Strategies for the development of self – regulated learning skills of first year university students

by

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DECLARATION

I declare that the thesis hereby submitted by me for the degree Doctor in Philosophy in Learning and Teaching at the Potchefstroom Campus of the North-West University is my own independent work and has not previously been submitted by me at any other university/faculty.

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I. M. Venter **Date**

DEDICATION

To my children: Martin, Theo and Mareli

"I tried to teach you all about life, but you taught me what life is about. You inspire in me two sentiments :
Affection for what you are, and
Admiration for what you have become."

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ABSTRACT

The high dropout rate of first year students is a major source of concern for the Department of Higher Education and Training and for Higher Education Institutions (HEI's).

Research indicated that students' Self-Regulated Learning (SRL) skills and strategies play a significant role in achieving academic success at universities. Thus, the main aim of this study was to develop strategies for the development of SRL skills of first year university students.

In order to achieve the research aim and objectives an extensive literature review was conducted on SRL and the relationship between SRL skills and the academic achievement of students at HEI's.

For the purposes of the empirical investigation, a mixed-method approach was followed. In the quantitative part of the investigation, the results of the Learning and Study Strategies Inventory (LASSI), which was administered to the 2007 cohort of first year students (n=2421) at the Potchefstroom Campus of the North-West University, were analysed to determine whether the subscales in the LASSI significantly predicted academic success and to identify variables that related to the first year students' learning and study skills and academic achievement.

In the qualitative part of the research, interviews were conducted during 2010, with a selected group of participants from the 2007 cohort of first year students who were then in their fourth year of study. The questions in the interviews were based on questions in the Self-Regulated Learning Inventory Schedule (SRLIS), and the aims were to explore the participants' experiences with their studies and to determine

which SRL skills, in addition to the skills assessed by the LASSI, influenced their studies and academic achievement.

The quantitative analysis of the LASSI results revealed that:

- *Motivation, Time management a*nd *Information processing* were the best LASSI predictors of the first year students' academic success.
- The independent biographical variables *Grade 12 marks, age* and *gender* correlated better with the first year students' academic achievement than the LASSI subscales did.

The qualitative investigation revealed that:

- Successful students realised at the onset of their studies that they had to adapt their study methods to meet the challenges that studying at a university requires.
- Successful students could differentiate between the different types of study material and could adapt their study methods accordingly. They could also adapt their study methods when the volume of the study material differed.
- Successful students applied a repertoire of study methods in a flexible manner, and managed their time well.
- Successful students conveyed knowledge of themselves as students, as well as of the different requirements that study at a university implicates.
- Most of the successful students received information from parents, lecturers or principals about different study methods and could describe their learning styles and preferences clearly.
- Some of the successful students could accurately infer which questions could be expected in the exam papers, and knew how and why these questions were asked.
- Successful students set realistic academic goals for themselves.

- Unsuccessful students did not consider their own study preferences or the academic requirements of the university.
- Unsuccessful students did not manage their time well and were not motivated.

On the basis of the findings, strategies were proposed for the development of SRL skills of first year students at universities. The strategies are presented as a compulsory programme that first year students have to complete in the first semester.

Key words: *strategies, Self-Regulated Learning, Constructivism, knowledge acquisition, first year students*.

OPSOMMING

Die hoë uitvalsyfer van eerstejaarstudente is ‘n groot bron van kommer vir die Departement van Hoër Onderwys en Opleiding en vir Hoër Onderwys Instansies (HOI’s).

Navorsing het aangetoon dat studente se Selfregulerende Leer (SRL) vaardighede en strategieë ‘n beduidende rol speel in die behaling van akademiese sukses op universiteit. Daarom was die hoofdoel van hierdie studie om strategieë te ontwikkel vir die ontwikkeling van SRL vaardighede van eerstejaarstudente.

‘n Uitgebreide literatuurstudie is uitgevoer op SRL en die verhouding tussen SRL vaardighede en die akademiese prestasie van studente aan HOI’s om die navorsingsdoel en doelwitte te bereik.

‘n Gemengde metode benadering is gevolg vir die doel van die empiriese navorsing. In die kwantitatiewe deel van die navorsing is die resultate van die *Learning and Study Strategies Inventory* (LASSI) wat deur die 2007 kohort van eerstejaarstudente (n=2421) aan die Potchefstroomkampus van die Noordwes Universiteit voltooi is, geanaliseer om vas te stel of die subskale van die LASSI akademiese sukses betekenisvol voorspel, en om veranderlikes te identifiseer wat verwant is aan die eerstejaarstudente se leer en studievaardighede en akademiese prestasie.

In die kwalitatiewe gedeelte van die navorsing is onderhoude in 2010 gevoer met ‘n geselekteerde groep deelnemers uit die 2007 kohort van eerstejaarstudente wat in 2010 in hul vierde jaar van studie was. Die doelwit van die onderhoude, wat gebaseer was op die *Self-Regulated Learning Inventory Schedule* (SRLIS), was om die deelnemers se ondervinding met hul studies te eksploreer en om vas te stel

watter SRL vaardighede, addisioneel tot die vaardighede wat deur die LASSI geassesseer is, hul studie en akademiese prestasie beïnvloed het.

Die kwantitatiewe analise van die LASSI resultate het die volgende bevind:

- *Motivering, Tydsbestuur,* en *Inligtingsverwerking* was die beste LASSI voorspellers van die eerstejaarstudente se akademiese sukses.
- Die onafhanklike biografiese veranderlikes *Graad 12 punte, ouderdom* en *geslag* het beter gekorreleer met die eerstejaarstudente se akademiese prestasie as wat die LASSI subskale het.

Die kwalitatiewe ondersoek het bevind dat:

- Suksesvolle studente het aan die begin van hul studie besef dat hulle hul studiemetodes moes aanpas om die uitdagings van studie aan ‘n universiteit die hoof te bied.
- Suksesvolle studente kon differensieer tussen die verskillende tipes studiemateriaal en kon hulle studiemetodes daarvolgens aanpas. Hulle kon ook hulle studiemetodes aanpas wanneer die omvang van die studiemateriaal verskil.
- Suksesvolle studente het ‘n verskeidenheid studiemetodes op ‘n buigsame manier toegepas, en hul tyd goed bestuur.
- Suksesvolle studente het kennis van hulself as studente getoon, sowel as van die verskillende vereistes wat studie aan ‘n universiteit impliseer.
- Die meeste van die suksesvolle studente het inligting van ouers, skoolhoofde of dosente oor verskillende leermetodes ontvang, en kon hul leerstyle en –voorkeure duidelik omskryf.
- Sommige van die suksesvolle studente kon akkuraat aflei watter vrae verwag kon word in die eksamenvraestelle, en het geweet hoe en waarom hierdie vrae gestel is.

- Suksesvolle studente het realistiese akademies doelstellings vir hulself gestel.
- Onsuksesvolle studente het nie hul eie studievoorkeure of die akademiese vereistes van die universiteit in ag geneem nie.
- Onsuksesvolle studente het nie hul tyd goed bestuur nie en was nie gemotiveerd nie.

Op grond van die bevindings is strategieë voorgestel vir die ontwikkeling van SRL vaardighede van eerstejaarstudente aan universiteite. Die strategieë is vervat in ‘n verpligte program wat eerstejaarstudente tydens die eerste semester voltooi.

Sleutelwoorde: *strategieë, Self-gereguleerde Leer, Konstruktivisme, kennisverkryging, eerstejaarstudente.*

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis Of Variance
APS	Admission requirements
B.Ed	Bachelor of Education
B. Eng	Bachelor of Engineering
B. Pharm	Bachelor of Pharmacy
CHE	Council of Higher Education
DoE	Department of Education
e-based	electronically based
e-learning	electronic learning
e-enhanced	electronically enhanced
e. g.	exempli gratia: for example
ERIC	Educational Resource Information Centre
eFundi	electronic software programme used at the NWU
FYA	First Year Academy
Gr	Grade
GTM	Grounded Theory Methodology
HEI	Higher Education Institution
HEMIS	Higher Education Management and Information System
HEQC	Higher Education Quality Committee

HEQF	Higher Education Qualifications Framework
HERDSA	Higher Education Research and Development Society of Australasia
HERD-SA	Higher Education Retention Statistics of South Africa
HESA	Higher Education Statistics Agency
HSRC	Human Science Research Council
ICT	Information Communication Technology
ILS	Index of Learning Styles
IRIN	Integrated Regional Information Network
ISD	Instructional Systems design
ISDD	Instructional Systems Design Development
LASSI	Learning and Study Strategies Inventory
LIB	Bachelor of Law
MAI	Metacognitive Awareness Inventory
ME	Metacognitive experiences
MK	Metacognitive knowledge
m-learning	mobile learning
MoE	Ministry of Education
MSLQ	Motivational Strategy Learning Questionnaire
MTMM	Multi-trait multimethod
NSC	National School Certificate
NMMU	Nelson Mandela Metropolitan University
NPHE	National Plan for Higher Education
NQF	National Qualifications Framework
NT	National Treasury

NWU	North - West University
PC	Personal Computer
PDA	Personal Digital Assistant
PMPS	Perceptual Modality Preference Survey
p-values	probability values
R^2	The coefficient of determination
SA	South Africa
SAQA	South African Qualifications Authority
SAQF	South African Qualification Framework
SCT	Social Cognitive Theory
SDL	Self-Directed Learning
SEI	Secondary Education Institution
SI	Supplemental Instruction
sms	short message service
SRL	Self-Regulated Learning
SRLIS	Self-Regulated Learning Interview Schedule
t-Tests	Tests using the t-statistic that establishes whether two means collected from independent samples differ significantly.
UCT	University of Cape Town
UFS	University of the Free State
US	University of Stellenbosch
UWC	University of the Western Cape

CHAPTER 1
ORIENTATION

1.1 INTRODUCTION

In this chapter the reader is orientated towards the study. Against the backdrop of the escalating number of first year students at Higher Education Institutions (HEI's) and the alarming dropout rates, the research problem, aim and objectives are stated. The research design and methodology which were implemented to address the research problem and to achieve the aims and the objectives of the research are briefly discussed and information is given about the ethical considerations that guided the research. The potential contribution of the study is mentioned and a brief exposition of the different chapters in the thesis is provided.

1.2 MOTIVATION FOR THE RESEARCH

Statistics indicate that the dropout rate of first year students at HEI's is much higher than for students in their consecutive years of study (Department of Education, 2005). Despite their good or excellent Grade 12 results, many first year students drop out or fail, indicating that academic success or proficiency at high school does not necessarily lead to academic success at HEI's (Lines, 2005:6).

A survey was done in 2005 of the throughput rate of 120 000 students that enrolled in 2000 for their first year of study at South African HEI's (Naidoo, 2005:1). According to the late Dr Prem Naidoo, previously the Deputy Executive Director of the Higher Education Quality Committee (HEQC) and Director of Accreditation at the Council of Higher Education (CHE), the results of the survey that are reflected in

Figure 1.1 below indicated an alarming lack of successful completion of studies at these institutions.

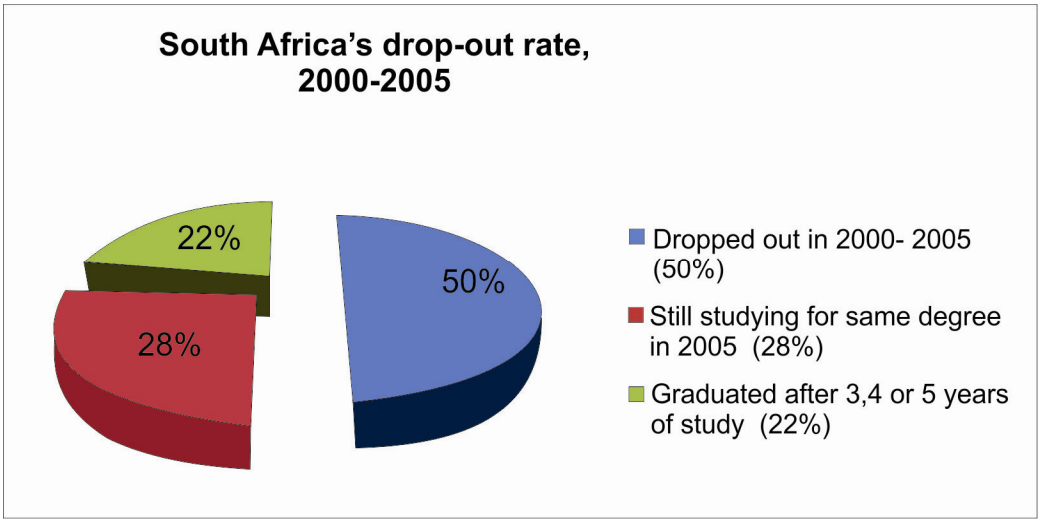

Figure 1.1: South Africa's HEI dropout rate, 2000-2005 (Department of Education, 2005)

Figure 1.1 illustrates that the percentage of students who dropped out in the period between 2000 – 2005 was 50%. Twenty eight percent (28%) of the students were still studying for the same degree in 2005 and only 22% completed their qualification after three, four or five years of study.

