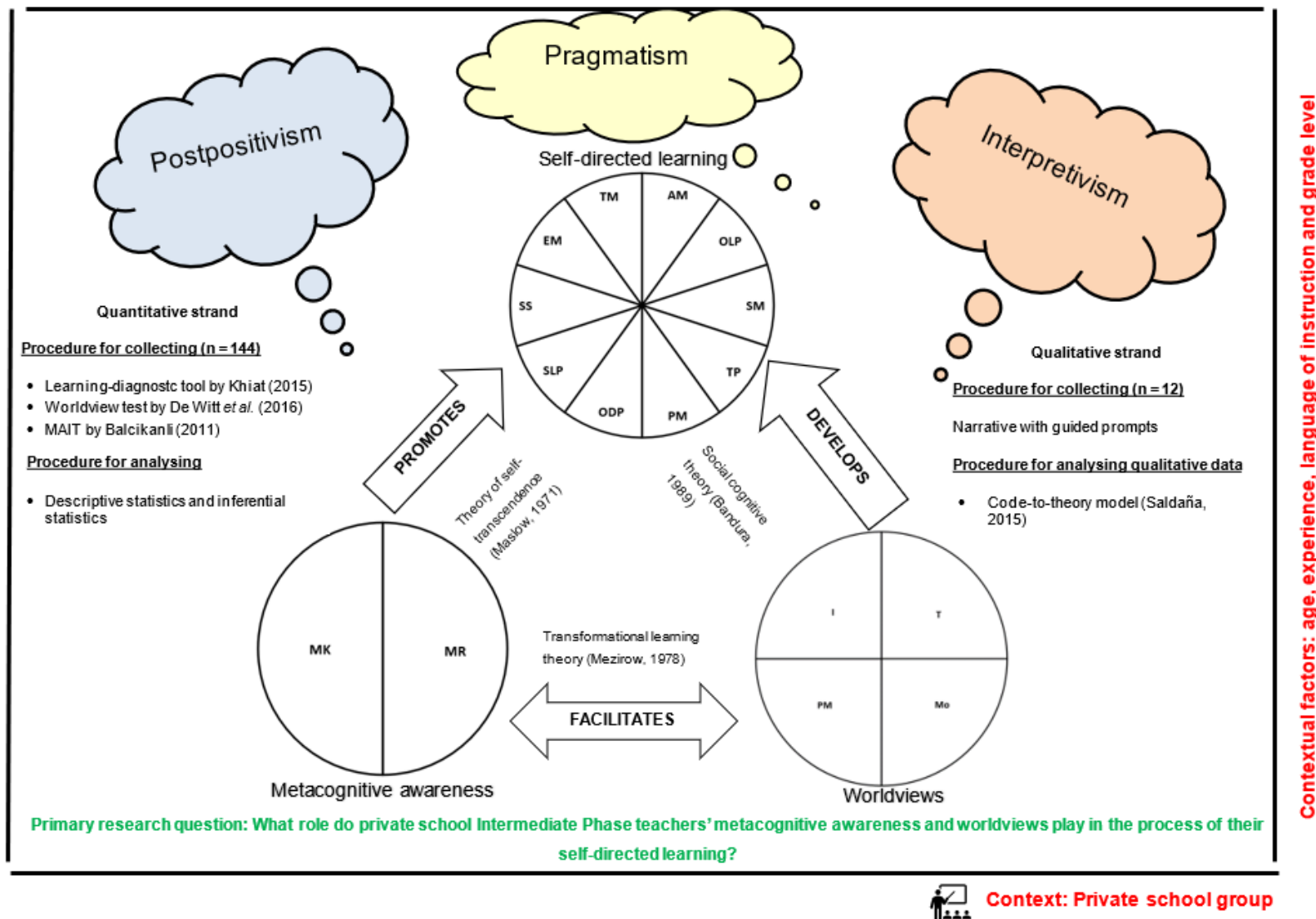


Figure 6-1: Overview of the study.

The researcher explored the role metacognitive awareness and worldview played in the process of teachers' self-directed learning. These concepts formed the basis of the initial conceptual-theoretical framework (see Figure 2-5) to determine the nature of the conceptual overlaps between the concepts. To determine the level of self-directedness, Khiat's (2015) learning diagnostic tool was applied. Khiat (2015, 11) conceptualised self-directed learning as consisting of 10 subscales, namely "*online learning proficiency (OLP)*, *stress management (SM)*, *technical proficiency (TP)*, *procrastination management (PM)*, *online discussion proficiency (ODP)*, *comprehension competence (CC)*, *assignment management (AM)*, *seminar learning proficiency (SLP)*, *examination management (EM)* and *time management (TM)*".

To identify the respondents' dominant worldview, the worldview test, developed by De Witt *et al.* (2016,102), was administered. Four worldview groups were identified – "*traditional (T)*, *modern (Mo)*, *postmodern (PM)* and *integrative (I)*" – each consisting of five subscales, namely "ontology, epistemology, axiology, anthropology and societal vision". Furthermore, to determine the respondents' metacognitive awareness, the MAIT, developed by Balcikanli (2011), was administered. Metacognitive awareness can be understood in terms of *metacognitive regulation* and *metacognitive knowledge*. The conceptual relationship between the concepts was based on the social cognitive theory (Bandura, 1989), transformational learning theory (Mezirow, 1978), and self-transcendence theory (Maslow, 1971) that underpin Vygotsky's (1978) social constructivism.

6.3 Pragmatist stance and triangulation

Before conducting the research, the researcher took a philosophical stance to underpin the study. Due to the nature of mixed-methods inquiry, Tashakkori and Teddlie (2003) contend that pragmatism is the most appropriate philosophy to govern a mixed-methods approach. In addition, Johnson *et al.* (2007) state that pragmatists believe the focus of the research is on the consequences and the importance of the research questions being asked, rather than simply the methods employed. As a result, the researcher's role in this study included obtaining several perspectives from both quantitative and qualitative data, as both data sets were collected and interpreted to gain a dynamic understanding of the research problem. Figure 6-2 depicts how triangulation was used in the study.

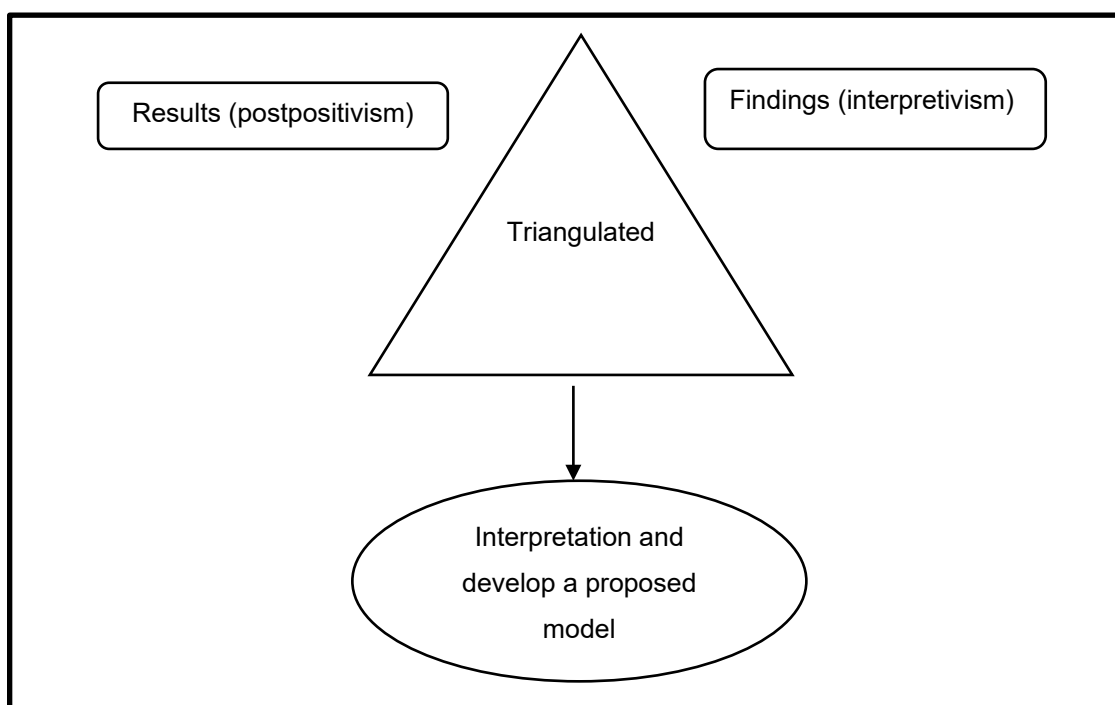


Figure 6-2: Triangulation.

The quantitative data were analysed within a postpositivist philosophy. The relationships between the constructs were measured by administering standardised questionnaires to the respondents. In so doing, the quantitative data provided numerical values and were analysed by using statistical procedures to determine the relationship between self-directed learning, metacognitive awareness and worldviews. In order to explore teachers' awareness of the three concepts, the interpretivist philosophy was employed for the qualitative strand of the study. Teachers' opinions and experiences were collected in the form of narratives where teachers were afforded the opportunity to describe their own lived experiences. Consequently, the researcher could identify themes that emerged from the data. Together, the results and findings were interpreted within a pragmatic paradigm, as both the quantitative and the qualitative data were quantifiable and presented as valuable findings.

6.4 Searching for overlapping differences and similarities between models

Table 6-1 provides an overview of the mixed-methods model, indicating the variables or themes, research questions, quantitative results and qualitative findings contextualised within the literature in pursuit of the development of a model. Results and findings that were not substantiated by the literature were also integrated and included in the discussion. Emerging

model components from each data strand were identified based on similarities and differences between the results, findings and the literature.

Table 6-1: Summary of the quantitative findings and the qualitative results.

Mixed-methods approach					Triangulation (concepts)
Quantitative (variables)					Model level and model components Contextual components (population/sample – private school setting) • Age • Years of teaching experience • Language of instruction • Grade 5 Metacognitive awareness: <i>Subordinate level of metacognitive knowledge:</i> • Declarative • Procedural • Conditional <i>Subordinate level of metacognitive regulation:</i> • Planning • Monitor • Evaluate Worldview <i>Categorical level</i> • Traditional • Modern • Postmodern • Integrative All categories depend on a subordinate level of the integrative worldview to promote self-directed learning. This is underpinned by the <i>worldview components</i> of “ontology, epistemology, axiology, anthropology and societal vision” (De Witt <i>et al.</i> 2016,102).
Variables	Research questions	Results	Supporting literature	Emerging model components	
SDL and WV	2.1.1.1	4.4.4	NA ¹²	Visible domain and affective domain	
WV and MA	2.1.1.2	4.4.3	NA	Metacognitive knowledge Integrative worldview	
MA and SDL	2.1.1.3	4.4.2	NA	Metacognitive knowledge, visible domain and affective domain	
SDL, MA and WV	2.1.1.4	4.5	NA	Metacognitive knowledge Visible domain and affective domain Integrative worldview	
Qualitative (themes)					<u>Self-directed learning</u> <u>Visible domain</u> OLP, SM, TLP, PM, ODP, CC <u>Affective domain</u> AM, SLP, EM, TM
Theme	Research questions	Findings	Supporting literature	Emerging model components	
SDL	2.1.2.1	5.4.1-5.4.10	2.2	All 10 subscales	
WV	2.1.2.2	5.5.1-5.5.5	2.3	Ontology, epistemology, axiology, anthropology societal vision	
MA	2.1.2.3	5.6.1-5.6.2	2.4	Metacognitive knowledge Metacognitive regulation	

¹² There is a paucity in the field regarding research on the combination of metacognitive awareness, worldview and self-directed learning in an educational environment. Refer to Addendum K for the letter from the librarian.

In the discussion that follows, each secondary research question is intersected with overlaying the concepts addressed in the quantitative and qualitative sections. By doing so, the secondary research questions are answered by searching for overlapping differences and similarities between the models that emerged from (i) the conceptual-theoretical framework (see Figure 2-5), (ii) the structural equation model (see Figure 4-8) and (iii) the qualitative model (see Figure 5-1). Results from the quantitative strand are utilised to understand the findings from the qualitative strand and *vice versa* to answer the primary research question, namely: What role do private school Intermediate Phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning?