The number of students from the 2000 cohort who dropped out in their first year is 36 000 (30%). The number who dropped out in their second or consecutive years of study is 24 000 (20%) (Naidoo, 2005:2; Human Sciences Research Council Policy Brief, 2008:5). Higher Education Statistics Agency (HESA), an article 21 company that represents HEI's, calculated the average dropout rate of students at approximately 35% per year (HESA, 2007:2).

In the light of these alarming statistics, Naidoo expressed the need for systematic initiatives to address the general standard for intake and admission requirements, and above all, for successful completion of studies.

According to Prof Amanda Lourens, chairperson of the Higher Education Retention Statistics of South Africa (HERD-SA) in 2010, the dropout figures in South Africa

(SA) are higher than international figures. She emphasised that, "*Institutions are facing major challenges in the selection and admission of students, potential testing and assisting students to enable the required throughput rates*" (Lourens, 2010).

Despite the alarming dropout rates at South African HEI's and the calls for initiatives to address selection and admission processes and to elevate throughput rates, more and more first year students gain access to HEI's (*Beeld*, 4 May 2009), and thus academic support interventions should play an increasingly more important role to ensure that these students complete their qualifications in the study time allowed.

An article in *Beeld* on 4 May 2009, with the title: "*Eerstejaar-tsunami tref*", supplied the following statistics: 22 000 more matriculants from the year 2008 gained access to study at HEI's in 2009, than matriculants from 2007 who gained access to study at HEI's in 2008. This represents an increase from 85 000 to 107 000 first year students, or a rise in percentage of 25,88% in one year's time (*Beeld*, 2009). According to the article, there was an increase of 30% of applications for first-year students in 2009 at the University of Pretoria (UP). At the Nelson Mandela Metropolitan University (NMMU) the increase was 22,8%. At the North-West University (NWU) the increase was 10%.

Two years later, in 2011, an article in *Beeld* (2011:19) stated that the number of students at HEI's in 2010 was 840 000. The vice-director general of universities in the Department of Higher Education, Ms Jacie Menon, stated that the number of registered students at HEI's has to reach the million mark in 2013 (*Beeld,* 2011:19). This indicates that an increase of 160 000 students will have to be accommodated at the presently overburdened universities, although Menon mentioned that two new universities still have to be built: one in Mpumalanga and one in the Northern Cape (*Beeld*, 2011:19).

The question arises where the 126 000 university entrance candidates who matriculated in 2010 could be accommodated. According to the Department of Education (DoE) only 86 000 students could be accommodated for studies at HEI's in 2011, which is an increase of 10% from the previous year.

In order to address these increases in first year student numbers, more students will have to be accommodated in first year classes, or first year classes will have to be duplicated or even triplicated. Because of the large intake of first year students, there will be less time for lecturers and student advisers to address individual academic requests and needs (unless their numbers are duplicated or triplicated as well). Without adequate support structures such as an appropriate number of advisers and lecturers, students will increasingly have to take more responsibility for their own learning (Holsgrove *et al.*, 1999:99). They will have to become more autonomous and self-regulated in learning, and less dependent on support structures.

1.3 PROBLEM STATEMENT

Against the background of the poor throughput rates and the escalating number of first year students at South African universities, the question arises:

What are the abilities, attributes and skills that academically successful first year students possess?

Research done by *inter alia* Barry Zimmerman and Dale Schunk (1989) threw light on this question. Their research indicated that the motivational, behavioural and metacognitive practices that accompany Self-Regulated Learning (SRL) strategies play a significant role in predicting academic success. Fraser and Killen (2003:21) found that the absence of these factors may lead to poor academic performance, especially in the first year of study at a HEI.

A survey conducted by Kotsiantis and Pintelas in 2005 at the Hellenic Open University in Greece on high dropout rates, indicated that more than fifty percent of the first year students who dropped out did not manage their study time well,

misjudged their learning abilities and displayed a lack of self-regulated control of their learning processes (Kotsiantis & Pintelas, 2005:665).

Research that was conducted on first year students at seven Australian universities indicated that two-thirds of the participants were of the opinion that they were not well prepared for university studies (Department of Education, Training and Youth Affairs, 1999:1). The participants reported that they received a high degree of support and advice from teachers and parents on how to regulate their learning processes at Secondary Education Institutions (SEI's), but instruction on the acquisition of the SRL skills that are required by HEI's and practice therein did not take place at the HEI's.

According to Lines (2005), the assumption can be made from the above and other research findings that most first year students come to HEI's ill prepared for independent and self-regulated learning. This conclusion has been substantiated by South African studies (Schutte, 1995; Fraser & Killen, 2003) and in the Netherlands (Bruinsma, 2003). According to Monteith (1989:28) and Schutte (1995:221), the lack of self-regulated control of learning processes is one of the main reasons for high dropout rates amongst first year students. A high degree of learner support (with a resultant lack of self-regulated learning) is normally provided at SEI's. Students expect the same support at the HEI where they are studying, but often do not receive it. According to Lines (2005:11), this is one of the main reasons why there is such a high dropout rate for first-year students.

It is therefore imperative that intervention practices should be offered by HEI's to support first year students to gain access to strategies and advice, which can help them to improve their SRL skills. Except for personal disappointment, failing a year at university or college also implies a financial setback for the individual as well as the state. This is illustrated by the following statement. In 2005 the DoE issued a public statement lamenting that the dropout rate was costing the National Treasury R4.5 billion in grants and subsidies to HEI's, without a proportionate return on investment, such as knowledgeable and skilled graduates (Human Science Research Council, 2008:2).

National economic growth depends on providing opportunities to all students to develop the appropriate knowledge and skills needed in a knowledge-based, global economy. The acquisition of knowledge, skills and competencies will have to be increased and improved to raise the quality of Higher Education and eventually the income levels of the South African population (Benton, 2006:2).

Student learning support programmes and bridging courses have been implemented at various South African HEI's, but a NEXUS search conducted by the researcher has indicated that no research has been done on strategies for the development of Self-Regulated Learning (SRL) skills of first year students at South African universities.

Thus, for the purposes of this study, the researcher formulated the following primary research question:

What strategies can be proposed for the development of Self-Regulated Learning (SRL) skills of first year students at a South African University?

1.4 RESEARCH AIM AND OBJECTIVES

As stated previously, no known documented strategies for developing the SRL skills of first year students at South African universities exist. Such strategies become more imperative when the growing numbers of first year students who are admitted to universities and the alarming dropout rates are taken into account.

Thus, the main aim of the research was to develop and propose strategies for the development of SRL skills of first year students, based on the results of an extensive literature review and an empirical investigation. The research aim was therefore deductive.

Related to the main research aim, the researcher wished to:

- Conduct a literature review on the phenomenon of SRL ;
- analyse the results of the Learning and Study Strategy Inventory (LASSI)

which was conducted on a cohort of first year students who registered for their studies at the Potchefstroom Campus of the NWU;

- determine whether the SRL skills of this cohort of first year students, as assessed by the LASSI, significantly predicted their academic success;
- identify different variables that relate to the SRL skills and academic achievement of these first year students;
- explore how these students have experienced their studies in their first year and subsequent years of study;
- determine through interviews based on the Self-Regulated Learning Interview Schedule (SRLIS) that was developed by Zimmerman and Martinez-Pons (1989), which self-regulated traits or skills have influenced the academic achievement of a selected group of students in their fourth year, in addition to the skills assessed by the LASSI; and
- combine the findings of the literature review and the empirical study to identify the SRL skills that are necessary for academic success.

1.5 RESEARCH DESIGN AND METHODOLOGY

In order to answer the research question and to achieve the aims and objectives of the research, the researcher conducted a literature review and an empirical investigation.

1.5.1 The literature review

The literature review concentrated on the following aspects:

- *A Constructivist view of knowledge acquisition*
- *Self-Regulated Learning (SRL)*
- *A Social Cognitive view of SRL*

- *The relationship between SRL and academic achievement of students at HEI's*

The literature review was conducted by consulting the following databases and search engines: EBSCOhost, SABINET, Bokola and Google Scholar. The following key words were used:

Self-Regulated Learning, self-regulation, self-reflection, dropout figures at HEI's, first year students, learning strategies, learning skills, motivational strategies, Behaviourism, Constructivism, academic success and failure, acquisition of self-regulated learning, active construction of knowledge, student support, reflective thinking, formative assessment, self-efficacy, goal orientation, throughput figures, Self-Regulated Learning inventories, metacognition, Self-Directed Learning, Social Cognitive theory, Connectivism.

1.5.2 The empirical investigation

Research approaches continually evolve and change in response to the complex, interconnected global communities and their needs in our world (Creswell & Garrett, 2008:1). A complex research topic such as analysing and exploring the SRL skills of first year university students, requires amassing substantial evidence by implementing both quantitative and qualitative research methodologies in a mixed-method research approach. Boekaerts and Callagher (2006:206) and Boekaerts and Corno (2005:200) pointed out that more than one form of evidence is needed to assess a complex phenomenon such as SRL.

A quantitative approach was followed to: (1) analyse the results of the Learning and Study Strategies Inventory (LASSI); (2) determine whether the subscales in the LASSI significantly predict academic success; and (3) identify different variables that relate to learning and study skills.

A qualitative approach was followed to (1) explore the participants' experiences with their studies and (2) analyse which SRL skills, in addition to the skills assessed by the LASSI, have influenced their studies and academic success.

1.5.2.1 Quantitative Research Design and methodology

Research Design

A non-experimental diagnostic survey was conducted by utilising the LASSI as a diagnostic instrument. The reasons for implementing the LASSI as a measuring instrument vary and will be motivated further in Chapter 4.

Study population

The cohort of first year students who registered in 2007 at the Potchefstroom Campus of the North-West University as first year students (n = 2421) and who were assessed by means of the LASSI during their orientation week, served as the study population.

Measuring instrument

Professors Claire Weinstein, David Palmer and Ann Schulte, from the Department of Educational Psychology at the University of Texas in Austin, developed the Learning and Study Strategies Inventory (LASSI) in 1987. According to Weinstein and Mayer (1983) learning strategies are behaviours and thoughts in which the individual engages, and which are intended to influence his/her encoding processes (Weinstein & Mayer, 1983). According to Muis *et al.* (2007:179), the LASSI was developed from a cognitive theoretical framework to measure the types of learning and study strategies individuals use when studying in academic environments. The LASSI was developed as a diagnostic instrument and was designed to gather information about individual learning and study practices, attitude, motivation and anxiety. In 2003 it was used by almost 2 000 tertiary institutions over the world (McMahon & Luca, 2004:427). In 2006 the completion of the LASSI was made compulsory for all new students at the City University of Hong Kong (Wong & Downing, 2007:32).

The focus of the LASSI is on both covert and overt thoughts and behaviours that relate to successful learning and that can be altered through educational interventions (Weinstein, 1987:2). The questionnaire contains 10 subfields: *Attitude,*

Motivation, Time management, Anxiety, Concentration, Information processing, Selecting main ideas, Study aids, Self-testing and *Test strategies* (Weinstein, 1987:2).

The LASSI has been administered to first year students at various South African tertiary institutions and has been used at the North-West University (Potchefstroom Campus) for a substantial period of time. The LASSI has high content -, construct - and interface validity as well as high measurement reliability (Weinstein, 1987:3).

Research has been done on the efficiency of the LASSI questionnaire for various purposes. Studies by Olaussen and Braten (1998), Olivarez and Talent-Runnels (1998), Murphy and Alexander (2002), and Haught *et al.* (2006) have indicated that the LASSI yields reliable measures of student learning and studying behaviours.

A more detailed discussion of the LASSI will be presented in Chapter 4.

Data analysis

The statistical data analysis was conducted by a statistician from the Statistical Consultation Service of the NWU (Potchefstroom Campus). Descriptive statistics were reported for the percentile scores of the LASSI subfields. These were indicated in a hierarchical order from the highest score to the lowest score, and the average student profile at the Potchefstroom Campus was interpreted and discussed.

Factor analyses were conducted to determine the construct validity of the LASSI and Cronbach's Coefficient alpha was calculated to determine the reliability of the LASSI.

T-tests were conducted to determine whether the results of the LASSI subfields differed significantly for the two genders. ANOVA's were performed to determine whether significant differences exist between faculties in terms of LASSI scores. Correlations between LASSI subfields and academic performance were determined. Effect sizes were calculated in all cases to determine the practical significance of results.

Stepwise regression analyses were performed to determine which of the LASSI subscales were the most important predictors of academic success. The independent biographical variables (gender, age, and grade 12 results) were also incorporated into the regression analyses.

1.5.2.2 Qualitative research design and methodology

Research Design

In the qualitative part of the empirical investigation an interactive design was used. Structured interviews were conducted with the participants to explore their experiences with their studies and the traits or skills that have influenced their studies and academic success, in addition to those assessed by the LASSI. The decision was taken to implement this qualitative method of data collection, because it allowed the researcher to reach a deeper understanding of the context of the SRL skills and the perceptions of learning by the participants in the form of narratives (Fraenkel & Wallen, 2003:431;462; Leech & Onwuegbuzie, 2010:75). The methodology implemented for the analysis of the interviews was interpretative content analysis by means of open and axial coding.

Participant selection

The participants with whom the interviews were held during 2010, were a selected group from the cohort of first year students who registered at the Potchefstroom Campus of the NWU in 2007. This group of students in their fourth year of study was selected in accordance with their 2007 LASSI results, as well as their academic achievement during their years of study. The academic records of these students were obtained from the academic administration with the permission from the Institutional Registrar.

The following criteria guided the selection of the participants:

1. students who completed the LASSI in 2007;

2. students in their fourth year of study; and

3. students whose academic and LASSI mean scores indicated a difference of more than 10% from each other. These criteria will be further elaborated upon in Chapter 4.

Data collection strategy

Structured interviews were conducted with the selected participants who conformed with the selection criteria. The Self-Regulated Learning Interview Schedule (SRLIS) (Zimmerman & Martinez-Pons, 1989) was used as a frame of reference for the questions posed during these interviews. Three additional questions were added to the ten questions derived from the SRLIS. The questions addressed the participants' experiences with their studies and SRL skills that could have influenced their studies and academic success since their first year of study.

Data analysis

The participants' contributions were digitally recorded (with their informed consent) and were transcribed verbatim. These transcriptions were then analysed in accordance with the coding procedures of interpretative content analysis and is further described in Chapter 4.

1.6 ETHICAL CONSIDERATIONS

Permission to gain access to the students' academic records for the purpose of tracing their academic progress was obtained from the Institutional Registrar of the NWU. The letter of permission can be found in Appendix 3.

Students who were selected for the interviews agreed to participate anonymously and voluntarily, with their full consent. An informed consent form was signed by the participants and is attached in English and Afrikaans in Appendices 1 and 2. All relevant ethical aspects, as listed in the NWU Ethics Application Form, were adhered

to and the research was approved by the Ethics Committee of the NWU in June 2010 (see Appendix 8).

1.7 CONTRIBUTION OF THE STUDY

The contribution of the study is aimed at improving knowledge of, and building the scholarship of learning as a phenomenon contextualised in Higher Education (HE). Tight (2004:6) *in* Bitzer (2009:387), categorised eight themes in HE. They are: (1) teaching and learning, (2) course design, (3) the student experience, (4) quality, (5) system policy, (6) institutional management, (7) academic work and (8) knowledge. Tight's categorisation was implemented to identify the areas in HE the researcher positioned her study in, as his categorisation is applicable to a large degree, and its flexibility makes it useful when categorising HE themes (Wilkinson & Van Jaarsveld *in* Bitzer, 2009:391). By implementing Tight's categorisation, the researcher could identify two main themes her research is positioned in:

- **Teaching and learning** – which includes approaches to studying, learning styles and pedagogical styles; and

- **The student experience** – which includes access, counselling, motivation, diversity, success and non-completion, evaluation and employment.

In this study the researcher came to the conclusion that the two main themes did overlap to some extent with some of the other themes in Tight's categorisation. This will not be elaborated on, as Bitzer (2009: 388) stated that Tight acknowledged that a definite listing is not possible, and that overlapping among themes may occur.

As indicated previously, the dropout rate of first-year students at HEI's has reached alarming proportions. Thus, there is a bridge to be crossed between Grade 12 and the first year of study at a university because of the academic under-preparedness of most first year students (Fraser & Killen, 2003:22; Lines, 2005:6). In addition to this problem the number of first year university students is increasing alarmingly and these students should be supported in the form of guided intervention strategies.

The NEXUS search conducted by the researcher has indicated that no research has been done on strategies for the development of SRL skills of first year students at South African universities. The literature review has not indicated how the poor throughput figure of first year university students can be alleviated by improving their SRL and no documented strategies for developing the SRL skills of first year students at South African universities was encountered. Thus, this study endeavoured to propose strategies for the development of SRL skills of first year university students at the Potchefstroom Campus of the North-West University. It is anticipated that these strategies will improve the SRL skills of first year students at this university and will result in better academic achievement and higher throughput figures.

1.8 CHAPTER DIVISION

The thesis is divided in the following chapters**:**

Chapter 1 (this chapter) provides a preview of the study.

Chapter 2 provides a theoretical exposition of SRL.

Chapter 3 explores the relationship between the SRL skills and the academic achievement of students at HEI's.

Chapter 4 describes the research design and methodology that are followed in the empirical part of the research.

In **Chapter 5** the results emanating from both the quantitative and qualitative research are presented and discussed.

In **Chapter 6** strategies are proposed for the development of SRL skills of first year university students.

In **Chapter 7** a summary of the study is provided and recommendations are made for the development of SRL skills of first year university students.

1.9 CONCLUDING REMARKS

In this chapter, a preview was provided of the present study.

In the following chapter (Chapter 2) a theoretical exposition of SRL will be undertaken.

CHAPTER 2
SELF - REGULATED LEARNING (SRL): A THEORETICAL EXPOSITION

2.1 INTRODUCTION

According to Alexander (2004:10) research on learning and learning theories is a core objective for education. In this chapter the theory of self-regulation of learning will be discussed.

Studies of the nature of knowledge and how it is learned play an important role in understanding learning theories such as SRL, thus in the next paragraph a description of the nature of knowledge and the definition of knowledge will be provided. The three kinds of knowledge that are mostly referred to by educationists will be described, namely: *Declarative, Procedural* and *Conditional* knowledge. The process of knowledge acquisition is elucidated, followed by a theoretical overview of the origin and development of SRL. The overview will contain information regarding a paradigm shift in the perspective of learning that took place and that led to the Constructivist perspective of learning. A discussion of various concepts that relate to SRL will follow; such as its definition, the difference between SRL and *Self-Directed Learning,* and theoretical views regarding some issues in SRL.

A description of the Social-cognitive view of SRL and its origins will follow in the consecutive paragraph. This will include a feedback loop and the relevant constructs, such as self-efficacy, motivation and goal-setting. The categories of SRL skills deemed to be important for academic achievement, as well as the latest findings on SRL will conclude this chapter.

This combined exposition of the above – mentioned aspects will form the core of the literature review in this chapter, which in turn will provide a theoretical perspective on SRL.

2.2 KNOWLEDGE

Various perspectives of what knowledge is, has been postulated. More specifically, Jacobs *et al.* (2002:161) defined knowledge as: "*The learning content which learners/students are expected to acquire in order to function effectively in their environments*". Paris *et al.* (1983) were the first educational psychologists to categorise knowledge as **Declarative, Procedural** and **Conditional** knowledge. This categorisation is recognised and widely used by for example Schunk (1999), Zimmerman (2001), Peirce (2003), Almasi (2003), Stone *et al. (*2005), Bereiter and Scandalian (2006), Dunlap (2007), Stulp (2008) and Hetrick (2009). The notion of these three types of knowledge applies to course content as well as to learning strategies.

A short description of the three kinds of knowledge is tabled below, and a discussion of what they constitute follows after that.

Table 2.1 Declarative, Procedural and Conditional knowledge

Type of knowledge	Description of type of knowledge	The student knows:
Declarative	Declarative knowledge indicates the **know that** of things and includes knowledge of the self as learner, and which factors influences performance.	**That**
Procedural	Procedural knowledge indicates the **know how** in order to perform a procedure.	**How**
Conditional	Conditional knowledge indicates the **when** and **why** aspects of cognition	**When** and **why**

Paris *et al.* (1983)

According to Paris *et al.* (1983), Schunk (1991), Zimmerman (2001) and Peirce (2004) the categorisation in Table 2.1 is made according to the characteristics that each type of knowledge possesses. An example adapted for each of the three types of knowledge necessary for learning in a Physics class (demonstrated and set forth in a workshop presented by Peirce in 2004), is provided below.

- **Declarative knowledge** is the factual information that one knows and that can be declared – it can be spoken or written. According to Peirce (2004) "*Declarative knowledge is for example knowing the formula for calculating momentum."*

- **Procedural knowledge** is the knowledge of how to do something, or how to perform the steps in a process. According to Peirce (2004) "*Procedural knowledge is for example knowing the mass of an object and its rate of speed and how to do the calculation."*

- **Conditional knowledge** is the knowledge about when to use a procedure, skill or strategy and when not to use it; why a procedure works and under which conditions; and why one procedure is better than another. According to Peirce (2004) "*Conditional knowledge is necessary for students to recognise that an exam word problem requires the calculation of momentum as part of its solution."*

Paris *et al.* (1983), Zimmerman (2001) and Peirce (2004) perceived *metacognitive knowledge* (which will be discussed later in Paragraph 2.8.3.1) as **Procedural** and **Conditional** knowledge. In contrast with their views, Efklides (2008:280) perceived *metacognitive knowledge* as **Declarative** knowledge stored in the brain. The researcher wishes to state that she differs from Efklides, but agrees wholeheartedly with the perception of Paris *et al.* (1983), Zimmerman (2001) and Peirce (2004). In the researcher's view **Declarative** knowledge indicates factual knowledge, while **Procedural** and **Conditional** knowledge indicates the metacognitive "knowing of knowing", that refers to the higher cognitive thinking process of analysing and evaluating (evaluating how, when and why to apply knowledge). It is imperative to

display all three kinds of knowledge for SRL. Declarative knowledge is as important as Procedural and Conditional knowledge. An exposition of different viewpoints of what metacognition is, including its definition, will be provided later in Paragraph 2.8.

Zimmerman (2001:31) and Peirce (2004) postulated that students need to possess and be aware of the three kinds of knowledge mentioned above, to increase their self-regulating abilities. The following scenario in a HEI classroom is supplied to denote the importance of possessing all three kinds of knowledge in order to learn in a self-regulated manner.

- Students need **Declarativ**e knowledge that all reading assignments are not alike, for example that (1) a history textbook chapter with factual information differs from (2) a primary historical document, which differs from (3) an article interpreting (or analysing) that document. They also need to know that there are different kinds of note-taking strategies useful for annotating the different types of texts.

- Students need **Procedural** knowledge to know how to actually write different kinds of notes.

- They need **Conditional** knowledge to know when and why they should apply these kinds of knowledge when they study.

The conclusion can be drawn that possessing all three kinds of knowledge in order to learn in a self-regulated manner is crucial. According to some learning specialists, e.g. Alison Preston (Texas University: Centre of Learning and Memory), the way in which some kinds of knowledge is processed may typify the knowledge. The memory of Declarative knowledge for instance, relies on the function of the hippocampus and may be processed as short-term memory (Preston, 2011:3). Procedural knowledge is based on the concept of procedural memory (Woolfolk, 1998:250). The process of knowledge acquisition (or information processing) will be elucidated in the next paragraph.

2.3 THE PROCESS OF KNOWLEDGE ACQUISITION

Knowledge acquisition or information processing is primarily approached by learning theorists through a study of the memory (Woolfolk, 1998:244). Woolfolk stated that the information processing views compared the brain's information processing to the model of a computer. According to her, processing involves the gathering and representing of information (encoding), holding information (storage) and getting the information when needed (retrieval). The system is guided by control processes that determine the flow of information through the system (Woolfolk, 1998:243).

A discussion of the information processing system derives from the ideas of several theorists, but the diagram of Woolfolk is presented as a model. The three memory stores of this model are the (1) sensory register, (2) the short-term memory and (3) the long-term memory. Information is encoded in the *sensory register*. Perceptions determine what will be held in the *short-term/working memory* for further use. Information that is thoroughly processed becomes part of *long-term memory* and can be activated to return to the short-term/working memory. The system is represented schematically in Figure 2.1. The circles indicate the memory stores and the arrows indicate the actions that are performed.

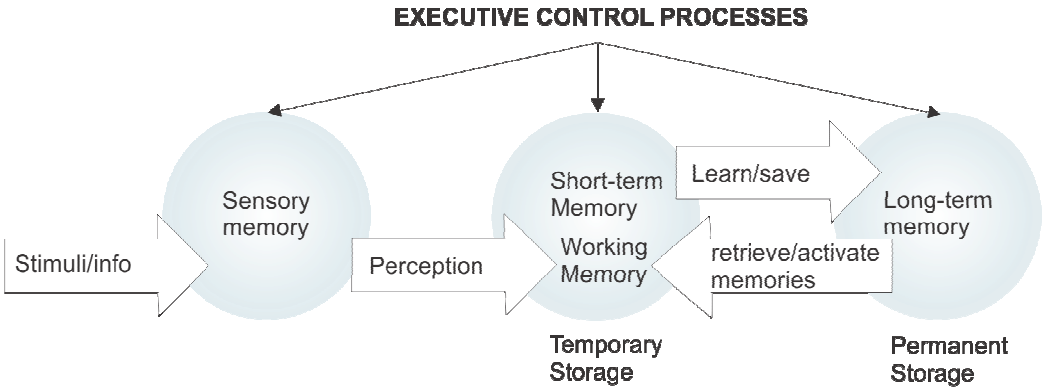

Figure 2.1 The information processing system

Woolfolk (1998:244).