Table 6-2 indicates the grouping of the secondary questions in terms of the construct or concept as the concepts overlapped.

Table 6-2: Grouping of the secondary questions.

Quantitative questions	Answered together	Qualitative questions
1. What is the relationship, if any, between self-directed learning and Intermediate Phase teachers' worldviews, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Questions 1, 5 and 6	5. What aspects of self-directed learning do Intermediate Phase teachers become aware of?
2. What is the relationship, if any, between Intermediate Phase teachers' worldviews and metacognitive awareness, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Questions 2, 6 and 7	6. What aspects of worldviews do Intermediate Phase teachers become aware of?
3. What is the relationship, if any, between Intermediate Phase teachers' metacognitive awareness and their self-directed learning, and do demographics such as age, language, subjects, years' experience and province play a role in the relationship?	Questions 3, 5 and 7	7. What aspects of metacognition do Intermediate Phase teachers become aware of?
4. What model, if any, can illustrate the relationship between the worldviews and metacognitive awareness of Intermediate Phase teachers and their self-directed learning?		

Thus, Questions 1, 5 and 6 were interpreted together. Secondary Questions 2, 6 and 7 were answered together, and Secondary Questions 3, 5 and 7 were grouped. Secondary Question 4 was answered in light of the above questions.

6.5 Establishing the literature in the context of the study

In 2020 and 2021, the researcher conducted a thorough literature review on self-directed learning, worldviews, and metacognitive awareness. The search focused on the main concepts and theories that explain the interconnected nature of the concepts for the development of a model that illustrates the relationship between Intermediate Phase teachers' worldviews and metacognitive awareness and their self-directed learning. The literature included major contributors over the past 50 years, such as Knowles (1975) regarding his conceptualising of self-directed learning and Guglielmino (1977) who established the Self-directed Learning Readiness Scale to measure self-directed learning readiness. More recent studies regarding self-directed learning were also considered, for example Du Toit-Brits and Van Zyl (2017), Alharbi (2018), Van der Walt (2019) and Zhu *et al.* (2020). When this study was conducted, researching worldviews, there were not many studies that focused exclusively on worldviews within an educational context. Literature to support the notion of a worldview included De Witt (2013), Bishop and Van der Walt (2010) and Kari and Savolainen (2010). The current study was conducted mainly in light of research done by De Witt *et al.* (2016), whose research indicates four non-scientific worldview groups in the Western world.

Metacognitive awareness is regarded as a ubiquitous term in the literature, and the researcher found many studies on metacognitive awareness within an educational context published over the past 50 years. These include works by Flavell (1979), Chatzipanteli *et al.* (2014), Jagals and Van der Walt (2016), Gómez (2016), Koriati (2019) and Smith *et al.* (2020). The literature search produced search results in which each concept had been reported upon in silos, but not together. Consequently, the researcher conceptualised the relationship between the concepts (see Figure 2-5) and then set about to explore the nuanced relationship between metacognitive awareness and worldviews in the process of Intermediate Phase teachers' self-directed learning.

6.6 Model level and model components

This section investigates contextual and conceptual components in search of a model illustrating the relationship between Intermediate Phase teachers' worldviews and metacognitive awareness and their self-directed learning. The aim of the study was to explore the roles metacognitive awareness and worldviews play in the process of self-directed learning among Intermediate Phase teachers. To do so, a conceptual-theoretical model was developed (see Figure 2-5), followed by a statistical model (see Figure 4-8) and a qualitative model (see Figure 5-1). The model's conceptual components included metacognitive awareness and worldview, as well as their roles in the development of self-directed learning. Contextual

components such as age, teaching experience, language of instruction and grade level taught were also taken into consideration.

6.7 Contextual components

In this section, the contextual components of the population, namely age, teaching experience, language of instruction and grade level taught, are discussed.

6.7.1 Age and teaching experience

The results of the quantitative strand indicate that contextual factors such as age and years of teaching experience play a role in the teachers' metacognitive awareness and worldviews in the process of self-directed learning. The data (see § 4.4.1) indicate a significant correlation between the respondents' conditional knowledge as part of metacognition and years of teaching experience, as well as the respondents' ability to manage their time and handle stress in an academic environment. Although many years of teaching experience can be indicative of a teacher with more pedagogical knowledge, sufficient planning skills and the ability to cope under pressure than, say, someone who is a beginner teacher, Smith *et al.* (2020) suggest that a teacher's awareness of his or her metacognitive knowledge will have an impact on the outcome of a lesson. If teachers are aware of and have knowledge of the dimensions of metacognition, they can be mindful of these skills when teaching. In addition, age and experience have a significant correlation with the ability to plan and handle stress in an academic environment, as well as the level of technical proficiency and online learning proficiency required. Alharbi (2018) indicates that self-directed learning behaviour is characterised by someone who possesses various skills, including time management and stress management. As 75% of the teachers in the current study were below the age of 50, various age groups had to cope with the challenge of an online learning environment as opposed to traditional face-to-face teaching and learning, which were the status quo before the study commenced. According to Maslow's (1971) theory of self-transcendence, metacognitive awareness promotes self-directed learning by making individuals aware of the knowledge of skills required to develop themselves.

6.7.2 Language of instruction

In terms of self-directed learning and metacognitive awareness, the results (§ 4.3.1-4.3.2) suggest that both language groups (English and Afrikaans) were considered equal, regardless of the language of instruction. However, in terms of a worldview (§ 4.3.3), the respondents were categorically different (traditional $n = 64$; modern $n = 7$; postmodern $n = 19$; integrative n

= 47), but they were regarded as consistent in terms of *how* their worldview related or applied to their teaching and learning experiences. The researcher did not anticipate the language of instruction to play a significant role in the development of self-directed learning, but rather (in line with Fisher, 2012) that a teacher's personal reflection capacity and willingness to understand that a worldview has an impact on beliefs, the way one teaches and the way one thinks about knowledge and how knowledge should be transferred would play a role in the development of his or her self-directed learning. The transformational learning theory of Mezirow (1978) facilitates metacognitive awareness and a worldview, for it is only when one becomes aware of personal epistemological beliefs that one can choose to direct one's behaviour to promote the development of self-directed learning.

6.7.3 Grade level taught

The results of the quantitative strand indicated that contextual factors such as grade level taught played a role in the teachers' metacognitive awareness and worldviews in the process of self-directed learning. Data (§ 4.3.4) showed that the teachers who taught at the Grade 5 level had a greater capacity for time management, as part of self-directed learning, when compared to the responses from Grade 4 and 6 teachers. In terms of metacognitive regulation, Grade 5 teachers had a greater capacity to plan, monitor and evaluate their teaching strategies and manage their time when compared to teachers who taught other grades. In terms of a worldview and the grade level taught, the teachers were categorically different but consistent in terms of *how* their worldview related or applied to their teaching and learning experiences. In line with this, De Witt *et al.* (2016) contend that a worldview denotes a system of meaning making that inform individuals on how to interpret, enact and co-create their reality. Bandura's (1989) social cognitive theory suggests that the environment (the reality) in which teaching takes place contributes to and develops a teacher's personal beliefs regarding teaching and learning and the development of self-directed learning, or not.

6.8 Answering the secondary research questions

This section focuses on answering the secondary research questions. Table 6-3 provides a summary of the self-directed learning and worldview variables or subscales. The specific sections in Chapter 4 and extracts from the participants' narratives are mentioned as well.

Table 6-3: Concepts or dimensions of self-directed learning and worldview.

Concept/dimension		Variables/ subscales		Chapter 4 (§ 4.4.4)	Themes/categories (§ 5.4 and 5.5)
Self-directed learning § 2.2	The visible domain of self-directed learning	OLP		-	“expand my knowledge base and also helps you be aware of and make use of different techniques to engage with learners”
		SM		Positive weak correlation	“time management”, “prioritise”
		TP		-	“I excel once I understand how and where to find the information”
		PM		Negative weak correlation	“to-do list”
		ODP		Positive weak correlation	“good way to gather insights”
		CC		-	“make notes”
	The affective domain of self-directed learning	AM		Negative weak correlation	“plan ahead of time”
		SLP		-	“I enjoy learning opportunities from seminars”
		EM		-	“plan beforehand” “constructive feedback”
		TM		-	“planning”, “set goals”
Worldview § 2.3		T	O	-	“desks, chairs and whiteboard”
		Mo	Ep	-	“knowledge should be made practical”
		PMo2	Ax	-	“love children”
		I	A	-	“share opinions”
			Sv	-	“holistic/different style of teaching”

"AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management

T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative

O = Ontology, Ep = Epistemology, Ax = Axiology, An = Anthropology, Sv = Societal vision"

The findings from the qualitative strand (§ 5.4.1-5.4.10) suggest that all the teacher participants indicated an awareness of all 10 dimensions of self-directed learning as conceptualised by Khiat (2015). Furthermore, the narratives of the participants reflect Xu and Ko's (2019) conceptualization of self-directed learning as a process of independence and control in which an individual directs, monitors, and regulates actions toward achieving specific learning goals. The researcher anticipated the participants' accounts to reflect what had already been reported in most literature studies. However, the data (§ 4.5.1) indicated that self-directed learning split into two parts after an inter-item correlation was done. The first domain was labelled the "visible domain of self-directed learning" and the second domain was labelled the "affective domain of self-directed learning". The division may be due to the (new) online teaching and learning environment, as opposed to the previous traditional teaching environment. The split was an unexpected discovery, as the initial conceptual-theoretical model (see Figure 2-5) did not split self-directed learning into two separate domains, but rather 10 dimensions that equally form part of self-directed learning.

From the initial conceptual-theoretical model (see Figure 2-5), the concept of worldview was divided into four groups, namely “*traditional, modern, postmodern and integrative*”, each consisting of five subscales. The subscales are conceptualised by De Witt *et al.* (2016, 102) as “*ontology, epistemology, axiology, anthropology and societal vision*”. The results of the quantitative strand (§ 4.4.4) indicate weak associations between a worldview and self-directed learning. *Procrastination management* was the only self-directed learning variable with a significant correlation with a *traditional worldview*, suggesting that traditionalists are not always sure how to manage deadlines in a (sometimes online) academic environment, although the qualitative data (§ 5.4) indicate that most of the participants applied a “*to-do list*” to help them *manage procrastination*. With regard to a *modern worldview*, the respondents felt confident in learning from an online platform, although it caused some stress in an academic environment as well. Moreover, the respondents were not always confident in selecting appropriate teaching materials for their learners, although most of the teacher participants indicated that they “*plan ahead of time*” to help them manage assignments. In terms of a *postmodern worldview* and an *integrative worldview*, there exist weak associations between the constructs.

The participants were asked to write narratives (§ 5.5.1-5.5.5) regarding their experiences of the subscales of the worldview groups. It was evident that they were aware of aspects of the subcategories of a worldview and how these beliefs influenced their everyday tasks and teaching behaviour, although they did not profess to belong to a specific worldview group. Although an individual, in this case a teacher, may not be acutely aware or profess knowledge of a specific worldview group, these beliefs interface with everyday teaching choices and behaviours, as mentioned by Taylor (1989) and Fisher (2012). The researcher expected all four worldview groups to play a role in the advancement of teachers’ self-directed learning, as initially conceptualised in Figure 2-5. However, the structural model (see Figure 4-6) indicated weak associations between a traditionalist, a modernist and a postmodernist worldview and self-directed learning. As a result, only an integrative worldview was shown to make a unique contribution to self-directed learning, implying that the other worldview groups were not conducive to self-directed learning development.

According to Bandura's (1989) social cognitive theory, people learn best by observing others' behaviour in a social setting, and an individual's thought processes influence motivation, attitudes, and behaviour. This theory considers internal mental processes that form part of the learning process in terms of shared interaction between intellectual, behavioural and environmental influences. In this manner, teachers (and their worldviews) may contribute to the learning process by modelling appropriate strategies to enhance self-directedness, or not. In terms of Vygotsky's (1978) social constructivism, individuals learn from one another in a social environment. The process of self-directed learning and the development of a worldview

do not stand in silos but, instead, work together to promote the holistic development of the individual.