An elucidation of the process of information processing or knowledge acquisition that is based on the explanation by Woolfolk (1998:242-257), is provided.

- The *sensory memory* holds all the *stimuli or information* from the environment for a very brief time, and has a large capacity, but the duration of holding is very short.

- *Perception* is the meaning we attach to the stimuli/information received. This meaning is constructed, based on objective reality as well as our existing knowledge.

- The *short-term memory* has a smaller capacity than the sensory memory, and also holds new information for a brief time. It is also called the *working memory* because its content is activated information. This may be some new information that has just been encountered, or knowledge from the long-term memory that has been activated.

- The information has to be *saved through rehearsal*: either through repetition, called maintenance rehearsal, or through elaborative rehearsal, that involves the association of the new information with something in the long-term memory store. If the information is not rehearsed, it is lost from the short-term memory, as a result of interference or decay.

- The *long-term memory* holds the information that is well learned, and which is high in memory strength or durability. The capacity of long-term memory is unlimited and if information is stored securely, the duration is permanent. Obtaining access to long time information is more time- and effort consuming than obtaining access to short time memory (Woolfolk, 1998:249). The contents of the long-term memory is distinguished as three categories of memory: (1) semantic; (2) episodic; and (3) procedural memory. Procedural memory indicates how to do things, resulting in Procedural knowledge (see Par 2.2).

- *Retrieving information* can partly be effected through the spreading of activation from one bit of knowledge to related ideas in the network, or through reconstruction. *Storing information* in the long-term memory can be integrated through elaboration, organisation and contextualising. Woolfolk states that information from the long-term memory store is not lost, but may become available if the right cues are given (1998:256).

To facilitate the connection between existing and new knowledge, a learning skill such as concept mapping can be used, leading to deep or meaningful learning. (Kinchin *et al*., 2000:44; Atherton, 2005:1-4). *Deep learning* implies the critical analysis of new information and linking it to prior knowledge. This process should lead to understanding, and the long-term retention of concepts. According to Carl Wieman, who was awarded the Nobel Prize in Physics in 2001, there is not enough time during a lecture to develop the long-term memory structures that are required for mastery of a subject or lengthy topic (Wieman, 2009:2). He stated that for deep learning to occur, extended and highly focused mental processing of knowledge is required by the individual student.

The ability to acquire and process knowledge depends on the individual student, but self-regulation of learning contains more processes than this ability. To elucidate all these processes, the concept of SRL will be discussed in the next paragraph.

2.4 SELF-REGULATED LEARNING (SRL)

The concept of SRL only evolved in the latter half of the twentieth century, when learning specialists, such as Zimmerman (1986, 1988) came to the conclusion that knowledge is constructed by the person who learns. The paragraphs that follow will indicate the evolvement in the different perspectives on learning; from the Behaviouristic theory of learning to the Constructivist theory of learning. Connectivism as a theory of learning will be discussed shortly, in order to accommodate contemporary views. The different perspectives of Constructivism will

be explained, as each perspective offers a different viewpoint on how knowledge is constructed. SRL is based on the premise that knowledge is constructed, and that if the learner/student is able to construct knowledge, then he/she should be able to self-regulate his/her learning. The ability to construct knowledge leads to the ability to regulate the integration of new knowledge and of learning (Hardy *et al.,* 2006:308).

2.5 A THEORETICAL OVERVIEW OF THE ORIGIN AND DEVELOPMENT OF SRL

2.5.1. A paradigm shift in perspectives of learning

A literature review indicated a paradigm shift in learning perspectives that occurred in the latter half of the twentieth century (Jonassen, 1999:10; Mowrer, 2001:3; Zimmerman, 2001:23). This shift will be discussed in more detail, but a description of what a paradigm is, is deemed necessary to start with. A *paradigm*, according to Venter (2000:7) is not a theory, but a network of convictions that is shared by a number of scientists. The origin of a paradigm can be found in a specific view of the world and the ensuing theoretical starting points, and it forms the foundation of the development of different models or theories (Shulman, 1986:3, Botha, 1990:38; Jansen & Steinberg, 1991:9). The definition of what a paradigm is, as coined by Peca (2001:2), is used for the purposes of this study: "A paradigm refers to a set of interdependent assumptions of the world that provides a conceptual and philosophic framework to study the world in an organised manner".

For most of the first half of the twentieth century, the Behaviouristic perspective of learning, or paradigm, provided the most prominent conceptions of learning (Schunk, 2001:83). According to behaviourists learning consists of a stimulus and a response. The behaviourist paradigm of learning is based on Pavlov's theory of Classical and Operant Conditioning that implies each stimulus (cause) has a specific response or effect (Ormrod, 2000:398). The example of the dog that salivates (response) when it sees its food bowl (stimulus), is well known, and was introduced by Pavlov (1849-1936).

The Behaviourist paradigm perceived learning as a knowledge and skills acquisition process that relies very heavily on teacher/lecturer transmission of knowledge. Behaviourists such as Skinner were unwilling to acknowledge the existence of the mind or the act of knowing, because these were not observable (Jonassen, 1999:10; Schunk, 2001:85). According to Mowrer (2001:3) behaviourists view learning as nothing more than the acquisition of new behaviour. This view assumes that learning only takes place when a visible change in the behaviour over an established time is observed (Schunk, 2001:23).

Criticism against Behaviourism was initially voiced by Martin (1984:17) and this was followed by others (Zuriff, 1985:1; Greenfield, 1993:34; Reigeluth & Moore, 1999:54). One of the main causes for criticism was the focus of Behaviourism on observable conduct, caused by a stimulus/stimuli. This focus on observable conduct disenables our understanding of the concepts of understanding, reasoning and thought (Bransford *et al.*, 2003:8). Other criticisms against Behaviourism are its failure to explain generic tracts in human behaviour, and its inability to explain the development of language (Reigeluth & Moore, 1999:54; Bransford *et al.*, 2003:9).

The researcher wishes to state that although Behaviourism does not encourage the development of SRL, it does contribute to the concept of what *memorisation* is – one of the learning strategies discussed in Chapter 3, and analysed as a SRL skill in the interviews with selected students (see Chapter 5).

Research shows that various kinds of instruction and experience produced a paradigm shift: from seeing knowledge as transmitted to seeing it as constructed – from Behaviourism to Constructivism. Even before this paradigm shift from the Behaviouristic view of learning to the Constructivist view of learning, many of the concepts underlying the constructivist reform of educational practice and learning perspective have been reflected in the work of Dewey (1859-1952), Vygotsky (1896-1934), Piaget (1896-1980) and Bruner (1915-2007), according to Harris and Graham (1994:233), and Davis (2006:1). John Dewey (1859-1952) emphasised the importance of experience in education and stated that learning is active and that students should be involved in real-life tasks and challenges (Boisvert, 1988:21).

Although SRL was not conceived as a learning theory in the first half of the twentieth century, Albert Einstein (1879-1955) already made a statement in 1950 which can be interpreted as an indication of student-based learning, namely: “I never teach my pupils, I only attempt to provide the conditions under which they can learn” (Harris, 1995). Another view of Constructivism can be traced to the work of Piaget (1896-1980), who demonstrated empirically that children’s minds are not empty, but that they actively process the material with which they are presented. Piaget stated that people construct new knowledge from their experiences through the processes of accommodation and assimilation (Atherton, 2005).

According to Davis (2006:2) and Schunk (1989:271) the difference between the theories of Vygotsky and Piaget is that the major theme of Vygotsky's theory of learning is that social interaction plays a fundamental role in the development of cognition, while Piaget’s theory of learning is that it is a biologically oriented process in which the student develops his/her own objective sense of reality. Other educational psychologists, such as Jerome Bruner (1915-2007) elaborated on Vygotsky’s theory. Bruner developed the concept of instructional scaffolding, in which the social environment offers support for learning, which is gradually withdrawn as knowledge becomes internalised (Davis, 2006:2).

According to Jones (1989:28) the Social Cognitive Theory (SCT) of Albert Bandura (1925-2010) preceded the paradigm shift with regard to the understanding of learning that took place in the second half of the twentieth century. The SCT contends that behavioural consequences, rather than strengthening behaviours, serve as sources of information and motivation (Schunk, 1989:85). Bandura’s SCT of learning focuses on how humans act cognitively on their social experiences and how these cognitions then influence their behaviour, development and learning (Bandura, 1986; 1989). With its strong emphasis on human cognition, the SCT defines learning as a triadic, dynamic and reciprocal interaction of personal factors, behaviour and the environment (Bandura, 1986; 1989). Behaviour and learning are largely regulated through cognitive processes.

A key aspect of the Constructivist learning theory is the way in which individuals move away from reliance on teachers/lecturers for the acquisition of knowledge, to a process where they can discover and construct knowledge themselves (Zimmerman, 2001:23), and their learning becomes more autonomous. *Autonomy of learning* can be described as the capacity of a student for learning, which includes the extent to which a student can undertake action for learning independently, be responsible for his or her own learning, be self-reflexive about and can evaluate the quality of his or her own learning (South African Higher Education Quality Framework Level Descriptors:2010). In this student-centred perspective the lecturer becomes a facilitator, coach and motivator, whereas in the previous, traditional paradigm the lecturer was seen as the transmitter of knowledge. Learning is seen as a developmental process and students are seen as possessing skills, knowledge and abilities, including social and emotional experiences that influence how they will engage in the learning process (Ambrose *et al.,* 2010).

In the Constructivist perspective of learning students actively construct their own knowledge by anchoring new information to pre-existing knowledge. However, understanding how knowledge is constructed still remains as a challenge (Bereiter & Scandalian, 2006:707). This challenge is applicable to the current move towards *Mobile Learning*. Mobile learning is a range of activities that are performed in response to the rapid development and increasing popularity of portable electronic devices, such as smartphones or those that run Google's Android platform; or tablet devices, that perform most of the same functions as desktop computing platforms. Corbeil and Corbeil (2007:2) provided a definition of mobile learning by Professor Clark Quinn; namely that mobile learning is the intersection of mobile computing (the application of small, portable, wireless devices) and e-learning (learning facilitated and supported through the use of information and communications technology). Mobile and e-learning are discussed in paragraph 2.10 in this chapter, as well as in Chapter 3. The portability of mobile devices and their ability to connect to the Internet almost anywhere and anytime indicate that knowledge may be acquired through additional SRL skills.

The learning theory for Mobile learning and e-learning is described as *Connectivism* (Siemens, 2004; Brown, 2005; Wagner, 2005; Corbeil & Corbeil, 2007; Van der Zanden, 2009:73). Siemens (2004:2) stated that the learning theory of Connectivism addresses the learning that occurs outside the student: learning that is stored and manipulated by technology. The learning process in Connectivism implies that students connect to persons and systems, thus treating them equally as virtual extensions to obtain instant knowledge-on-demand (Van der Zanden, 2009:75). When knowledge is abundantly available through the internet, an important learning skill is the rapid evaluation of knowledge. The SRL skills demanded by Mobile learning and e-learning are discussed in Chapter 3. The implementation of technology and connection-making that are included as learning activities distinguishes Connectivism from other learning theories.

Although the Connectivist learning theory is acknowledged in this paragraph, the researcher approached her research from the Constructivist learning theory. The next paragraph will indicate the aspects that add to the understanding of what the Constructivist perspective of learning entails.

2.5.2 The Constructivist perspective of learning

The Constructivist learning theory postulates that learning is an internal, active process of recreating, developing, constructing and thus acquiring knowledge (Barr & Tagg, 1995; DeCorte, 1996; Zimmerman, 2001:32; Charmaz, 2006:187). Through this process of knowledge construction, emphasis is placed on the role of learning activities. The different perceptions of where and how knowledge construction takes place indicate different schools of thought within the Constructivist theory, but they all concur with the same basic assumption about learning, namely that it is a process of constructing knowledge.

As early as in 1982 Moshman noted different Constructivist approaches to learning and instruction, and gave a description of each perspective (Moshman, 1982:371-384). He differentiated between Endogenous, Exogenous and Dialectical Constructivism. In addition to Moshman (1982); Harris and Graham (1994); Schunk

(2000); and both Woolfolk (1998) and Davis (2006) concurred that the Constructivist learning theory contains different perspectives on learning. The three perspectives that will be explained are **Endogenous Constructivism, Exogenous Constructivism** (both also known as *Cognitive Constructivism*) and **Dialectic Constructivism** (also known as *Social Constructivism*). Among other variables, the roles of the environment or social context, of significant others (such as parents or teachers), and other differences of approach exist in these perspectives (Harris & Graham, 1994:234; Davis, 2006:2). The ability to construct knowledge leads to the ability to regulate the integration of new knowledge and of learning (Hardy *et al,* 2006:308).