The relationship between a worldview and metacognitive awareness is discussed next. Table 6-4 provides a summary of the variables or subscales of worldview and metacognitive awareness. The specific sections in Chapter 4 and extracts from the participants' narratives in Chapter 5 are mentioned as well.

Table 6-4: Concepts or dimensions of worldview and metacognitive awareness.

Concept/ dimension	Variables/subscales		Chapter 4 (§ 4.4.3)	Themes/categories (§ 5.6 and 5.5)
Metacognitive awareness § 2.4	Metacognitive knowledge	D	-	"self-knowledge"
		P	-	"teach steps", "practice"
		C	-	"self-reflection"
	Metacognitive regulation	PI	-	"checklist"
		Mo	-	"clear objectives"
		Ev	Weak positive relationship	"reflection"
Worldview § 2.3	Traditional	O	-	"desks, chairs and whiteboard"
	Modern	Ep	-	"knowledge should be made practical"
	Postmodern	Ax	-	"love children"
	Integrative	An	-	"share opinions"
		Sv	-	"holistic/different style of teaching"

"D = Declarative knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate

T = Traditional, Mo = Modern, PMo2 = Postmodern, I = Integrative

O = Ontology, Ep = Epistemology, Ax = Axiology, An = Anthropology, Sv = Societal vision"

The results from the quantitative strand (§ 4.4.3) indicate weak positive and negative relationships between metacognitive awareness and a worldview. The only significant correlation is between a traditional worldview and the variable of *evaluation*, as part of metacognitive regulation, suggesting that traditionalists reflect more on their teaching goals and strategies than the other worldview groups. The accounts of the participants' experiences (§ 5.6) of their metacognitive awareness reflect findings from previous literature studies (§ 2.3) conducted, as all the participants indicated awareness of aspects related to their metacognitive awareness. There exists a paucity in the field regarding research on worldviews within an educational context, but the participants' accounts indicated an awareness of aspects relating to a worldview, even if they did not actively reflect or profess their beliefs. This is in agreement with Taylor (1989) and Fisher (2012). The researcher was amazed that the teachers indicated an awareness of the subordinate levels of a worldview, as teachers may not always be aware of their personal beliefs and how these influence their teaching methods.

According to the findings from the qualitative strand (§ 5.6.1-5.6.2), the participants indicated an awareness of metacognitive knowledge, as they understood the need for “self-knowledge”, “practising” strategies and then “reflecting” on what worked and what did not work. The participants also indicated an awareness of metacognitive regulation by using strategies such as “checklists”, formulating learning goals and considering on what worked and what did not work. The participants’ accounts of metacognitive awareness are supported by Gómez (2016) and Smith *et al.* (2020), who advocate the fostering of metacognition as a critical component of effective teaching. The researcher was surprised by the participants’ recounts, as metacognition is usually regarded as a higher-order concept that most teachers shy away from. The initial conceptual-theoretical model (see Figure 2-5) conceptualised metacognitive awareness as consisting of two dimensions, each with three subcategories. The participants were aware of both dimensions and their subcategories. The perspectives of the participants on metacognition point to an integrated approach rather than teaching each skill separately. According to Nelson and Narens, there appears to be an invisible interplay between metacognitive knowledge and metacognitive regulation (1990). The researcher indicated that metacognitive awareness could facilitate a worldview and *vice versa*. To do so, Mezirow’s (1978) transformational learning theory was applied to explore this relationship. The theory suggests that people, in this case teachers, can alter their thinking derived from new information. In this manner, learning can challenge set viewpoints or opinions and lead to a more reflective teaching practice. Towards this end, an educational environment is a valuable place to promote opportunities to engage critically with others in order to challenge set ideas and create opportunities for reflection.

Next, the overlaps in metacognitive awareness and self-directed learning are discussed. Table 6-5 provides a summary of metacognitive awareness and self-directed learning variables or subscales. The specific sections in Chapter 4 and extracts from the participants’ narratives in Chapter 5 are also mentioned.

Table 6-5: Concepts or dimensions of metacognitive awareness and self-directed learning.

Concept/ dimension	Variables/ subscales	Chapter 4 (§ 4.4.2)	Themes/categories (§ 5.6 and 5.4)
Metacognitive awareness § 2.4	D	Significant correlations between metacognitive	“self-knowledge”
	P		“teach steps”, “practice”
	C		“self-reflection”
	PI		“checklist”
	Mo		“clear objectives”
	Ev		“reflection”
	AM		“plan ahead of time”

Concept/ dimension	Variables/ subscales	Chapter 4 (§ 4.4.2)	Themes/categories (§ 5.6 and 5.4)
Self-directed learning § 2.2	OLP	knowledge and all 10 subscales of self-directed learning.	"expand my knowledge base and also helps you be aware of and make use of different techniques to engage with learners"
	SM		"time management", "prioritise"
	TP		"I excel once I understand how and where to find the information"
	PM	Fewer significant correlations between metacognitive awareness and all 10 subscales of self-directed learning.	"to-do list"
	ODP		"good way to gather insights"
	SLP		"I enjoy learning opportunities from seminars"
	CC		"make notes"
	EM		"plan beforehand"
	TM		"constructive feedback"
			"planning", "set goals"

"D = Declarative Knowledge, P = Procedural knowledge, C = Conditional knowledge, PI = Planning, M = Monitoring, Ev = Evaluate

AM = Assignment management, OLP = Online learning proficiency, SM = Stress management, TP = Technical proficiency, PM = Procrastination management, ODP = Online discussion proficiency, SLP = Seminar learning proficiency, CC = Comprehension competence, EM = Examination management, TM = Time management"

The results (§ 4.4.2) indicate more significant associations between metacognitive knowledge and self-directed learning than metacognitive regulation and self-directed learning. Although the qualitative data (§ 5.4) indicated that most of the teachers were aware of aspects related to their self-directed learning, the quantitative data (§ 4.4.2) indicated that some teachers were not always sure how to apply their declarative, procedural and conditional knowledge when teaching online, working from or learning from a computer-based platform. At the time of the study (July 2021), the private school group was faced with the challenges of the Covid-19 pandemic and the impact it had on teaching and learning. It appeared the respondents struggled to apply their knowledge of learning in synchronous and asynchronous learning environments, as opposed to face-to-face teaching and learning.

In terms of metacognitive regulation, the results from the quantitative strand (§ 4.4.2) indicate that the respondents were able to plan lessons, monitor and evaluate themselves in terms of their assignments, learn new knowledge from training sessions and manage their time effectively. However, the teachers were unsure how to plan to learn from an *online platform*, how to monitor their ability to learn from an *online platform* or evaluate themselves when learning from or taking part in *online discussions*. In line with previous literature studies concerning self-directed learning (e.g. Arkan *et al.*, 2016), the participants were able to direct their actions towards achieving a learning goal. In addition, if a teacher has knowledge of the dimensions of metacognition (knowledge and regulation), he or she can be mindful of these skills when teaching (Smith *et al.*, 2020).

As shown in Figure 4-5, the researcher predicted a relationship between metacognitive knowledge and regulation as strong predictors of self-directed learning. However, the structural

model results (see Figure 4-8) revealed that only the subordinate level of metacognitive knowledge contributed significantly to the development of self-directed learning. The researcher suggested metacognitive awareness to promote self-directed learning based on the initial conceptual-theoretical framework (see Figure 2-5). The standard theory to explain this conceptual relationship is Maslow's (1971) theory of self-transcendence. This theory attests individuals have the capacity to transcend their thoughts, surpass their beliefs and limitations and see themselves from a more sophisticated perspective. This view is significant because it provides a broader understanding of people's worldviews and suggests that people have the capacity to surpass their own limitations, should they wish to do so.

In pursuit of understanding the interconnected nature between the constructs or concepts, the researcher drew a conceptual-theoretical map (see Figure 2-5) to explore the role Intermediate Phase teachers' metacognitive awareness and worldviews played in the process of their self-directed learning. To that end, the researcher combined the conceptual-theoretical model (see Figure 2-5) with the structural model (see Figure 4-8) and the qualitative model (see Figure 5-1) to demonstrate the relationship between Intermediate Phase teachers' worldviews and metacognitive awareness and their self-directed learning. Figure 6-3 depicts the combination of the three models.

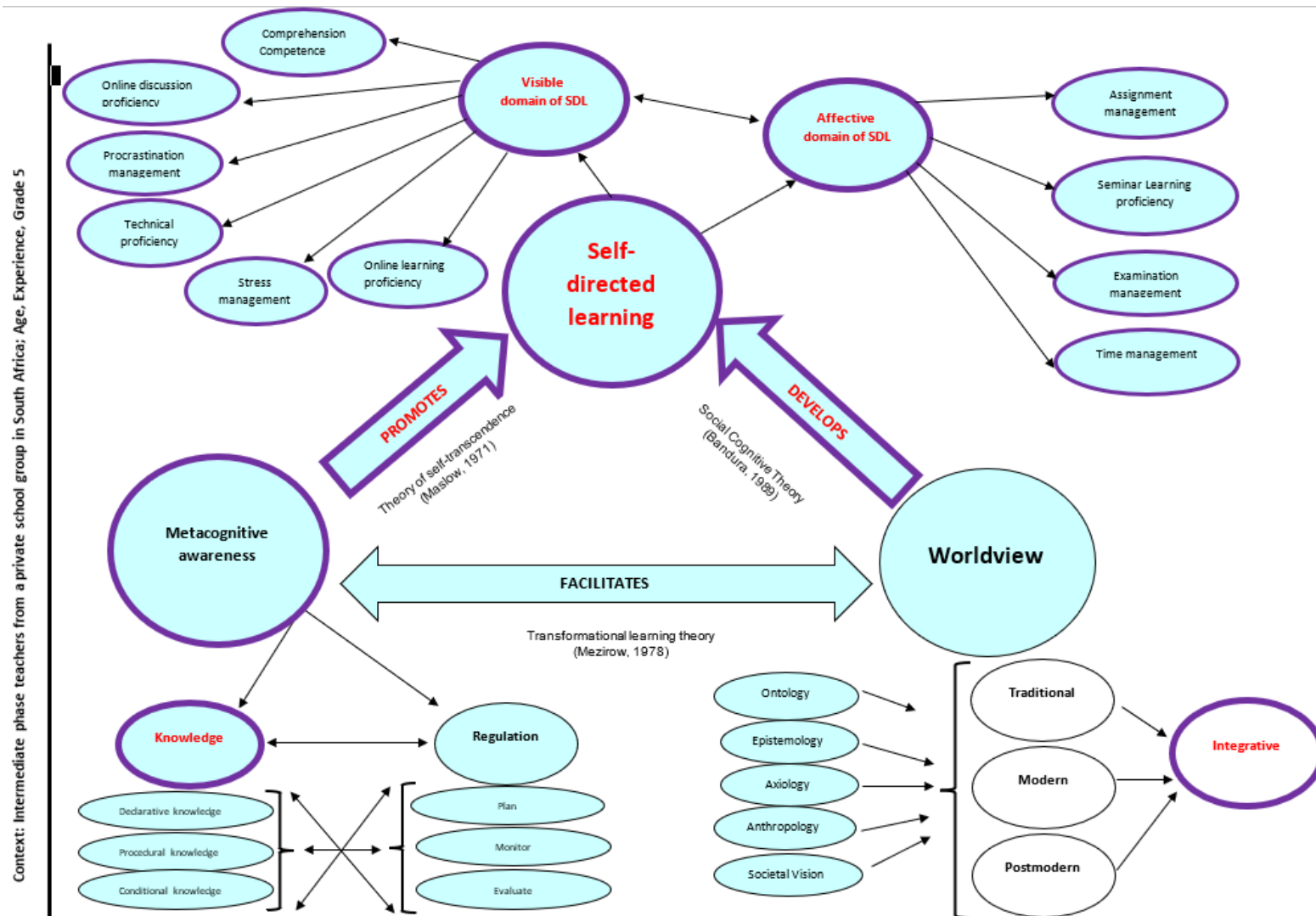
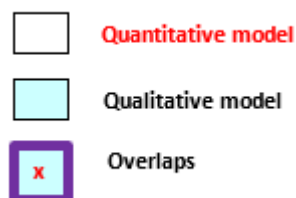


Figure 6-3: Final model explaining the interaction between the concepts.

Figure 6-3 shows three integrated models derived from the theoretical model of the literature study (see Figure 2-5), the statistical model of the quantitative strand (see Figure 4-8) and the qualitative model from Figure 5-1. To distinguish between these models in Figure 6-2, the following diagrammatic keys are used:



In Chapter 4 (§ 4.5), four structural models emerged to explain possible relationships between the main constructs. Although there was a significant relationship between metacognitive awareness and self-directed learning, only metacognitive knowledge contributed significantly to the development of self-directed learning, as shown in Figure 4-8. In comparison, the qualitative findings (5.4, 5.6) included teachers' lived experiences with self-directed learning and metacognitive awareness; participants indicated a combined awareness of metacognitive knowledge and metacognitive regulation for the development of self-directed learning. The theory of self-transcendence was applied to explain the theoretical relationship between metacognitive awareness and the promotion of self-directed learning. In terms of the four worldview groups, the integrative worldview was the only worldview to make a unique contribution to the development of self-directed learning, as depicted in Figure 4-7. The findings (§ 5.5) reflected the participants' awareness of all the subordinate levels of a worldview, and so, Bandura's (1989) social cognitive theory was applied to explain the theoretical relationship between a worldview and the development of self-directed learning. The results from Chapter 4 revealed the absence of a link between metacognitive awareness and a worldview, although the participants' accounts (§ 5.5-5.6) indicated an awareness of all the subordinate levels of metacognitive awareness and a worldview. Mezirow's (1978) transformational theory was applied to explain the link between metacognitive awareness and a worldview.

Contextual factors were also taken into consideration when the final model was developed, although the study did not set out to explain the impact of age, teaching experience, language of instruction and grade level taught on the development of Intermediate Phase teachers' self-directed learning. Nevertheless, the results of the quantitative strand (§ 4.4.1) revealed that age, teaching experience and Grade 5 level correlated with aspects of self-directed learning and metacognitive knowledge. In line with Van Wyk's (2017) study, the participants in the current study indicated an awareness of self-directed learning, took responsibility for their

learning and applied appropriate metacognitive strategies in the learning process. The researcher did not expect the participants to be much aware of aspects related to their self-directed learning, worldviews or metacognition, as these concepts are regarded as 'academic' by nature or classified as higher-order concepts. Vygotsky's (1978) social constructivism underpins the study, as people, in this case teachers, experience reality through their lived experiences.

6.9 Answering the primary research question

The following discussion serves to answer the primary research question: What role do private school Intermediate Phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning?

Metacognitive awareness consists of the subordinate level of metacognitive knowledge and metacognitive regulation and is a significant element of effective teaching (Chekwa *et al.*, 2015). The components of the subordinate levels (declarative, procedural and conditional knowledge, planning, monitoring and evaluation) assist in developing awareness and control over how teachers conceptualise their thinking and, therefore, drive their teaching practices. Smith *et al.* (2020) contend that metacognitive awareness can be taught, and this may help empower teachers to make better decisions regarding their teaching methods. All worldview categories depend on a subordinate level of the integrative worldview to promote self-directed learning. Consequently, as teachers become aware of knowledge about themselves and their beliefs (worldviews), they have a choice to direct their actions towards promoting self-directed learning, or not. Initially, for the study's purpose, self-directed learning was conceptualised as an inherent process that might not be visible or tangible at first, as personal beliefs (worldviews) are applied and challenged to formulate (new) learning goals and strategies that facilitate the capacity to become aware of one's own knowledge and the regulation of knowledge (metacognition).

A person, in this case a teacher, is an individual who possesses his or her own thoughts, beliefs and opinions regarding teaching methodologies and pedagogical approaches, but if left unchecked, reflection-in-action and the development of self cannot occur. Towards this end, the combination of metacognitive knowledge and metacognitive regulation, together with an integrative worldview, is a predictor of the development of a teacher's self-directed learning.

6.10 Applications of the model: Contribution and Recommendations

There are many references regarding self-directed learning and metacognition; to be exact, 161 works (Google Scholar, 2022) include the terms “self-directed learning”, “metacognition” and “worldview” within an educational context. Research studies have examined teacher beliefs, teachers’ metacognitive awareness and how teacher beliefs influence teaching habits although teachers may not be aware of their worldview regarding education. Ontologically, the final model (see Figure 6-3) provides an understanding of how these three concepts influence one another practically and how they contribute to a teacher’s self-directed learning. The model can be applied as part of teacher-training modules to make teachers aware of their specific worldview and how this informs their decision making as a teacher. Epistemologically, the model may contain challenges for teachers; however, knowledge of worldviews, metacognitive awareness and self-directed learning should form part of all teachers’ pedagogical knowledge to equip themselves for the 21st-century learning environment. Methodologically, the model provides an opportunity for the development of a worldview questionnaire within an educational context and should be integrated into preservice teacher programmes as well as in-service professional development courses. If teachers do not understand their teacher type and the effect their personal views have on education, they will hamper their own personal growth.

6.11 Conclusion and a reflection on my journey

South Africans face a severe education crisis due to a lack of educational resources, infrastructure, poor governance and unqualified teachers (Macha & Kadakia, 2017). Consequently, private schools promise to offer better quality education opportunities for learners (Mupunga, 2019). In this mixed-methods study, the researcher explored the role that private school Intermediate Phase teachers’ metacognitive awareness and worldviews play in the process of their self-directed learning. The purpose of collecting both qualitative and quantitative data was to converge and triangulate results and findings. According to self-transcendence theory, metacognitive awareness aids in the development of self-directed learning (see Figure 4-5 and section 5.4, 5.6). The findings (§ 5.4, 5.5) and Figure 4.6 also reflected Bandura’s (1989) social cognitive theory supporting the relationship between worldview and self-directed learning. In addition, Mezirow’s (1978) transformational theory supports the relationship between metacognitive awareness and a worldview as participants’ accounts (§ 5.5-5.6) indicated an awareness of all the subordinate levels of metacognitive awareness and a worldview.

Since I was five years old, I have wanted to be a primary school teacher because I love working with people and helping them to succeed. I always used to think my Grade 1 teacher was born

with special teaching powers that told her exactly what to do and how to teach. I also wanted to be a “superhero”, and therefore, I completed my Bachelor of Education degree in 2002. I have been a Grade 4 teacher for the past 16 years, and I always enjoyed listening to my colleagues talk about educational issues. However, during my Bachelor of Education (Honours) year, I realised that my Grade 1 teacher was not born with special teaching powers, but that much of her teaching skill came from her preconceived ideas about education. This was when I recognised that the way in which teachers (myself included) think about education directly affects the way in which they teach and learn.

During the 2020 pandemic, the teachers at our school battled to cope with the everyday demands of teaching within an online learning environment. This was a challenge we were not adequately prepared for. I was quite intrigued by why some of my colleagues were excited about new ways of teaching, whereas others were extremely negative and refused to embrace new teaching methods. And so, I started my journey by asking teachers provoking questions about their insights into education. The most interesting finding for me was discovering that I was indeed a traditionalist. This was enlightening for me because I then understood why I never got excited about “new” ways of teaching.

A traditionalist teacher is one who is firmly rooted in tradition (“this is the only way we do things”) and is not always eager to embrace or consider “alternative” methods of teaching and learning. What I did not realise at the time was that I was impeding my own professional development and growth. Throughout this journey, I was confronted with my own ideas about how learning “should” and “should not” take place. I unknowingly harboured my own epistemological beliefs, and I viewed these as concrete and absolute. From my three-year journey, I learned that teachers are not born with special teaching powers; instead, they have the choice to improve themselves with new knowledge and skills. Knowing who you are (teacher type) will help to develop self-aware teachers who understand the impact their thoughts and beliefs have on their learning and that one is indeed able to grow from concrete and absolute beliefs to more embracing beliefs.

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Addenda

Addendum A – Statistical techniques associated with the secondary research questions

Addendum B – Invitation to respondents for the quantitative questionnaire

Addendum C – Quantitative questionnaire

Addendum D – Invitation to participants for writing the narrative

Addendum E – Qualitative prompts – Writing a narrative

Addendum F – Addendum F: Quantitative analysis: Variables, subscales and worldview test

Addendum G – Goodwill permission from Head of Primary Schools

Addendum H – Legal authorisation

Addendum I – Ethical clearance certificate

Addendum J – Proposed timeline

Addendum K – E-mail from the librarian

Addendum L – Turnitin

Addendum M – Copy of ID

Addendum N – Letter from Statistical Consultation Services

Addendum O – Solemn declaration

Addendum A – Statistical techniques associated with the secondary research questions

Secondary research questions	Statistical technique
What level of self-directed learning do intermediate phase teachers' exhibit?	mean scores and standard deviations
What worldviews do intermediate phase teachers exhibit?	mean scores and standard deviations
What level of metacognitive awareness do intermediate phase teachers exhibit?	mean scores and standard deviations
How do/es intermediate phase teachers' self-directed learning relate to personal effect sizes attributes? (Age, language, subjects, years' experience, grades and province)	Effect sizes
How do/es intermediate phase teachers' worldviews relate to personal attributes? (Age, language, subjects, years' experience, grades and province)	Effect sizes
How do/es intermediate phase teachers' metacognitive awareness relate to personal attributes? (Age, language, subjects, years' experience, grades and province)	Effect sizes
What is the relationship, if any, between self-directed learning and intermediate phase teachers' worldviews?	Spearman's rho to calculate correlations and ANOVAs
What is the relationship, if any, between intermediate phase teachers' worldviews and metacognitive awareness?	Spearman's rho to calculate correlations and ANOVAs
What is the relationship, if any, between intermediate phase teachers' metacognitive awareness and their self-directed learning?	Spearman's rho to calculate correlations and ANOVAs
What model, if any can illustrate the relationship between worldviews and metacognitive awareness of the teachers and their self-directed learning?	Structural equation modelling

Addendum B – Invitation to respondents for the quantitative questionnaire

Dear Colleague

I am a master's student from the North-West University involved in a study with the aim of exploring what role intermediate phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning.

As an intermediate phase teacher, your responses are truly valuable, and you are contributing to the field of educational research. Your time and input are greatly cherished and appreciated.

This study consists of two parts: Part A: Online questionnaire
Part B: Narrative

This invitation is for Part A: completing an online questionnaire.

If you would like to take part in the study, please follow the link provided. [\(CLICK HERE\)](#). The closing date for completing the questionnaire is 21 June 2021. It will take you approximately 30 minutes.

Please note the ethical aspects considered for this study include:

- Teachers' right to privacy and anonymity will be protected by keeping responses to the questionnaire anonymous and confidential.
- Involvement in the study is completely voluntary, and respondents may withdraw if they wish at any time.

Thank you for your time and consideration.

Addendum C – Quantitative questionnaire

Dear Colleague

Welcome to the study and thank you for taking time from your extremely busy schedule to complete the questionnaire. As an intermediate phase teacher, your responses are truly valuable, and you are contributing to the field of educational research. Your time and input are greatly cherished and appreciated. Please note that all responses are confidential, private and anonymous. However, if you would like more information regarding the study and the findings, please send an email to *selfdirectedlearningMED@gmail.com*

You are required to read and answer this questionnaire which consists of 4 sections and will take 30 minutes to complete. There are no right or wrong answers.