A concise definition of each perspective is presented as following: **Endogenous constructivism** emphasises the internal process that students use for knowledge construction; **Exogenous constructivism** emphasises the reconstruction of the external reality with accurate thought suggestions; and **Dialectic constructivism** emphasises the role that the social environment plays in the construction of knowledge. A more detailed discussion of the three perspectives is provided, to explain the connection of a different kind of learning to each perspective.

2.5.2.1 Endogenous constructivism

The internal construction of new knowledge is emphasised in this perspective. Moshman (1982:376) described **Endogenous constructivism** as "*Emphasising learner/student exploration"*, adding that this perspective indicates abstract reflection and an emphasis on development (Moshman, 1982:374). Endogenous (or Cognitive) constructivists, of which Piaget was the main exponent, focus on the mental processes that individual students utilise for knowledge construction (Jonassen, 1999:12). The student is the locus of activity in the construction of new knowledge, rather than the environment (Harris & Graham, 1994:235), and learns by constructing new knowledge or new cognitive structures through metacognitive reflection on, or coordination with, current cognitive structures (Harris & Graham, 1994:235; Moon, 2004:12-17). Students construe reality or knowledge according to their specific ability at a given moment, which becomes more sophisticated in

accordance with the increasing experience of the students (Schuell & Moran, 1994:341; Schunk, 2000:230). To improve the desired sophisticated ability mentioned above, lecturers should provide the student with tasks or learning that are just beyond the students' current competence (Pressley & McCormick, 2006:18).

2.5.2.2 Exogenous constructivism

Moshman (1982:375) described this perspective as "*Recognising the role of direct instruction"*. According to Pressley and McCormick (2006) and Schunk (2000), in this perspective the lecturers provide explanations and model problem-solving. Knowledge acquisition is regarded as a reconstruction of the structures in the external world, or experience - which is in contrast with **Endogenous** constructivism. According to Dalgarno (1996); Doolittle (2001:2) and Betts *et al.* (2007:58) the focus in this perspective falls on the ways that individuals can reconstruct the external reality with their own accurate thought suggestions through networks, schemes and rules.

2.5.2.3 Dialectic constructivism

Moshman (1982:376) described this perspective as: "*Emphasising the role of interaction between learners/students, their peers and their teachers/lecturers"*. **Dialectic** or Social constructivists, such as the father thereof: Vygotsky, claim that learning is subject to the milieu within which the student is situated, and that knowledge is constructed in social contexts (Jacobs, 2002:162; Woolfolk, 1998:275; Shuell, 1998:285). Although the social milieu plays a strong role during the construction of knowledge, this does not mean that the value of the *cognitive view of learning* (**Endogenous** and **Exogenous constructivism**) is disregarded. Dialectic constructivists see neither **Exogenous** learning nor **Endogenous** development as predominant.

Dialectic constructivists postulate that knowledge develops from experiences in social contexts (Spivey, 1997:4), and may change according to the reality or context that individuals find themselves in (Von Glasersfeld, 1995:4). This implies that not all

knowledge should be regarded as dependable, as persons in different contexts may attach different meanings to their perception of reality. According to Von Glasersfeld (1995) and Murphy (1997) not only does the reliability of knowledge depend on the context that it was construed in, but also if it is accepted and acknowledged by most persons in a group. To aid learning, the lecturers should provide hints and prompts to students as they struggle to construct knowledge (Pressley & McCormick, 2006).

2.5.2.4 Constructivist triangulation

Moshman (1982) noted the importance of integrating (but not synthesising) these three perspectives, to improve our understanding of cognition and its development (Harris & Graham, 1994:237). Dalgarno (1996) described the interaction of the three perspectives, and connected different learning strategies to a certain constructivist perspective. In his view:

- Investigative learning and metacognitive strategies are connected to **Endogenous constructivism**
- Experience learning is connected to **Exogenous constructivism**
- Cooperative learning is connected to **Dialectic constructivism**

Investigative learning, according to Betts *et al.* (2007:58), takes place when students investigate problems on their own, as the lecturers refrain from giving the solutions to them. The *metacognitive strategies* referred to should be distinguished from *cognitive strategies* (Livingston, 1997). Cognitive strategies allow students to build knowledge but metacognitive strategies enable a student to monitor and improve this knowledge (Gourgey, 1998).

Experience learning, according to Moon (2004:12-17), takes place when a student performs tasks in a specific environment from the instructions given by a lecturer. *Cooperative learning*, according to Smith (1996:71), focuses on construing knowledge in a social context, with input from others.

Although different perspectives exist in the Constructivist theory of learning, it can be concluded that Constructivists perceive learning as a constructive process requiring the active cognitive engagement of the student to process information/facts into knowledge (Nicol, 1997; Crotty, 1999). The Endogenous constructivist perspective is an imminently suitable learning perspective, because it entails metacognitive strategies which can be applied by the students to determine the development of their competencies (Schunk, 2000:230; Moon, 2004:12-17). The student monitors, evaluates and controls his/her learning and is personally involved and committed during the learning process. However, Exogenous and Dialectic constructivism are not disregarded, as all three perspectives add up to what the construct of Constructivism entails.

According to Charmaz (2006:187) Constructivism is a social scientific perspective that assumes that people construct the realities in which they participate. Thus, Constructivist researchers gain multiple views of the phenomenon they are researching, and acknowledge that their interpretation of the studied phenomenon is itself a construction (Charmaz, 2006:188). Adding to Charmaz's perspective, Shuell (1998:288) and Jonassen (1999:14) postulated that Constructivists view the mind as an active force that is able to self-construct one's reality, selectively encode information, perform behaviour on the basis of values and expectations, impose structures on its own actions and self-regulate learning.

Learning itself is viewed by Shuell (1998) as an active, constructive, cumulative and goal-oriented process. The ability of self-constructing knowledge leads to the ability to regulate the integration of new knowledge and of learning (Hardy *et al.,* 2006:308). Students should thus actively engage in a process of knowledge integration and regulation of their own learning (Hardy *et al.,* 2006:309) and become autonomous and self-regulated students. The ability to self-construct one's knowledge can thus be described as having a direct connection with being able to self-regulate one's learning.

The concept of self-regulation of learning or SRL will be discussed in the next paragraphs.

2.6 SRL – AN EXPOSITION OF CONCEPTS

2.6.1 Defining SRL

Various definitions of SRL have been given by learning scientists. The next three definitions are provided to provide a holistic perspective of SRL. Zimmerman (1998:329) described SRL as the extent to which a student is metacognitively, motivatedly and behaviourally involved in his/her learning. Pintrich (2000:453) described SRL as an active and constructive process wherein students have to set learning goals, and then have to regulate, monitor and manage their cognitions, motivation and behaviour, in order to attain their set goals within the context of learning. He describes the context of learning as the external environment in which the learning task or assignment has to be performed, or the classroom or cultural context wherein learning has to take place (Pintrich, 2000:456). A more recent (and concise) definition is that of Harrison and Pain (2009:228), namely that SRL is the development of independent learning skills.

2.6.2 SRL and Self-Directed Learning (SDL)

SRL and Self-Directed Learning (SDL) can both be traced to the SCT of Bandura (Guglielmino, 2010). These two concepts have several characteristics in common, and for the purposes of this study some clarification will be given regarding these differences, as well as the reason why SRL is preferred for the purposes of this study. According to Bissbort and Nenniger (2009:3), the two terms (SDL and SRL) can be linked to two theoretical viewpoints: the *Educational theory* (SDL) and the *Educational Psychological theory* (SRL).

The *Educational theory* describes SDL with the emphasis on the initiation and continuation of ongoing and lifelong learning. SDL means actively selecting, structuring and creating learning environments that support learning, combined with high self-efficacy, intrinsic motivation and monitoring of the progress of learning by learning activities that mainly include extensive and autonomous planning, organising and self-evaluating (Guglielmino, 1987:72).

In comparison, the *Educational Psychology theory* describes SRL with the emphasisis on self-regulation within the learning process. SRL describes learning in terms of cognitive, motivational, emotional and metacognitive processes (Boekaerts & Nenniger, 1999; Efklides, 2004; Schunk *et al*., 2006; Zimmerman, 1989; Zimmerman & Martinez-Pons, 1988). These and other authorities on self-regulation view SRL as a systematic process of human behaviour. This process involves the setting of one's personal goals and steering one's behaviour towards achieving the established goals (such as academic success) (Zeidner *et al*., 2000:751).

Guglielmino (Workshop presentation at the NWU in 2010), stated that the two terms are in a 90% accordance. She described SRL as having self-reflective and metacognitive elements, while SDL is more indicative of personality traits and emotional intelligence. She described a highly self-directed student as:

" ..*one who exhibits initiative, independence and persistence in learning; one who accepts responsibility for his/her own learning and views problems as challenges, not obstacles; one who is capable of self-discipline, has a strong desire to change and is self-confident, enjoys learning and has a tendency to be goal-oriented.*" (1987:73)

This research focuses on the perspective of learning through self-regulation (SRL) and not self-direction (SDL), as the researcher believes and will attempt to prove that SRL skills such as self-reflection and metacognition are more accurate indicators of successful academic achievement than the personality traits and emotional intelligence mentioned by Guglielmino (1987), although these constructs are not ruled out completely in SRL. This conviction is supported by Loyens *et al.* (2008:415), who stated that SRL is a better predictor than SDL of academic achievement.

Some aspects related to SRL, such as motivation, self-awareness, key processes, the environment and how to acquire capacity to self-regulate learning, will be presented and discussed from seven main perspectives on SRL in Table 2.2.

2.6.3 Theories regarding generic aspects of SRL

According to Zimmerman (2001:9), SRL can be approached through the following seven main theoretical perspectives regarding five generic aspects of SRL, namely the *Operant, Phenomological, Information processing, Social Cognitive, Volitional, Vygotskian,* and *Constructivist* perspectives.

These aspects are briefly discussed under the following headings:

Motivation: What motivates students to self-regulate their learning;

Self-awareness: The processes students go through to become self-aware;

Key processes: The key processes that self-regulating students use to attain their academic goals;

Social and physical environment: The social and physical environment and how it affects students' self-regulated learning; and

Acquiring capacity: How a student acquires the capacity to self-regulate when learning.

To ensure a more complete grasp of SRL as viewed from these different perspectives according to Zimmerman (2001), a brief comparison of the theoretical views regarding these aspects in SRL follows, as depicted in Table 2.2

Table 2.2 A comparison of theoretical views regarding specific aspects of Self-Regulated Learning

Theories of learning	Motivation	Self-awareness	Key Processes	Social and Physical Environment	Acquiring Capacity
Operant	Reinforcing stimuli are emphasised	Not recognised except for self-reactivity	Self-monitoring, Self-instruction and Self-evaluation	Modelling and Reinforcement	Shaping behaviour and fading adjunctive stimuli
Phenomological	Self-actualisation is emphasised	Emphasise the role of self-concept	Self-worth and self-identity	Emphasise the subjective perceptions of the environment	Development of the Self-System
Information Processing	Motivation is not emphasised historically	Cognitive self-monitoring	Storage and the transformation of information	Modelling and enactive mastery experiences	Increases through social learning at four successive levels
Social Cognitive	Self-efficacy, outcome expectations, and goals are emphasised	Self-observation and self-recording	Self-observation, self-judgment and self-reactions	Modelling and enactive mastery experiences	Increases through social learning at four successive levels
Volitional	A precondition to volition based on one's expectancy/values	The action controlled rather than the state controlled	Strategies to control cognition, motivation and emotions	Volitional strategies to control distracting environments	An acquired ability to use volitional control strategies
Vygotskian	Not emphasised historically except for social context effects	Consciousness of learning in the Zone of Proximal development (ZPD)	Egocentric and inner speech	Adult dialogue mediates children's speech	Children acquire inner use of speech in a series of developmental levels
Constructivist	Resolution of cognitive conflict or a curiosity drive is emphasised	Metacognitive monitoring	Constructing schemas, strategies or personal theories	Historically social conflict or discovery learning are stressed	Development constrains children's acquisition of self-regulatory process

Zimmerman (2001:9)

A brief discussion of the five aspects in SRL (as) as perceived from the Constructivist view, according to Zimmerman (2001:9), follows:

- **Motivation** is generated by curiosity or the goal of conflict resolution;
- The SRL student uses metacognitive monitoring to become **self-aware**;
- The **key processes** that self-regulating students use to attain their academic goals are constructing schemas, strategies or personal theories. Strategies, according to Zimmerman (2001:31), refer to deliberate actions that are performed to reach specific goals;
- The **social and physical environment** that affects students' SRL skills are social conflict or discovery learning; and
- **Acquiring the capacity to self-regulate** when learning, is constrained or determined by development.