Please indicate informed consent by clicking on the option below:

1. I understand that I am completing this questionnaire voluntary, and I have not been pressurised to take part. (yes/ no)
2. I understand what is expected of me in the research and I may choose to leave the study at any time and will not be penalised or prejudiced in any way. (yes/no)
3. I understand that my responses are confidential, private and anonymous but I give permission that my answers may be used to further educational research in the field of self-directed learning. (yes/ no)

Section 1: Biographical details

1. Please indicate your age group. (**tick list*)
(20-30); (31-40); (41-50); (51-60); (61+)
2. Please indicate your years' experience in the intermediate phase.
3. Please indicate your primary language of instruction in the classroom. (**tick list*)
(English); (Afrikaans)
4. Please indicate the province where you teach. (**tick list*)

Western Cape; Northern Cape, Eastern Cape, Gauteng, North- West, Limpopo, Mpumalanga, Free State, KwaZulu-Natal

5. Indicate the grade(s) you teach. (**tick list*)
(Grade 4 only); (Grade 5 only); (Grade 6 only); (I teach classes across the phase)

6. Indicate the subject(s) you teach. (**tick list*)
English Home Language; English First Additional Language, Afrikaans Huistaal, Afrikaans Eerste Addisionele Taal, Mathematics, Natural Science and Technology, Robotics, History, Geography, IT, Art, Life Skills, Physical education, Music

Thank you, you have completed Section 1.

Section 2: Self-directed learning

When answering the following section, reflect on the past lockdown period. Teachers had to attend and take part in online teaching and training sessions and most schoolwork had to be completed electronically. Most teachers had to learn new computer skills in order to teach their learners remotely.

In the following section, you are going to complete a questionnaire that consists of 26 questions. Please read each statement and indicate the number that best describes your thoughts and feelings about your learning and professional development.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

1. "The information I gathered for my assignments is relevant. (*Assignment in this context refers to assignments teachers have to set for their learners in the specific subject*)
2. I can present the information in my assignment clearly. (*Assignment in this context refers to the teacher's ability to select appropriate information when setting an exam or a test for the learners in the specific subject*)
3. I do not know how to pick up important information during online presentations. (*Online presentations in this context refers to listening to online training for professional development*).
4. I do not understand what my instructor says during online presentations. (*Online presentations in this context refers to listening to online training for professional development*).
5. I cannot focus during online presentations (*Online presentations in this context refers to listening to online training or teaching a hybrid class*).
6. I fear not doing well for my assignments/assessments. (*Assignments in this context refers to the teacher's ability to handle academic stress in an educational environment to set appropriate tests/ exams / tasks for the learners*)
7. I am demoralised when I do not meet the expectations, I set for myself in my studies. (*Studies in this context refers to the teacher's ability to handle academic stress in an educational environment*).
8. I feel intimidated whenever I use the internet.
9. I have problems using computer software and hardware.

10. I try to avoid study (*teaching and learning*) work that needs computers.
11. I find excuses for not studying for courses. (*Courses in this context refers to teachers attending online lessons to expand professional development and to manage deadlines*)
12. I prefer to do other things than study the learning materials or resources. (*Learning materials and resources in this context refers to the resources on Teams that teachers can read/ download to help them teach online and manage deadlines*).
13. I keep postponing my study tasks designated in a course. (*Study tasks in this context refers to setting assignments/ test/ exams/ digital worksheets for the learners timeously*)
14. I do not know how to prepare for online discussions. (*e.g., Teams meetings and/or Teams training*)
15. I do not know what to write in response to discussion topics posted on the discussion forums. (*e.g., Microsoft Teams*)
16. I learn from my instructor and peers during seminars. (*Seminars in this context refers to the teachers' ability to learn new information during online presentations via Teams to expand professional development*)
17. I reflect on what I have learnt during seminars. (*Seminars in this context refers to the teachers' ability to learn new information during online presentations via Teams to expand professional development*)
18. I love attending seminars. (*Seminars in this context refers to the teachers' ability to learn new information during online presentations via Teams to expand professional development*)
19. I cannot relate the content of the readings to the course objectives. (*Readings and course objectives in this context refer to the teacher's ability to understand readings and make study notes during online training sessions from the Remote Learning Teams group and to keep track of what they know or do not know relating to subject matter or new teaching approaches*)
20. I do not understand the assigned readings. (*Readings in this context refer to the teacher's ability to understand study notes and resources during online training sessions (from the Remote Learning Teams group) and to keep track of what they know or do not know relating to subject matter or new teaching approaches*)
21. I do poorly in tests and examinations. (*Tests and examinations in this context refer to the teacher's ability to plan a lesson for an informal or formal class visit and/or moderation*)

22. I feel confident when taking tests and examinations. (*Tests and examinations in this context refer to the teacher's ability to plan a lesson for an informal or formal class visit and/or moderation*)

23. I plan what I need to learn in a course. (*Courses in this context refers to teachers attending online lessons to utilize teaching time effectively and to set up personalised learning goals for what they want to achieve*)

24. I set targets to achieve for assignments and examinations for each course. (*Refers to the teacher's ability to utilize time effectively and setting up personalised learning goals for what they want to achieve when setting the test/ task/ assignment for learners*).

25. I set aside enough time to study for examinations and/or do the assignments in a course. (*Refers to the teacher's ability to utilize time effectively and setting up personalised learning goals to prepare for lessons/ formal class visit*).

26. I find time to study the learning materials and/or resources in a course. (*Refers to the teacher's ability to utilise time effectively and setting up personalised learning goals with regards to online learning/ new teaching approaches*).

Thank you, you have completed Section 2.

Section 3: Worldviews Test

In the following section, you are going to complete a questionnaire that consists of 17 questions. In each of the following 17 questions, you are presented with four statements, which give a different view on the same topic. Simply select the answer you most agree with (or fits you best), and the one you least agree with (or are most opposed to). After selecting your 2 answers, proceed to the next question.

1. Please select the item you **most agree** with, and the one you **least agree** with.

When I'm forming an opinion on an issue...

Most Least

☐ ☐ ... I tend to trust traditional or religious leaders

☐ ☐ ... I tend to trust scientists and other experts

☐ ☐ ... I tend to trust my judgment, feelings, and intuition

☐ ☐ ... I try to honour all perspectives and combine them into a larger whole

2. Please select the item you **most agree** with, and the one you **least agree** with.

The most important thing in my life is...

Most Least

☐ ☐ ... to be successful and have people recognize my achievements

☐ ☐ ... to actualize my inner potential and thereby serve the (cultural) evolution of humanity

☐ ☐ ... to do things my way and forge my path in life

☐ ☐ ... to be of service to my family, community, and/or country

3. Please select the item you **most agree** with, and the one you **least agree** with.

I strive for...

Most Least

☐ ☐ ... a comfortable and fun lifestyle

☐ ☐ ... a wholesome and natural lifestyle

☐ ☐ ... a sober, simple, and humble lifestyle

☐ ☐ ... a diverse and expressive lifestyle

4. Please select the item you **most agree** with, and the one you **least agree** with.

Self-identity

Most Least

☐ ☐ I feel more like a citizen of the world than a citizen of a country

☐ ☐ I feel part of the vast, interconnected whole that is life and the universe

- ☐ ☐ Who I am is defined by my social position and/or my achievements
- ☐ ☐ Who I am is defined by my religion and upbringing

5. Please select the item you **most agree** with, and the one you **least agree** with.

The human-nature relationship

Most Least

- ☐ ☐ Things in nature are generally more perfect than those made by humans
- ☐ ☐ By mastering nature, the human being can find freedom
- ☐ ☐ Humans should behave as protectors of creation
- ☐ ☐ On a deep level, I feel like I am one with nature

6. Please select the item you **most agree** with, and the one you **least agree** with.

Values of nature

Most Least

- ☐ ☐ Nature has value in and of itself, even if it has no value for humans whatsoever
- ☐ ☐ People ascribe different values to nature, and all of them are important
- ☐ ☐ Nature is created by God* and is therefore valuable
- ☐ ☐ Nature has value because humans can use and enjoy it

* When the term God is used, we do not necessarily mean the Christian God. The word can also refer to the divine, the ultimate, or the Creator (Brahman, Allah, Yahweh, etc.).

7. Please select the item you **most agree** with, and the one you **least agree** with.

It is very important to me...

Most Least

- | | | |
|-----------------------|-----------------------|---|
| ☐ | ☐ | ... to be imaginative and express myself in the way I think and live |
| ☐ | ☐ | ... to explore my inner world so I can live from my 'true' or 'deeper' self |
| ☐ | ☐ | ... to adapt myself to others and behave appropriately and socially |
| ☐ | ☐ | ... to have enough money to have and do nice things |

8. Please select the item you **most agree** with, and the one you **least agree** with.

Metaphysics

Most Least

- | | | |
|-----------------------|-----------------------|---|
| ☐ | ☐ | People look at the world from different perspectives, which are all equally valid |
| ☐ | ☐ | The universe is governed by mechanical, natural laws |
| ☐ | ☐ | Reality is complex: it is both scientific and spiritual at the same time |
| ☐ | ☐ | God* stands far above life on earth |

* When the term God is used, we do not necessarily mean the Christian God. The word can also refer to the divine, the ultimate, or the Creator (Brahman, Allah, Yahweh, etc.).

9. Please select the item you **most agree** with, and the one you **least agree** with.

Role of Science

Most Least

- | | | |
|-----------------------|-----------------------|--|
| ☐ | ☐ | To gain an understanding of the world, science needs to be integrated with other forms of knowledge, such as spiritual insight |
| ☐ | ☐ | Science is the ultimate source of trustworthy knowledge |
| ☐ | ☐ | We depend too much on science and not enough on faith |

- ☐ ☐ Morality, art, and intuition are important for gaining knowledge about the world

10. Please select the item you **most agree** with, and the one you **least agree** with.

For me, to live a good life is ...

Most Least

- ☐ ☐ ... to support those who are oppressed and dominated
- ☐ ☐ ... to respect the tradition and honour my community
- ☐ ☐ ... to offer my unique 'gifts' to the larger whole of life
- ☐ ☐ ... to be independent and do whatever I enjoy

11. Please select the item you **most agree** with, and the one you **least agree** with.

Origin of life

Most Least

- ☐ ☐ Life was brought about through biological evolution (not steered by a higher power)
- ☐ ☐ How life originated is still unclear, despite what science and religion say about it
- ☐ ☐ Life was miraculously created by a higher power
- ☐ ☐ I see the universe as a creative expression of an evolving consciousness or 'Spirit'

12. Please select the item you **most agree** with, and the one you **least agree** with.

Impacts of science and technology

Most Least

- ☐ ☐ One of the negative effects of science and technology is that they break down people's ideas of right and wrong
- ☐ ☐ Science and technology can make beneficial contributions when society is actively engaged with technological developments

- ☐ ☐ Science and technology are making our lives healthier, easier, and more comfortable
- ☐ ☐ Science and technology are often corrupted by special interests, e.g., of big corporations

13. Please select the item you **most agree** with, and the one you **least agree** with.

The human-nature relationship

Most Least

- ☐ ☐ Humans can improve on nature
- ☐ ☐ Interfering with nature is risky because it may be too complex for us to understand
- ☐ ☐ Aware of their deep connectedness, humans and nature can work together in mutually enhancing ways.
- ☐ ☐ When it comes to interfering with nature, mankind has no right to play God

14. Please select the item you **most agree** with, and the one you **least agree** with.

Nature and role of suffering

Most Least

- ☐ ☐ The suffering in the world is created and maintained by existing power structures
- ☐ ☐ I use the pain and suffering in my life as opportunities for inner growth
- ☐ ☐ The suffering that happens to people is the will of God
- ☐ ☐ The suffering that happens to people does not have meaning but is random

15. Please select the item you **most agree** with, and the one you **least agree** with.

Nature of death

Most Least

- ☐ ☐ I do not know what happens to us after we die
- ☐ ☐ I do not believe in an afterlife of any form
- ☐ ☐ In an afterlife, we will be punished or rewarded for our actions in this life
- ☐ ☐ I believe that the evolution of our consciousness continues after our death

16. Please select the item you **most agree** with, and the one you **least agree** with.

Relationship individual - society

Most Least

- ☐ ☐ When individuals thrive and blossom, they naturally start working for a better world for all
- ☐ ☐ Each individual needs to sacrifice his/her desires to serve the community and society at large
- ☐ ☐ Everybody needs to take care of, and stand up for, oneself
- ☐ ☐ Society should offer decent care for every individual

17. Please select the item you **most agree** with, and the one you **least agree** with.

In society...