Zimmerman acknowledged perceptions by Constructivists that differ from his perceptions of the aspects described in Table 2.2 (2001:31). Some Constructivists, such as Paris *et al.* (2001), do not agree wholeheartedly with his description and depart from the classical constructivist traditions and views such as his (Zimmerman, 2001:31). The following points illustrate only a few differences in perceptions of SRL from different Constructivist views:

Paris *et al.* (*in* Zimmerman, 2001:30) added the theory of *agency and control* to Zimmerman's perception of the issue of **motivation** from the Constructivist view. Paris *et al.* (*in* Zimmerman, 2001:31) also added to Zimmerman's perception of **self-awareness**, the influence that the *stages of development* has on the acquisition of self-awareness. These stages imply changes in cognitive functioning, for example an increased ability to differentiate between academic and social competence, between effort and ability and changes in the social context of the school/university, social comparative information and the students' construction of self-identities. Paris *et al.* (*in* Zimmerman, 2001:31) postulated a multifaceted approach to SRL, and included

performance to the more classical Constructivist focus on **competence.** Self-competence, agency and control, academic tasks are added to the strategies schemas and personal theories that Zimmerman proposed students use as **key self-regulation processes**.

Instead of the conflict or discovery learning in Zimmerman's view, Paris *et al.* (*in* Zimmerman, 2001:32) perceived the issue of **social and physical environment** as adaptable for the students' conceptions of their self and SRL. The last issue that some other Constructivists differ from Zimmerman's perception, is on **acquiring the capacity to self-regulate**. Paris *et al.* (*in* Zimmerman, 2001:33) postulated that developmental changes are effected in students' theories of themselves. These emerging theories lead to students' *forming of distinctive identities*, which influence their use of self-regulatory methods and their capacity to self-regulate.

Zimmerman (2001) provided a broad index of aspects of SRL that are divided into seven main theoretical views. His acknowledgement of theoretical viewpoints that differ from his view, e.g. those of Paris *et al.* (Zimmerman, 2001:10-33) should be borne in mind when other theoretical viewpoints are discussed. The Social Cognitive view of certain issues was presented as one of the seven main theoretical views on these issues by Zimmerman, but should not be seen as contrary to the Constructivist view. Rather, it is an additional theoretical view of SRL that adds to the concept of what SRL contains.

Seven theoretical views of the five aspects in the debate about SRL were discussed in this paragraph, as well as two different Constructivist views of these issues. In order to describe and explain how students gain control or self-regulation over their learning and thinking, the term *metacognition* is referred to. Metacognition is a term that indicates the "*learning ability*" of students or learners, and will be discussed in the next paragraph.

2.7 METACOGNITION

Metacognition is linked to self-regulation, but it is a broad concept that is used to indicate a variety of epistemological processes that are difficult to delineate clearly (Brown *et al.*, 1983). Efklides (2008) and Koriat (2007) described metacognition as the awareness of a person of his/her cognition. This awareness should trigger processes that aid the person in the self-regulation process.

The term *metacognition* is associated with John Flavell (1979), who was the first cognitive educationist to have used the term (Livingston, 1997:1). According to Alexander *et al.* (1991) researchers in different fields differ greatly on its definition. Very simply put, metacognition means thinking about thinking, or knowing about knowing.

2.7.1 Definitions of metacognition

A table composed by the researcher with definitions of metacognition is supplied to indicate the different views and the evolution of its meaning.

Table 2.3 Definitions or descriptions of metacognition

Author(s)	**Definitions or short descriptions of the term *metacognition***
Flavell (1979)	The knowledge and cognition about cognitive phenomena
Kluwe (1982)	Executive monitoring processes, that are both the knowledge of students of their own and other persons' cognition, and the monitoring and regulation of their thoughts, including the decisions that they take to identify the task, determine and predict the task outcomes.
Gravelek and Raphael (1985)	The skills of an individual to adapt cognitive activities in order to understand better
Schoenfeld (1987)	Metacognition has the potential to increase the meaningfulness of students' classroom learning. Three components can be distinguished, namely convictions and intuitions, knowledge and self-regulation.
Zimmerman and	The decision-making processes that regulate the selection

Martinez-Pons (1989)	and use of various forms of knowledge.
Paris and Winograd (1990)	Self-appraisal and self-management are two components of the term. Self-appraisal denotes personal reflections by students on their knowledge and skills, their affective view of their knowledge, abilities and characteristics as learners. These reflections supplies information regarding their knowledge and thought processes that the students follow in order to take decisions on when and how to use (knowledge) strategies. Self-management denotes the cognitive processes that help to manage aspects of problem-solving; before, during and after problem- solving.
Hacker *et al*. (1998)	Students themselves determine which sources to use, when and how it should be used, the intensity and speed that they should implement.
Mayer (2003)	Knowledge and awareness of one's own cognitive processes
Efklides (2003)	Metacognition is defined as cognition of cognition

Source: table composed by the researcher (2011)

For the purpose of this research the term *metacognition* is described as the term that refers to higher order thinking which involves active control over the cognitive processes engaged in learning.

2.7.2 Metacognitive components

The term *metacognition* is used by some educational psychologists, such as Brown, (1987), and Ertmer and Newby (1996) as consisting of two aspects, namely *metacognitive knowledge* and *metacognitive self-regulating processes* (also viewed by some educational psychologists as self-regulating processes). Conclusions drawn by Koriat (2007) and Efklides (2008) indicated that an added dimension can be distinguished when the term metacognition is referred to.

These two views of which components metacognition consists of, are reported on and analysed in more detail in the next paragraph.

2.7.2.1 Metacognitive knowledge

Brown (1987) categorised metacognition on the grounds of a person's awareness of his/her metacognitive knowledge. According to Livingston (1997:1) and Flavell (1979, 2003) metacognitive knowledge is divided into three interdependent, cyclical components: knowledge of person variables, task variables and strategy variables. Flavell described metacognitive knowledge as: "*The knowledge gained of the self as a learner, of task requirements and of specific strategies that should be used to achieve desired learning goals"*, according to Ertmer and Newby (1996), Jacobs and Paris (1987), Kluwe (1987) and Joseph (2003). Efklides (2008) recognised this category of *metacognitive knowledge* (as MK), but defined it further as that it constituted the "offline" monitoring of cognition (Efklides, 2008:1). By "offline" monitoring she meant cognition that is thought about and internalised.

2.7.2.2 Metacognitive experiences

Efklides (2008:1) distinguished the dimension of *metacognitive experiences* (ME), which is in accordance with Flavell's description (1979:907). She described this dimension as the online monitoring of cognition, indicating what one feels and thinks during a cognitive endeavour. According to her, metacognitive experiences comprise *metacognitive feelings, metacognitive judgments* and *online task-specific knowledge*. 1) Metacognitive feelings are the outcomes of nonconscious, nonanalytic processes. 2) Metacognitive judgments can be a product of either conscious or non conscious processes. 3) The third category of metacognitive experiences, namely online task-specific knowledge makes the person aware of task features, as well as of MK related to the task and its processing (Efklides, 2008:2). It can further be described as conscious analytic knowledge.

The awareness of the first component of metacognitive experiences, namely metacognitive feelings, can lead to conscious analytic processes. In other words: awareness of metacognitive feelings can lead to online task-specific knowledge. Efklides (2008:2) noted that to decode the exact meaning of metacognitive experiences (ME), metacognitive knowledge (MK) is thus mostly used – leading to a

self-regulatory metacognitive loop. ME has an impact on SRL through its effect on self-concept and motivation. She adds that the support of teachers or peers is important for students to effectively interpret their ME and regulate their cognition and emotions.

2.7.2.3 Metacognitive self-regulation

Metacognitive processes indicate the use of metacognitive strategies or metacognitive regulation (Flavell, 1979; Brown, 1987). Metacognitive strategies are processes that one uses to control one's cognitive activities and to ensure that a cognitive goal has been met. These processes consist of planning and monitoring cognitive activities and help to regulate and oversee learning. They are also used to check the outcomes of these activities. In fact they are so crucial to SRL, that Efklides described them as "*The missing link in the SRL process*" (Efklides, 2006:288). She viewed these metacognitive skills or processes as the *control function of metacognition* (Efklides, 2008:2). Flavell (1979) supplied the following example: After reading a paragraph in a text a student may question himself about the concepts discussed in the paragraph. His cognitive goal is to understand the text. Self-questioning (self evaluation) is a common metacognitive comprehension monitoring strategy. If he finds that he cannot answer his own questions, or that he does not understand the material discussed, he must then determine what needs to be done to ensure that he meets the cognitive goal of understanding the text. He may decide to go back and re-read the paragraph with the goal of being able to answer the questions he had generated. If he can now answer the questions after re-reading through the text, he may determine that he now understands the material. Thus, the metacognitive strategy of self-questioning is used to ensure that the cognitive goal of comprehension is met.

It should be borne in mind that the components or aspects of metacognition interact and take place in a social environment. Students' social experiences influence their affective state (Efklides, 2008:2), that in turn may influence their self-regulating abilities. This effect should be taken into consideration. Both SRL and selfregulation processes make use of students' metacognitive experiences in a social environment,

which is an aspect that the Social Cognitive view on SRL takes into account, and will be described in the next paragraphs.

2.8 THE SOCIAL-COGNITIVE VIEW OF SRL

Karoly (1982), Bandura (1986), Kanfer and Gaelick (1986) conceptualised self-regulation as involving three key sub-processes (Schunk, 2001:130). These sub-processes interact with each other, and are: *self-observation*, *self-judgment* and *self-reaction.* These sub-processes are aspects of behaviour - one of three processes in the SRL loop of human functioning (Schunk, 2001:131-132). Schunk (2001), Zimmerman (2000) and Zimmerman and Martinez-Pons (1989) described SRL as a triadic interaction of behavioural, personal and environmental processes. These are processes of SRL, according to the Social Cognitive view, of which an overview will be provided in the following paragraphs.

2.8.1 The origins of the Social Cognitive view of SRL

The emergence of a Social Cognitive perspective on self-regulation, according to Zimmerman (1990:176), resulted in specific descriptions of his model of SRL. He identified two essential characteristics for SRL of students, namely their use of learning strategies and their perceptions of self-efficacy. He proposed the Social Cognitive model of SRL that integrates triadic determinants of SRL (personal, behavioural and environmental) on the basis of a strategic control loop (see Figure 2.1). Zimmerman postulated that when students monitor their responding attribute outcomes to their strategies, their learning becomes self-regulated, and they display increased self-efficacy, greater intrinsic motivation and higher academic achievement (Zimmerman, 1990:189).

From a Social Cognitive perspective SRL is conceptualised as a multiphase process, according to Zeidner *et al.* (2000:751). In this process self-generated thoughts, affects and actions are planned and adapted cyclically as needed, in order to attain personal goals (Boekaerts *et al.*, 2000:5). Self-regulatory behaviour involves cognitive, affective, motivational and behavioural components, which provide one

with the capacity to adjust one's actions and goals to achieve the wanted results, taking changing environmental conditions into account (Zeidner *et al.*, 2000:751; Boekaerts *et al.*, 2000:5).

Schunk (*in* Zimmerman & Schunk, 2001:125) postulated that students' efforts to self-regulate during learning are not determined only by 1) personal processes, such as cognition or affect, but also by 2) environmental and 3) behavioural events, which happens in a reciprocal fashion. Schunk's description of SRL efforts contained the three elements of SRL from the Social Cognitive perspective, and is in synthesis with the view of Zimmerman (2000:13) and Zimmerman and Martinez-Pons (1989:5). From the Social Cognitive perspective SRL is described as a triadic interaction of *personal, behavioural* and *environmental* processes.

The following figure demonstrates self-regulation as reciprocal interactions between behaviours, environmental variables and cognitions and other personal factors.

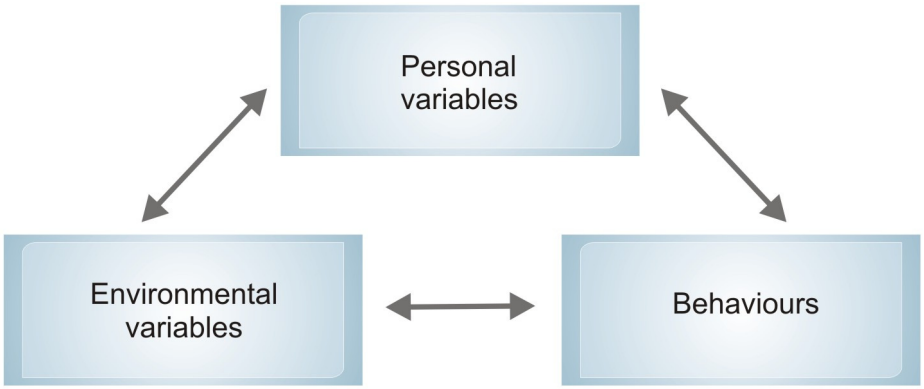

Figure 2.2 Reciprocal interactions in self-regulation

Schunk (2001:126)

These three interactions or self-regulatory processes are cyclical, because the feedback from a previous effort is used to make adjustments during a current effort (Bandura, 1986; Zimmerman, 2000:14). These adjustments are necessary because the personal, behavioural and environmental factors are constantly changing during learning and performance, and can best be demonstrated through the use of the

three self-oriented feedback loops or triadic processes. These triadic processes can thus be adapted proactively and reactively for the attainment of personal goals.