Most Least

- ☐ ☐ ... we should place more emphasis on science and technology
- ☐ ☐ ... we should place more emphasis on inner growth and self-actualisation
- ☐ ☐ ... we should have greater respect for religious authority and tradition
- ☐ ☐ ... we should place more emphasis on art, culture, and moral development

Thank you, you have completed Section 3.

Section 4: Teachers' Metacognitive Awareness

In the following section, you are going to complete a questionnaire with 24 questions. Please read each statement and indicate the number that best describes your thoughts and feelings about your learning.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

¹³**Declarative knowledge**

1. I am aware of the strengths and weaknesses in my teaching.
2. I know what skills are most important to be a good teacher.
3. I have control over how well I teach.
4. I know what I am expected to teach.

Procedural knowledge

5. I try to use teaching techniques that worked in the past.
6. I have a specific reason for choosing each teaching technique I use in class.
7. I am aware of what teaching technique I use when I am teaching.
8. I use helpful teaching techniques automatically.

Conditional knowledge

9. I use my strengths to compensate for my weakness in my teaching.
10. I can motivate myself to teach when I need to teach.
11. I use different teaching techniques depending on the situation.
12. I know when each teaching technique I use will be most effective.

Planning

13. I pace myself while I am teaching to have enough time.
14. I set my specific teaching goals before I start teaching.
15. I ask myself questions about the teaching materials I am going to use.
16. I organise my time to best accomplish my teaching goals.

¹³ These bold headings will not appear in Google Forms.

Monitoring

- 17. I ask myself periodically if I meet my teaching goals while I am teaching.
- 18. I find myself assessing how useful my teaching techniques are while I am teaching.
- 19. I check regularly to what extent my learners comprehend the topic while I am teaching.
- 20. I ask myself questions about how well I am doing while I am teaching.

Evaluate

- 21. I ask myself how well I have accomplished my teaching goals once I have finished.
- 22. I ask myself if I could use different teaching techniques after each teaching experience.
- 23. After teaching a point, I ask myself if I would teach it more effectively next time.
- 24. I ask myself if I have considered all possible techniques after teaching a point.”

Thank you, you have completed Section 4. You are done!

Addendum D – Invitation to participants for writing the narrative

Dear Colleague

I am a master's student from the North-West University involved in a study with the aim of exploring what role intermediate phase teachers' metacognitive awareness and worldviews play in the process of their self-directed learning.

As an intermediate phase teacher, your responses are truly valuable, and you are contributing to the field of educational research. Your time and input are greatly cherished and appreciated.

This study consists of two parts: Part A: Online questionnaire

Part B: Narrative

This invitation is for Part B: Writing a narrative

If you would like to take part in the study, please follow the link provided. ([Click here](#))

The closing date for writing the narrative is 7 July 2021. It will take you approximately 40 minutes to complete.

Please note the ethical aspects considered for this study include:

- Teachers' right to privacy and anonymity will be protected by keeping responses to the questionnaire anonymous and confidential.
- Involvement in the study is completely voluntary, and participants may withdraw if they wish at any time.

Thank you for your time and consideration.

Addendum E – Qualitative prompts – Writing a narrative

Dear Colleague

Welcome to the study and thank you for taking time from your extremely busy schedule to write a narrative. As an intermediate phase teacher, your responses are truly valuable, and you are contributing to the field of educational research. Your time and input are greatly cherished and appreciated. Please note that all responses are confidential, private, and anonymous. However, if you would like more information regarding the study and the findings, please send an email to selfdirectedlearningMED@gmail.com

Instructions:

You are required to write a narrative.

A narrative inquiry refers to the study of experience as a story, and it is also a way of thinking about your experience. A written account from you will provide me (the researcher) with a rich and vigorous understanding of *your* experiences and *your* teaching world (past, present and future) as well as *your* innermost thoughts and feelings.

There are 3 parts. Please read through each section carefully to familiarise yourself with the task. Key ideas and phrases are supplied to encourage reflection and trigger experiences about your teaching experiences. It may be advisable to make notes when reading the prompts to help you write the narrative.

Remember, these are your thoughts and your beliefs - there are no right or wrong answers. You may choose to write the narrative in English or Afrikaans.

Please indicate informed consent by clicking on the option below:

1. I understand that I am completing this questionnaire voluntary, and I have not been pressurised to take part. (yes/ no)
2. I understand what is expected of me in the research and I may choose to leave the study at any time and will not be penalised or prejudiced in any way. (yes/no)
3. I understand that my responses are confidential, private and anonymous but I give permission that my answers may be used to further educational research in the field of self-directed learning. (yes/ no)

PART A

Instructions:

Reflect on your teaching experience.

Use the following prompts to guide your thinking. Make notes along the way to help you organise your thoughts. As a guideline, **80 to 100 words per prompt** will suffice, but you may choose to write more or to write less. Remember, these are your thoughts and your beliefs- there are no right or wrong answers.

Prompt 1: Assignment management refers to the ability to plan, do and score well in the tutor marked assignments and group-based assignments. *For example, I can plan and complete tasks relating to my subject using Teams/ One Note applications within Microsoft office.*

When reflecting on your own teaching experience, how do you manage your assignments?

Prompt 2: Online learning proficiency refers to the ability to learn from online synchronous and asynchronous lectures and video lectures. *For example, when I watch online tutoring videos, I can use the newly acquired knowledge to further my understanding of the subject matter.*

When reflecting on your own teaching experience, how do you manage your online learning proficiency?

Prompt 3: Stress management refers to the ability to handle academic stress. *For example, I can manage my time between school and my family life/ I get demoralised when I cannot handle everything I have to do.*

When reflecting on your own teaching experience, how do you manage your stress?

Prompt 4: Technical proficiency refers to the ability to operate basic computer programmes. *For example, I know how to operate the basic functions of Microsoft Word and Teams to design worksheets for my learners/ I feel intimidated and scared when I use the internet.*

When reflecting on your own teaching experience, how do manage your technical proficiency?

Prompt 5: Procrastination Management refers to the ability to manage procrastination in learning. *For example, I do not find excuses not to complete tasks/ I always lose my to-do list and work only towards deadlines.*

When reflecting on your own teaching experience, how do manage procrastination?

Prompt 6: Online discussion proficiency refers to the ability to do well in online discussion forums. *For example, I enjoy online discussions regarding content to be taught/ online discussions are difficult to follow and understand / I am uncomfortable with online discussions.*

When reflecting on your own teaching experience, how do you manage your online discussion proficiency?

Prompt 7: Seminar learning proficiency refers to the ability to learn during seminars. *For example, I enjoy additional training opportunities to further my knowledge/ I enjoy learning from my colleagues and reflecting on my teaching practices/ I think these seminars waste my time- I know enough!*

When reflecting on your own teaching experience, how do manage your seminar learning proficiency?

Prompt 8: Comprehension Competence refers to the ability to understand readings and make study notes. *For example, I can make notes during training sessions and keep track of*

what I know and what I don't know to further my teaching practice / I do not understand how to use the notes from seminars and apply it in my teaching-learning context.

When reflecting on your own teaching experience, how do manage your comprehension competence?

Prompt 9: Examination Management refers to the ability to plan, do and score well in examinations. *For example, I can manage my emotions during class visits and try not to get too stressed/ I do not get worked up at all.*

When reflecting on your own teaching experience, how do manage examination management?

Prompt 10: Time management refers to the ability to utilise time effectively. For example, I plan my class time and I know how to manage my time. I set personalised targets (goals) I wish to achieve / I tend to waste time and lose many hours during my day.

When reflecting on your own teaching experience, how do manage your time?

Thank you, you have completed PART A.

PART B

Instructions:

Reflect on your teaching experience and pay careful attention to your beliefs about teaching.

Use the following prompts to guide your thinking. Make notes along the way to help you organise your thoughts. As a guideline, **80 to 100 words per prompt** will suffice, but you may choose to write more or to write less. Remember, these are your thoughts and your beliefs- there are no right or wrong answers.

Prompt 1: Describe the environment of your classroom. *For example, desks, chairs, interactive whiteboard, blackboard, textbooks/ digital textbooks etc.*

Prompt 2: How do you facilitate the acquisition of knowledge in your classroom? *For example, knowledge should be learned, and memorised/ knowledge is constructed through interactive play and dialogue.*

Prompt 3: Why did you decide to become a teacher? *For example, my mom was also a teacher/ I wanted to contribute to society.*

Prompt 4: How do you integrate different cultures in your classroom? *For example, everyone has the opportunity to share their religious opinions or talk about their culture's celebrations without fear of marginalisation.*

Prompt 5: What is your vision for teaching? *For example, a more uniform teaching system / a more digital platform."*

Thank you, you have completed PART B.

PART C

Instructions:

Reflect on your teaching methods.

Use the following prompts to guide your thinking. Make notes along the way to help you organise your thoughts. As a guideline, **80 to 100 words per prompt** will suffice, but you may choose to write more or to write less. Remember, these are your thoughts and your beliefs- there are no right or wrong answers.

Prompt 1: How do you teach for planning?

Prompt 2: How do you teach for monitoring?

Prompt 3: How do you teach learners to evaluate themselves? *For example, using a rubric/ questionnaire/ exit ticket.*

Prompt 4: How do you teach learners to learn more about themselves? *For example, their strengths and weaknesses with regards to knowledge of various strategies to apply **when** confronted with a task.*

Prompt 5: How do you teach learners to apply different strategies? *For example, knowledge about **how** to use specific strategies: reasoning, decision making, problem-solving etc.*

Prompt 6: How do you teach learners to differentiate between the requirements of tasks? *For example, **which** strategies to apply **when and why**.*

Thank you, you have completed PART C. You are done!

Addendum F – Quantitative analysis: Variables, subscales and worldview test

“SDL (self-directed learning) has 10 subscales

Assignment management=SDL1, SDL2

Online learning proficiency= SDL3, SDL4, SDL5

Stress Management= SDL6, SDL7

Technical proficiency= SDL8, SDL9, SDL10

Procrastination management= SDL11, SDL12, SDL13

Online discussion proficiency= SDL14, SDL15

Seminar learning proficiency= SDL16, SDL17, SDL18

Comprehension competence= SDL19, SDL20

Examination management= SDL21, SDL22

Time management= SDL23, SDL24, SDL25, SDL26

Metacognitive awareness has 6 subscales

Declarative knowledge= MA1, MA2, MA3, MA4

Procedural knowledge= MA5, MA6, MA7, MA8

Conditional knowledge= MA9, MA10, MA11, MA12

Planning= MA13, MA14, MA15, MA16

Monitoring= MA17, MA18, MA19, MA20

Evaluate= MA21, MA22, MA23, MA24

Worldviews has 5 subscales

Ontology (O) = O1, O2, O3

Epistemology (E) = E1, E2, E3

Axiology (X) = X1, X2, X3, X4

Anthropology (A) = A1, A3, A4, A5, A6

Societal vision (S) = S1, S2”

Subscale	Item order	Set
Ontology (O)	1(O1)	a
	2 (O2)	b
	3 (O3)	c
Epistemology (E)	4 (E1)	d
	5 (E2)	e
	6 (E3)	f
Axiology (X)	7 (X1)	g
	8 (X2)	h
	9 (X3)	i
	10 (X4)	j
Anthropology (A)	11 (A1)	k
	12 (A3)	l
	13 (A4)	m
	14 (A5)	n
	15 (A6)	o
Societal vision (S)	16 (S1)	p
	17 (S2)	q

“Worldviews questionnaire explained in more detail							
Original item ¹⁴	Column in data set 1 ¹⁵	Item order ¹⁶	Item type ¹⁷	Set indicator	Item set ¹⁸	Statements within set	Variable Code
Question 8	AG & AH	Question 1	Q1a_1 Q1a_2	a	Ontology 1: Metaphysics	1. God stands far above life on earth 2. The universe is governed by mechanical, natural laws 3. People look at the world from different perspectives, which are all equally valid 4. Reality is complex: it is both scientific and spiritual at the same time	O1
Question 6	AI & AJ	Question 2	Q1b_1 Q1b_2	b	Ontology 2: Values of nature	1. Nature is created by God and is therefore valuable 2. Nature has value because humans are able to use and enjoy it 3. People ascribe different values to nature, and all of them are important 4. Nature has value in and of itself, even if it has no value for humans whatsoever	O2
Question 11	AK & AL	Question 3	Q1c_1 Q1c_2	c	Ontology 3: Origin of life	1. Life was miraculously created by a higher power 2. Life was brought about through biological evolution (not steered by a higher power) 3. How life originated is still unclear, despite what science and religion say about it 4. I see the universe as a creative expression of an evolving consciousness or ‘Spirit’	O3
Question 9	AM & AN	Question 4	Q1d_1 Q1d_2	d	Epistemology 1: How to know/ role of science	1. We depend too much on science and not enough on faith 2. Science is the ultimate source of trustworthy knowledge 3. Morality, art, and intuition are important for gaining knowledge about the world 4. In order to gain understanding of the world, science needs to be integrated with other forms of knowledge, such as spiritual insight	E1
Question 12	AO & AP	Question 5	Q1e_1 Q1e_2	e	Epistemology 2: Impacts of	1. One of the negative effects of science and technology is that they break down people’s ideas of right and wrong	E2

¹⁴ The worldview test was administered with items arranged according to the online version found at <https://post-progressive.org/worldview-questionnaire>

¹⁵ The column indicates the data source as captured raw data.