In the next paragraph an academic process which indicates how students monitor the effectiveness of their learning methods, will be discussed. Zimmerman (1998, 2000) portrayed the process as a loop,

2.8.2 A self-oriented feedback loop

This loop refers to a cyclical process that students use to monitor the effectiveness of their learning methods. Students respond to feedback in a variety of ways (Zimmerman, 2001:5). Self-regulatory processes and accompanying beliefs fall into three cyclical phases: *forethought, performance* or *volitional control*, and *self-reflection* (Zimmerman, 2000:16).

The following figure gives a clear illustration of the learning processes in cyclical phases.

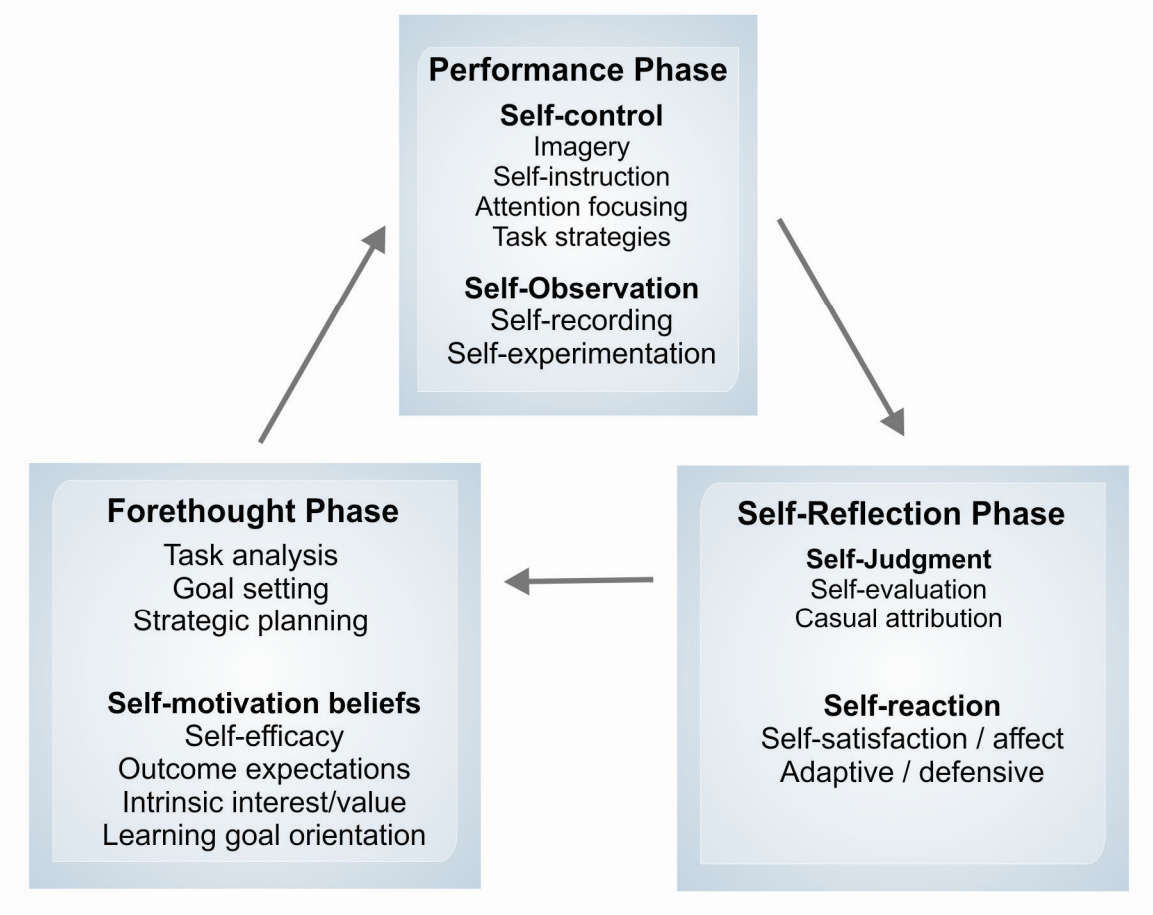

Figure 2.3 Phases and subprocesses of Self-Regulation

(a self-oriented feedback loop)

Zimmerman (2002:67)

- The *forethought phase* refers to influential processes that precede learning and create opportunities for learning.
- The *performance phase* refers to processes that occur during motor efforts, and have an effect on the student's attention and learning.
- The *self-reflection phase* refers to processes that occur after the performance and learning efforts and that influence the person's response to that experience. These self-reflections thus influence forethought about the subsequent motoric efforts (Zimmerman, 2002:67-68).

This cyclic process in which self-regulating students monitor the effectiveness of their learning methods or strategies is also called a **self-oriented feedback loop** (Zimmerman, 1988, 2000). This feedback loop refers to a cyclic process in which learners monitor the effectiveness of their learning methods and strategies. Self-regulating students respond to feedback in a variety of ways, e.g. by replacing one learning strategy with another one (Zimmerman, 1989:4). Thus the information gathered during self-reflection is used to make the necessary adjustments that are required to ensure the successful completion of the task (Schunk, 2001:1). The key processes that occur during the three phases of self-regulation, is illustrated in a table below.

Table 2.4 Key processes of self-regulation

Forethought	Performance Control	Self-reflection
Goal setting	Social comparisons	Progress feedback & self-evaluation
Social modelling	Attributional feedback Strategy instruction & self-verbalisation	Self-monitoring Reward contingencies

Schunk (2001:134)

The processes that fall under these headings will be reviewed shortly in the next paragraphs.

2.8.2.1 Forethought

Goal setting

This is an integral part of the forethought phase of SRL. Self-set goals will promote self-efficacy (Schunk, 1985). Bandura and Schunk (1981) proved that proximal (not too distant) goals led to more productive self-regulated practice than general goals and even more than distant goals. Schunk (2001:136) also proved that high goal expectations improved motivation during self-regulated practice and academic achievement and that direct goal attainment information will promote self-efficacy. (Direct goal attainment information is e.g. a statement such as: “You can do it” or

other social comparative information indicating that students are able to complete the task). Harrison and Pain (2009:227) and Prosser *et al.* (2008:122) stated that low goal expectations have strong negative effects on student effort.

The ideal for improving SRL is thus realistic goals that are proximal and defined, and high goal expectations. Students should be instructed to set high goal expectations – and instruction should also be given in dividing distant goals into more proximal, defined goals, especially if the student is lacking in SRL.

Social modelling

This process provides evidence on how information conveyed socially is internalised by students and used to promote greater learning (Schunk, 2001:136). An additional benefit is that students know they can succeed if they follow the same sequence. According to Schunk (1987) students have more self-efficacy and are motivated to succeed if they know how to perform a task. Modelling enhances self-efficacy and achievement, and the students' persistence to complete the task successfully will have a direct effect on their achievement (Schunk, 2001:136).

2.8.2.2 Performance control

Social comparison

According to Schunk (2001:137) social comparison conveys normative information for the goal of assessing one's capabilities. Schunk (1983) compared the effects of goal-setting with social comparative information. While goals enhance self-efficacy, comparative information promote self-regulated problem-solving. When both strategies (goal-setting and social comparative information) were implemented, the highest achievements were obtained. Schunk (2001:138) observed that the students' perceptions of progress against these standards enhance their motivation for SRL and skill acquisition.

Attributional feedback

Telling students that they can achieve better can motivate them. Schunk (2001:138) stated that this can motivate students to work harder and can convey the message that the students possess the necessary capability. Feedback linking success with ability, should enhance learning. This should sustain self-efficacy and self-regulation. It should be taken into consideration when giving positive feedback, that the credibility of attributional feedback is more important than the type of feedback. Credible feedback is likely to enhance students' self-efficacy, motivation and achievement. Care should be taken not to give feedback that is not credible, as this will lead students to doubt their learning capabilities, and their motivation and achievement will probably suffer (Schunk, 2001:138).

Self-verbalisation of strategies

Self-verbalisation of their self-regulating strategies can guide students' learning (Schunk, 2001:139). Self-constructed verbalisations effected very high motivation during self-directed practice, and continuous verbalisation effected very high self-efficacy and achievement.

2.8.2.3 Self-reflection

Research has indicated the importance of reflection in SRL (Ertmer & Newby, 1996; Schunk, 2001; and Zimmerman, 2000; Breed *et al.*, 2008). The descriptions of both Schunk and Zimmerman of self-regulation contained the element of *self-reflection*. Houston and Clift (1990:218) stated that self-reflective inquiry becomes a habit through use and further reflection on this use, which may lead to learning. Adding to the research on the importance of reflection in SRL, the view of reflective learning theorists, such as Schon (1983) and Mezirow (1991) is mentioned here. They regard learning as not sequential, but cyclical. They postulated that knowledge can be created by constantly rethinking (self-reflecting) about a learning experience. The benefits for teaching and learning is that the lecturer can be used as a resource and a sounding board, but ultimately learning occurs through the student thinking about

the learning experiences (sometimes known as critical incidences). These reflective thoughts about learning processes should in turn lead to metacognitive knowledge.

Students' ability to use self-reflective thinking as a metacognitive skill is dependent on the level of their metacognitive knowledge (Schmitt & Newby *in* Ertmer & Newby, 1996:17). Reflection is a skill that enables students to retrieve their previous knowledge in order to add on to that, when acquiring new knowledge (Breed *et al.*, 2008:68). This definition indicates that self-reflective thinking is also an ability to draw conclusions from previous knowledge and experiences, and implicates the determination of improved learning actions and skills. According to Sugerman *et al.* (2000) reflection indicates a reorganisation of perceptions and the forming of new relations that influence future thoughts and (learning) actions.

Two kinds of reflection in the learning process can be discerned, namely *reflection-in-action* and *reflection-on-action.* According to Ertmer and Newby (1996) reflection-in-action is done in the course of a specific learning activity to provide feedback on how effective students' strategic planning has been. It is integrated in the execution of the learning task, and enables students to assess their efforts and perform changes, and thus leads to immediate experimentation and thoughts (Schön, 1987). According to Atkins and Murphy (1993), Ertmer and Newby (1996), and Spalding and Wilson (2002), reflection-on-action is used **after** the learning task is completed and can be used to provide feedback on how effectively it has been executed. Reflection-on-action can be described as the intellectual and affective activities of students, contemplating their current learning experiences and knowledge and placing these actions in the context of previous experiences, thus leading to new insights and decisions (Lehrer *et al.,* 1999).

As described previously, Zimmerman (1998, 2000) views self-reflection as the third phase of a cyclic process of self-regulation, and according to him it consists of the sub-processes *self-evaluation, attributions, self-reactions* and *adaptivity*. His approach differs from the views mentioned in the previous paragraph, as he views self-reflection as a process during the completion of the learning task. Zimmerman views self-reflection as that which concerns students' thoughts on what they learn

about themselves by executing and completing a specific learning activity (Breed *et al.*, 2008:68). Self-reflection is an event that influences the students' reaction to the experience (Zimmerman, 2000).

For the purpose of this study self-reflection will be distinguished from reflection-in-action and reflection-on-action. Self-reflection is viewed by the researcher as being concerned with students' thoughts on what they have learned about themselves by performing a learning activity. It plays a decidedly important role as a metacognitive skill.

Self-monitoring

The result of a study by Sagotsky, Patterson and Lepper in 1987 indicated that for goal setting to influence academic performance, students need training on how to set challenging, but attainable goals (Schunk, 2001:140). Students had to monitor their work and reaching of the goal they set, and recorded their prowess. The study found that self-monitoring increased the students' achievement, but that goal setting itself had minimal effect. However the monitoring of progress enhanced their perceptions of their learning progress and their self-efficacy for continued learning (Schunk, 2001:141).

2.8.2.4 Reward contingencies

A study by Schunk (1983) proved that rewards for performances (points or prizes awarded for solving problems), **combined with** setting and obtaining attainable goals, led to high self-regulated problem-solving and the highest division of self-efficacy and achievement (Schunk, 2001:141). The result of offering rewards for participating only, led to no benefits for the students.

2.8.2.5 Progress feedback and self-evaluation

The feedback indicating progress on goal attainment can substantiate self-efficacy and motivation (Schunk, 2001:141). Successful goals and self-evaluation can in turn affect achievement outcomes and self-regulation positively. Goal-setting should

include the instruction to learn to use modelled strategies. When feedback is given these strategies lead to obtaining of self-efficacy, a self-evaluated learning progress and self-regulated strategy use (Schunk, 2001:142). Self-efficacy and motivation are interconnected and the terms will be clarified in the next paragraph.