¹⁶ Note the order of items was adapted and data obtained were rearranged to meet the requirements of the SPSS script, ordered according to item sets. Each item was considered a data set containing two data strands (i.e. “agree most” =1 and “agree least” =2)

¹⁷ Q1 indicates the original questionnaire as indicated in the SPSS script obtained from (joop.de.boer@vu.nl), f indicates the item order (e.g. question number 6) as represented by the SPSS script, the numbers 1 and 2 indicates the item type where 1 represents scores indicating “agree most” and 2 indicates “agree least”.

¹⁸ Source Adapted from De Witt, A., De Boer, J., Hedlund, N., & Osseweijer, P. (2016). A new tool to map the major worldviews in the Netherlands and USA, and explore how they relate to climate change. *Environmental Science & Policy*, 63, 101-112.

					science and technology	2.Science and technology are definitely making our lives healthier, easier, and more comfortable 3.Science and technology are often corrupted by special interests, e.g., of big corporations 4.Science and technology can make beneficial contributions when society is actively engaged with technological developments	
Question 1	AQ & AR	Question 6	Q1f_1 Q1f_2	f	Epistemology 3: When I am forming an opinion on an issue	When I'm forming an opinion on an issue... 1.... I tend to trust traditional or religious leaders 2.... I tend to trust scientists and other experts 3.... I tend to trust my own judgment, feelings, and intuition 4.... I try to honor all perspectives and combine them into a larger whole	E3
Question 2	AS & AT	Question 7	Q1g_1 Q1g_2	g	Axiology 1: Most important in my life	The most important thing in my life is... 1. to be of service to my family, community, and/or country 2... to be successful and have people recognize my achievements 3... to do things my own way and forge my own path in life 4... to actualize my inner potential and thereby serve the (cultural) evolution of humanity	X1
Question 7	AU & AV	Question 8	Q1h_1 Q1h_2	h	Axiology 2: Central values	It is very important to me... 1.... to adapt myself to others and behave appropriately and socially 2.... to have enough money to have and do nice things 3.... to be imaginative and express myself in the way I think and live 4.... to explore my inner world so I can live from my 'true' or 'deeper' self	X2
Question 10	AW & AX	Question 9	Q1i_1 Q1i_2	i	Axiology 3: Central ethics	For me, to live a good life is ... 1.... to respect the tradition and honor my community 2.... to be independent and do whatever I enjoy 3.... to support those who are oppressed and dominated 4.... to offer my unique 'gifts' to the larger whole of life	X3
Question 3	AY & AZ	Question 10	Q1j_1 Q1j_2	j	Axiology 4: Preferred lifestyle	I strive for... 1.... a sober, simple, and humble lifestyle 2.... a comfortable and fun lifestyle 3.... a diverse and expressive lifestyle 4.... a wholesome and natural lifestyle	X4
Question 4	BA & BB	Question 11	Q1k_1 Q1k_2	k	Anthropology 1: Self-identity	1.Who I am is defined by my religion and upbringing 2.Who I am is defined by my social position and/or my achievements 3.I feel to be more a citizen of the world than a citizen of a country 4.I feel part of the vast, interconnected whole that is life and the universe	A1
Question 5	BC & BD	Question 12	Q1l_1 Q1l_2	l	Anthropology 3: The human-nature relationship	1.Humans should behave as protectors of creation 2.By mastering nature, the human being can find freedom 3.Things in nature are generally more perfect than those made by humans	A3

						4.On a deep level, I feel to be one with nature	
Question 13	BE & BF	Question 13	Q1m_1 Q1m_2	m	Anthropology 4: Interference in nature	1.When it comes to interfering with nature, mankind has no right to play God 2.Humans can improve on nature 3.Interfering with nature is risky because it may be too complex for us to understand 4.Aware of their deep connectedness, humans and nature can work together in mutually enhancing ways.	A4
Question 14	BG & BH	Question 14	Q1n_1 Q1n_2	n	Anthropology 5: Nature and role of suffering	1.The suffering that happens to people is the will of God 2.The suffering that happens to people does not have meaning but is random 3.The suffering in the world is created and maintained by existing power structures 4.I use the pain and suffering in my life as opportunities for inner growth	A5
Question 15	BI & BJ	Question 15	Q1o_1 Q1o_2	o	Anthropology 6: Nature of death	1.In an afterlife we will be punished or rewarded for our actions in this life 2. I don't believe in an afterlife of any form 3. I don't know what happens to us after we die 4. I believe in reincarnation – that is to say that we will be born again in this world after our death	A6
Question 16	BK & BL	Question 16	Q1p_1 Q1p_2	p	Societal Vision1: Relationship individual-society	1. Each individual needs to sacrifice his/her desires to serve the community and society at large 2. Everybody needs to take care of, and stand up for, oneself 3. Society should offer decent care for every individual 4. When individuals thrive and blossom, they naturally start working for a better world for all	S1
Question 17	BM & BN	Question 17	Q1q_1 Q1q_2	q	Societal Vision 2: Societal aims	In society... 1.... we should have greater respect for religious authority and tradition 2.... we should place more emphasis on science and technology 3.... we should place more emphasis on art, culture, and moral development 4.... we should place more emphasis on inner growth and self-actualization”	S2

Addendum G – Goodwill permission from the head of the primary school



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

Faculty of Education

Research Unit: Self-directed learning

Tel: 018 111 1111
Email: selfdirectedlearningMED@gmail.com

Date: 31 May 2021

PERMISSION LETTER: HEAD OF PRIMARY SCHOOL

Dear School Principal

I herewith wish to request your permission for **all Grade 4 to 6 teachers** to participate in this research, which involves answering a questionnaire and writing a narrative. Prior to granting permission, please acquaint yourself with the information below.

The details of the research are as follows:

TITLE OF THE RESEARCH PROJECT:

Intermediate phase teachers' metacognitive awareness and worldviews for the process of self-directed learning in private school settings.

ETHICS APPLICATION NUMBER: NWU-01264-20-S2

PROJECT SUPERVISOR: Dr Divan Jagals

CO-SUPERVISOR: Dr M. Verster

ADDRESS: School for Professional Studies in Education, Faculty of Education, North-West University (Potchefstroom Campus)

CONTACT NUMBER: 27 + 18 + 299 2154

MEMBER OF PROJECT TEAM:

MEd-Student: Christine-Marie van der Westhuizen

ADDRESS: 38 Oxford Street, Durbanville

CONTACT NUMBER: 083 654 5515

FACULTY OF EDUCATION RESEARCH ETHICS COMMITTEE

Contact person: Ms Erna Greyling, E-mail: Erna.Greyling@nwu.ac.za, Tel. (018) 299 4656

This study has been approved by the Research Ethics Committee of the Faculty of Education of North-West University and will be conducted according to the ethical guidelines of this committee.

What is this research about?

This research aims to explore the role of private school intermediate phase teachers' metacognitive awareness and worldviews in the process of their self-directed learning.

Respondents/Participants

- All Grade 4 to 6 teachers

What is expected of the respondents/participants?

This study follows a mixed-method convergent parallel design, therefore quantitative and qualitative data are needed. The quantitative questionnaire will be sent out first, followed by the qualitative narrative two weeks later.

Phase 1: Collection of Quantitative data

- Respondents are required to answer a questionnaire which will take approximately 30 minutes to complete.
- The questionnaire will be available on Google Forms.
- The questionnaire consists of 4 sections. Section 1: biographical details, section 2: self-directed learning, section 3: worldviews and section 4: metacognitive awareness.

Phase 2: Collection of Qualitative data

- Participants are required to write a narrative with guided prompts regarding self-directed learning, worldviews, and metacognitive awareness.
- It will take approximately 40 minutes to complete.
- The questionnaire will be available on Google Forms.

Benefits to the respondents/participants

- A more acute awareness/ feeling of their own epistemological beliefs regarding self-directed learning.
- An awareness of their own perceptions of their worldview and how this translates into practice ("real" classroom).
- An awareness of various learning strategies and the importance of having learners understanding which strategy to apply how and when.
- An awareness of their own growth experience to incorporate self-directed learning into their teaching methods and its value for academic achievement.
- Teachers will be able to reflect on their personal views and how they can facilitate their learners' development of metacognitive strategy use in their subjects.

Risks involved for respondents/participants

- No foreseeable risks.

Confidentiality and protection of identity

- The researcher will not contact the respondents/participants individually.
- No emails/invitations will be posted on Facebook, Instagram, WhatsApp, Microsoft Teams, or any other form of social media.
- The data gathered and the identity of all respondents/participants will be treated as confidential.
- The researcher cannot gain access to personal information and records about the respondents/participants because no personal details are requested at any time during the research.
- Respondents/participants will be given a code number/pseudonyms and will be referred to in this way during all discussions with the supervisors and for reporting purposes.

- Any questions regarding the study may be forwarded to selfdirectedlearningMED@gmail.com

Confidentiality will be insured by applying the following measures

- All quantitative data will be treated as confidential. Only the researcher, the supervisors and the statistician will have access to the quantitative data.
- All qualitative data will be treated as confidential. Only the researcher and the supervisors will have access to the qualitative data.

Dissemination of findings

The data from the quantitative and the qualitative strands cannot be emailed to **individual** respondents/participants, as no email addresses/personal information was requested. The general findings will be communicated to the Head of the Curriculum Department, Mr A. Pollard, on completion of the study.

Process

Step 1: You, as the principal, will receive **two separate emails** from Mr Pollard with an embedded link.

Step 2: Please forward the **entire** email with the PDF attachment (background to the study) to the school secretary. (Simply press the *Forward* button)

Step 3: Please ask the school secretary to forward the **entire** email to all grade 4 to 6 staff members.

[Click here to fill out form](#)

Thank you for your support.

Kind regards

**The researcher
Christine-Marié van der Westhuizen**

Permission letter: Head of Primary School

Title of research: Intermediate phase teachers' metacognitive awareness and worldviews for the process of self-directed learning in private school settings.

* Required

* This form will record your name, please fill your name.

1. Name of School *

2. Name of principal *

3. I agree to give permission for the research to take place with the identified respondents/participants. *

☐ yes

4. I understand that taking part in the study is voluntary and respondents/participants will not be pressurised to take part. *

☐ yes

5. I have read the information and consent form and understand what is expected of the teachers. *

☐ yes

6. I understand that respondents/ participants may choose to leave the study at any time and will not be penalized or prejudiced in any way. *

☐ yes

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

Addendum H – Legal authorisation



Mr A Pollard
38 Oxford Street

Durbanville

7550

021 979 1204/5

Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

Faculty of Education

Research Unit: Self-directed learning

Tel: 018 111 1111
Email: selfdirectedlearningMED@gmail.com

Date: 31 May 2021

LEGAL AUTHORIZATION: HEAD OF CURRO SCHOOLS' CURRICULUM DEPARTMENT

Dear Mr Pollard

I herewith wish to request your permission for **all Grade 4 to 6 teachers** to participate in this research, which involves answering a questionnaire and writing a narrative. Prior to granting permission, please acquaint yourself with the information below.

The details of the research are as follows:

TITLE OF THE RESEARCH PROJECT:

Intermediate phase teachers' metacognitive awareness and worldviews for the process of self-directed learning in private school settings.

ETHICS APPLICATION NUMBER: NWU-01264-20-S2

PROJECT SUPERVISOR: Dr Divan Jagals

CO-SUPERVISOR: Dr M. Verster

ADDRESS: School for Professional Studies in Education, Faculty of Education, North-West University (Potchefstroom Campus)

CONTACT NUMBER: 27 + 18 + 299 2154

MEMBER OF PROJECT TEAM Med-Student: Christine-Marie van der Westhuizen

ADDRESS: Bougainville Street 16, Hillwood, Pinehurst, Durbanville

CONTACT NUMBER: 083 654 5515

FACULTY OF EDUCATION RESEARCH ETHICS COMMITTEE

Contact person: Ms Erna Greyling, E-mail: Erna.Greyling@nwu.ac.za, Tel. (018) 299 4656

This study has been approved by the Research Ethics Committee of the Faculty of Education of the North-West University and will be conducted according to the ethical guidelines of this committee.

What is this research about?

This research aims to explore the role of private school intermediate phase teachers' metacognitive awareness and worldviews in the process of their self-directed learning.

Respondents/Participants

- All Grade 4 to 6 teachers

What is expected of the respondents/participants?

This study follows a mixed-method convergent parallel design, therefore quantitative and qualitative data are needed. The quantitative questionnaire will be sent out first, followed by the qualitative narrative two weeks later.

Quantitative phase:

Respondents are required to answer a questionnaire which will take approximately 30 minutes to complete. The questionnaire will be available on Google Forms. There are 4 sections that cover the main constructs of the study namely: section 1: biographical details, section 2: self-directed learning, section 3: worldviews and section 4: metacognitive awareness.

Qualitative phase:

Participants are required to write a narrative with guided prompts. It will take approximately 40 minutes to complete. The narrative covers the main concepts of the study namely: self-directed learning, worldviews and metacognitive awareness.

Benefits to the respondents/participants

- A more acute awareness/ feeling of their own epistemological beliefs regarding self-directed learning.
- An awareness of their own perceptions of their worldview and how this translates into practice ("real" classroom).
- An awareness of various learning strategies and the importance of having learners understanding which strategy to apply how and when.
- An awareness of their own growth experience to incorporate self-directed learning into their teaching methods and its value for academic achievement.
- Teachers will be able to reflect on their personal views and how they can facilitate their learners' development of metacognitive strategy use in their subjects.

Risks involved for respondents/participants

- Potential of minor discomfort or inconvenience (e.g. time).

Confidentiality and protection of identity

- The researcher will not contact the respondents/participants individually, thus the researcher's personal email (or identity) will not be visible to any respondent/participant.
- No emails/invitations will be posted on Facebook, Instagram, WhatsApp or any other form of social media.
- The data gathered and the identity of all respondents/participants will be treated as confidential.
- The researcher does not have access to personal information and records about the respondents/participants because no personal details are requested at any time during the research.
- Respondents/participants will be given a code number/pseudonyms and they will be referred to in this way during all discussions with the supervisors and for reporting purposes.
- Any questions regarding the study may be forwarded to *selfdirectedlearningMED@gmail.com*

Confidentiality will be insured by applying the following measures:

Quantitative data: All data will be treated as confidential. Only the researcher, the supervisors and the statistician will have access to the quantitative data. The statistician will be requested to sign a confidentiality document as per EduRec guidelines.

Qualitative data: All data will be treated as confidential. Only the researcher and the supervisors will have access to the qualitative data. Responses from the narratives will be given a code number/ pseudonyms and they will be referred to in this way during all discussions with the supervisors and for reporting purposes.

Dissemination of findings

The data from the quantitative and the qualitative strands cannot be emailed to **individual** respondents/participants, as no email addresses/personal information was requested. The general findings will be communicated to you, as the Head of the Curriculum Department of the Private Schools Group on completion of the study.

DECLARATION BY RELEVANT PERSON:

By signing below, I *André Pollard* agree to give permission for the research to take place with the identified respondents/participants in the study entitled:

Intermediate phase teachers' metacognitive awareness and worldviews for the process of self-directed learning in private school settings.

I declare that:

- I have read **this** information and consent form and understand what is expected of the respondents/participants in the research.
- I have had a chance to ask questions to the researcher and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary **and** respondents/participants will not be pressurised to take part.
- Respondents/participants may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (place) 38 Oxford Street, Curro Holdings, Durbanville on (date) 31 May 2021



Signature of Head of Curriculum Department
Mr A. Pollard

Christinemarie van der Westhuizen [Management - Curro Head Office]

From: Christinemarie van der Westhuizen [Management - Curro Head Office]
Sent: Monday, May 31, 2021 1:33 PM
To: Andre Pollard [Regional Head - Curro Head Office - Head Office Curro Holdings]
Subject: REQUEST LEGAL AUTHORISATION
Attachments: LegalAuthorisationletter.docx; 9.1.5.4.2 EduREC Ethical Approval Letter - Jagals_Van der Westhuizen.pdf

Dear Mr Pollard

Please refer to the attached document to request permission to pursue the study.
Please see attached the ethical clearance from the university.

Vriendelike groete

Christine-Marie van der Westhuizen

Curriculum Manager: Afrikaans Home Language & Afrikaans First Additional Language Grade 4 - 7

Telephone: 087 285 1694 (Office)

Email: christine.d@curro.co.za

CURRO HEAD OFFICE

Telephone: 021 979 1204/5

Fax: 021 979 4049

Address: 38 Oxford Street, Durbanville

#Learners2Leaders

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www.curro.co.za

Addendum I – Ethical clearance certificate



Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: <http://www.nwu.ac.za>

Senate Committee for Research Ethics
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Faculty of Education Research Ethics Committee (EduREC)** on 27/05/2021, this committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-SCRE) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Intermediate phase teachers' metacognitive awareness and worldviews of self-directed learning in private school settings

Study Leader/Supervisor (Principal Investigator)/Researcher: Dr D Jagals

Team: C van der Westhuizen (MEd student – 31427669), Dr M Verster

Ethics number:

N	W	U	-	0	1	2	6	4	-	2	0	-	A	2
Institution				Study Number					Year		Status			

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application Type: Single Study

Commencement date: 27/05/2021

Risk:

Low

Expiry date: 27/05/2022

Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.

Special in process conditions of the research for approval (if applicable):

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- The study leader/supervisor/principal investigator/researcher must report in the prescribed format to the EduREC:
 - annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and
 - without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.
- The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EduREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.
- Annually a number of studies may be randomly selected for an external audit.
- The date of approval indicates the first date that the study may be started.
- In the interest of ethical responsibility, the NWU-SCRC and EduREC reserves the right to:
 - request access to any information or data at any time during the course or after completion of the study;

-
- *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
 - *withdraw or postpone approval if:*
 - *any unethical principles or practices of the study are revealed or suspected;*
 - *it becomes apparent that any relevant information was withheld from the EduREC or that information has been false or misrepresented;*
 - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
 - *new institutional rules, national legislation or international conventions deem it necessary.*

The EduREC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EduREC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely



Prof JAK Olivier
Chairperson NWU Faculty of Education Research Ethics Committee

Original details: (22351930) C:\Users\22351930\Desktop\ETHICS APPROVAL LETTER OF STUDY.docm
8 November 2018

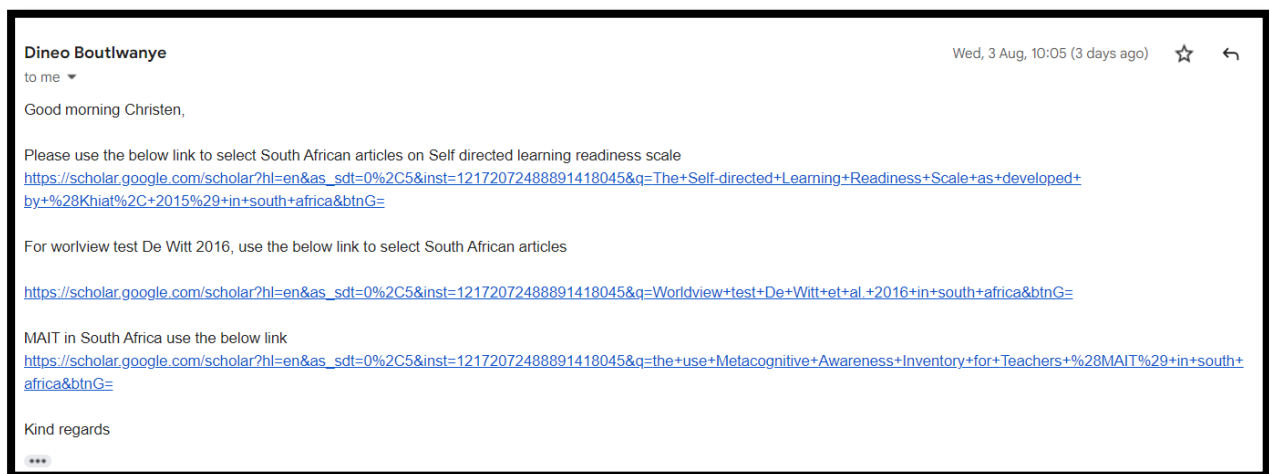
Current details: (22351930) M:\DSS18533\Monitoring and Reporting Cluster\Ethics\Certificates\Templates\Research Ethics Approval Letters\9.1.5.4.1 ES-REC Ethical Approval Letter.docm
5 December 2018

File reference: 9.1.5.4.2

Addendum J – Proposed timeline

	Months of the year										
Task	F	M	A	M	JU	JL	A	S	O	N	D
2020											
Proposal submission					x						
Chapter 1	start					finished					
Chapter 2				start							finished
Chapter 3							start				finished
2021											
Received ethical clearance					x						
Quan data collection					x						
Qual data collection					x						
Chapter 5						start			finished		
2022											
Chapter 4		start						finished			
Chapter 6						start		finished			
Submit to proofreader											
Finalisation of chapters											

Addendum K – E-mail form librarian



Please use the below link to select South African articles on Self-directed learning readiness scale

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&inst=12172072488891418045&q=The+Self-directed+Learning+Readiness+Scale+as+developed+by+%28Khat%2C+2015%29+in+south+africa&btnG=

For worldview test De Witt 2016, use the below link to select South African articles

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&inst=12172072488891418045&q=Worldview+test+De+Witt+et+al.+2016+in+south+africa&btnG=

MAIT in South Africa use the below link

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&inst=12172072488891418045&q=the+use+Metacognitive+Awareness+Inventory+for+Teachers+%28MAIT%29+in+south+africa&btnG=

Addendum L – Turnitin

Project 24 October

ORIGINALITY REPORT

11 %	10 %	4 %	1 %
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	repository.nwu.ac.za Internet Source	1 %
2	hdl.handle.net Internet Source	1 %
3	redfame.com Internet Source	1 %
4	trace.tennessee.edu Internet Source	<1 %
5	dspace.nwu.ac.za Internet Source	<1 %
6	uir.unisa.ac.za Internet Source	<1 %
7	library.oapen.org Internet Source	<1 %
8	books.aosis.co.za Internet Source	<1 %
9	www.tandfonline.com Internet Source	<1 %

Addendum M – Letter from Statistical Consultation Services



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

Statistical Consultation Services
Tel: +27 18 285 2016
Fax: +27 0 87 231 5294
Email: suria.ellis@nwu.ac.za

1 September 2022

Re: Dissertation, Me CMG van der Westhuizen, student number 31427669

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

A handwritten signature in black ink, appearing to read 'SM Ellis', is written over a horizontal line.

Prof SM Ellis (Pr. Sci. Nat.)

Associate Professor: Statistical Consultation Services