2.9 THE IDENTIFICATION OF CATEGORIES OF SRL SKILLS

With the large drop-out figure of students in their first and consecutive years (see Chapter 1), much debate is focused on creating optimal opportunities in learning environments for SRL, to aid students in developing autonomy of learning and achieving academically. Identifying the SRL skills necessary for academic achievement is a daunting task. Some important aspects may be overlooked when identifying SRL skills of students, e.g. the influence of external factors (McMahon & Luca, 2004:433). Measuring instruments such as the Motivational Strategy Learning Questionnaire (MSLQ) and the LASSI are used primarily for assessing individual learning skills and do not directly accommodate external influences (McMahon & Luca, 2004:433). The interview schedule of Zimmerman and Martinez - Pons (1989) should add to the findings made by the quantitative research, and will be implemented as additional measure for identification of key SRL skills demonstrated by self-regulated students. SRL skills can be complex and difficult to define and distinguish from each other. In order to distinguish between and identify SRL skills, Zimmerman and Martinez-Pons (1989) developed an interview schedule for assessing SRL strategies. The schedule will be discussed fully in the next chapter, as it will indicate the identified SRL skills that the qualitative research is based on. The fact that key SRL skills, e.g. learning motivation, are not directly observable makes self-report questionnaires or structured interviews, such as the SRLIS, the most applicable types of research instrument utilised (Dornyei, 2001).

With the advent of online learning, other categories of SRL skills may be implemented for the online learning environment than for the traditional classroom environment. This aspect will be clarified in Par. 2.11. McMahon and Luca (2004) made a strong plea that the LASSI would appear to be an ideal measuring

instrument for assessing and determining the self-regulatory skills that are crucial for academic achievement in an online learning environment.

2.10 THE LATEST RESEARCH ON SRL

The previous paragraphs indicated that SRL can be described as the development of independent learning skills. According to Harrison and Pain (2009:228), the latest research gives a broader description of SRL, namely that SRL should include multi-component, self-steering processes that target students' own cognitions, feelings, and actions, for adaptation and implementation by students to attain their own learning goals by themselves (Boekaerts *et al.*, 2005). Others, such as Hadwin *et al.* (2005) and Boekaerts and Cascallar (2006) recognised the important role that learning environments, lecturers and personality play in developing SRL in students – adding to the most recent view of SRL as more than an isolated learning phenomenon. These findings indicate that the personality traits and beliefs of individual students who do not possess SRL skills have to be altered. Although it has been advised that SRL can be taught (Livingston, 1996:12; McCombs, 2001:92; Paris *et al.,* 2001:259; Anderton, 2006:157-158) the provision of learning experiences to enable this learning capacity in students, is lacking. When endeavouring to teach SRL skills through a programme of strategies it should be seen in the light of helping first year students to acquire a "*learning ability*", and not as a cause and effect programme to improve academic achievement only. More should be done by HEI's to encourage the development of SRL - but in a comprehensive and encompassing programme or intervention schedule aimed at the individual student's needs.

According to Neville and Bennett (2008:698), some recent findings on SRL indicate that researchers on learning have begun to recognise that SRL needs to be explored as an event that develops in contexts over a period of time. The nature of these contexts influences students' cognition and motivation (Neville & Bennett, 2008:699). The Higher Education Quality Framework (HEQF) of South Africa gives acknowledgement to this statement. Autonomy of learning that refers to SRL, is

described in their level descriptors as a skill that develops over a period of time (see HEQF Level Descriptors, 2010: Appendix 3).

An analysis by Winne and Perry in 2000, that most previous research on SRL considered SRL as an aptitude that is stable within an individual across different settings, was helpful in understanding of how features of SRL work. An alternate approach has been suggested, and Winne and Perry (2000) stated that SRL can be assessed as an event. This approach describes SRL as an event demarcated by a previous event and then a subsequent event (Zimmerman, 2008:168). These two approaches will be discussed fully in Chapter 3, with some implications regarding the use of applicable measuring instruments for each of these approaches.

Regarding measuring instruments for assessing SRL, the development of online learning or technology based-learning has implications for assessment of SRL online as well. Zimmerman (2008:168-170) proposed computer traces, think-aloud protocols, structured diaries, direct observations and microanalytic measures for conducting online assessment of SRL.

Four questions emerge when researchers contemplate the measuring of SRL skills of students online (Zimmerman, 2008:168):

- How do trace measures of SRL compare to self-report measures in assessing the changes in self-regulation during learning;
- Are increases in students' level of SRL in personally managed contexts, such as at home or in the library, linked to improvements in their overall academic performance;
- Can lecturers modify their classrooms to foster increases in self-regulated learning by their students; and
- What is the role of students' feeling of motivation in initiating and sustaining changes in their SRL?

The latest research on SRL also include electronic or e-learning environments and the implications of it on the SRL capacity and effectiveness of students. This "second wave of research" (Zimmerman, 2008:166-183) involves the development of online measures of SRL processes, but it also provides valuable information regarding the SRL processes that students implement during e-learning. Electronically enhanced learning environments in the Higher Education field increase, bringing with it implications for the way in which students learn. This will be discussed in more detail in the next paragraph.

2.11 SRL AND E-LEARNING ENVIRONMENTS

When the nature and extent of technological advancement and the rapidly emerging developments in information and communication technology is taken into account, it is imperative that Higher Education forge a broader vision of education that maximises the potential of students to be self-regulated students (Njiru & Waugh, 2006:6). Technologies, such as mobile telephones, short text messages (sms'es), laptops, desktop computers, iPads, smartphones and personal digital assistants (PDA's) can all facilitate learning. PDA is the term for any small handheld device that combines computing, telephone/fax and networking features. PDA's provide computing and information storage retrieval capabilities for personal or business use. They are also called palmtops, handheld computers or pocket computers (Njiri & Waugh, 2006:7; Clarke, 2008:1). Podcasting and vodcasting can provide students with interesting learning resources, such as video or audio lectures and expert interviews (Clarke, 2008:1). The term *e-learning* covers a wide range of methods and techniques, but they all have the use of information and communication technologies in common. It can include the use of technology as part of a conventional or traditional course, as well as an online course where lecturers and students never meet face-to-face (Clarke, 2008:1-5). Throughout this study the term *e-learning* is used to include the whole range, but the emphasis is on the use of technology to open up wider opportunities for students in e-enhanced learning.

Clarke (2008:2) stated that e-learning contains the following terms:

online learning, computer-based learning, blended learning, learning objects, mobile or m-learning, interactive learning materials, computer-mediated learning, computer-mediated communication, Internet-based training and Internet 2.0.

Information Communication Technology (ICT) has increasingly been used in HEI's the past four decades (Beyers, 2010:14). HEI's are required to offer mobile and e-learning environments, and studies comparing technology-based and traditional course offerings are starting to appear more regularly (Felder, 2008:d22). Technology-based (e-learning) or technology-assisted learning (mobile learning) has a huge impact on the educational processes of a HEI. This has lead to pleas that measures of the effectiveness of online education should be assessed (Alavi *et al.*, 2000; Graham & Scarborough, 2001).

Universities that specialise in distance education are using multimedia courseware and the Internet more effectively, and the quality of their academic offerings is gaining increasing recognition (Grose, 1999:27). Globally, there are institutes where lecturers enable learning by using software tools, while offering the necessary support, e.g. at the Fashion Institute of Technology, USA; Bentley University, USA and the Queensland University of Technology, Australia (McLoughlin, 2010:36). The University of Barcelona, Spain, hosted the *International Conference on SRL in Technology Enhanced Learning Environments* in October, 2010.

An example of the progress of technology use for lecturing is the *iLecture* or *Lectopia*. A lecture capture and delivery solution, called the iLecture, has been developed by the University of Western Australia's Arts and Multimedia centre and is installed and implemented in a number of universities in Australia (Njiru & Waugh, 2007:6). According to Njiru and Waugh (2007) the iLecture's high level of automation, advanced monitoring capabilities and flexible processing options makes it the ideal solution for university-wide lecture capture, management and publication. It is a highly appealing learning technology for lecturers because of its unobtrusive operation (Fardon *et al.,* 2006). Through the iLecture system visuals and audio recordings are processed into a variety of streaming media formats. Students can access the recordings 24 hours a day, 7 days a week (Fardon *et al.*, 2006). With the

iLecture system, students can log into a course, module or a unit's Internet page from anywhere in the world and can click on a link that will direct them to a streaming video and audio recording of the lecture. The student can listen to the lecture while typing notes. A PowerPoint slideshow is used instead of an overhead projector, which is normally used in the lecture room in conjunction with PowerPoint slides (Fardon *et al*., 2006).

Social software tools should benefit SRL development in students by affording greater control by the student over his/her learning. Autonomy and engagement in global communities are provided by technology-assisted environments, where knowledge is created while the students assume the role of active participants in their learning (McLoughlin, 2010:29). Academically successful students should be able to use SRL in ways that are particular to the online environment in order to enhance their learning, but they still need to have access to the necessary scaffolding to support their learning – which should be provided by the HEI. In order to handle the complexity in teaching this type of information systems course, lecturers need information on the effects of various learning strategies and prior computer/technology experience on the students' academic achievement (Chen, 2002:11-12).

The SRL skills that are crucial for learning in a mobile or an e-learning environment, as well as the influence that mobile and e-learning environments have on the SRL skills and academic achievement of students, will be explained in the next chapter, when SRL skills and their correlation with academic achievement are discussed.

2.12 PERSONAL REFLECTION

The literature review provided an encompassing description on SRL, that was described in this chapter. Less research could be found on the types of knowledge (Declarative, Procedural and Conditional) and the role that each type of knowledge plays in SRL. The description of the three types of knowledge is recognised widely (see Par. 2.2). Peirce (2004) distinguished the three types of knowledge and identified each type necessary for a learning action to learn successfully in a Physics class and to improve the students' self-regulating abilities (see Par. 2.2). However,

students are not taught that there are different types of knowledge, nor to identify which type they need and use for a specific task. They should be informed of these three types of knowledge and be able to identify and implement a specific type of knowledge for a designated learning task or tasks. Being aware that there are 3 types of knowledge that they may implement according to the task specifics should increase students' self-regulating abilities, which should lead to the acquisition of metacognition (*knowing of knowing*).

Another area of concern is that when describing metacognition, most learning theorists did not view knowledge of the process of knowledge acquisition as important or crucial (see Par. 2.7). In the researcher's view a student's knowledge of the process as described by Woolfolk (1998) (see Fig. 2.1) should lead to demystifying the concept and the process of learning. Describing the three memory stores in the idiom of a computer, as Woolfolk did, is very appropriate in a student's reference framework, where electronic devices have an increasing impact. Knowledge on the process of how they acquire knowledge should lead to students feeling more empowered and responsible for their own learning. This should in turn increase their self-regulating abilities and metacognition, and help them to acquire a "*learning ability*".

2.13 CONCLUDING REMARKS

Students' powers of learning can be developed or enhanced by improving their thinking about strategic and reflective practices. These practices can be facilitated, and should lead to feelings of autonomy and competency, which relate directly to self-efficacy that motivates students to self-regulate. Efklides (2008:1) concluded that SRL contributes to successful learning which is associated with positive feelings, because students who feel responsible for their own learning should be intrinsically motivated by it.

SRL should not be regarded as a mental aptitude or a rigid personality trait, but as a process of self-regulation, as described above. Boekaerts and Corno described SRL as a developing and dynamic process (2005:208). Each process of SRL (e.g. the

establishment of goals, summarising, re-reading a script, employing learning strategies, seeking assistance) can be facilitated or modelled. The intricate process of acquiring metacognition can also be facilitated, and this will be discussed in the next chapter.

Not only the SRL skills acquired through the use of strategies set self-regulated students apart, but also their learning initiative, perseverance at the learning task, and displaying the competencies that they acquired through their own learning experiences, or that they were taught. Self-regulated students focus on their role as active participants in learning and they take control of their learning, because they realise that their learning successes depend on what they construct (Bandura, 2001). Rather than viewing learning as a reactive process to teaching, it should be viewed as an activity that can be developed proactively by students themselves – leading to SRL. Zimmerman defines SRL as the degree to which students are metacognitively, motivationally and behaviourally active participants in their own learning process (Zimmerman, 1989:4; Zimmerman, 2008:167).

In order to develop their "*learning ability*", a transformation in their perspective of what learning entails at a university should take place in the less self-regulated student. This can be effected through the implementation of strategies for developing SRL skills, as well as amending or altering the way in which the individual student views the process of learning. Boekaerts and Corno (2005:224) postulated that not only students' learning strategies and metacognitive skills should be targeted, but the importance of becoming a responsible and independent learner should be addressed as well when an intervention is designed and implemented. This concept is called *second generation classroom interventions*, to distinguish it from traditional classroom interventions. They are guided by conceptual models of self-regulatory skills as well as volitional strategies that students should use in different content domains (Boekaerts & Corno, 2005:224).

The perspective of SRL as being a proactive process is endorsed by the research undertaken for this study. Students should be made aware of their role as active participants in the acquisition of knowledge, and if they are deficient in SRL skills, it

should be facilitated by a programme of strategies to develop it. The relationship between SRL and the academic performance of students at HEI's will be clarified in Chapter 3.

CHAPTER 3

SRL AND THE ACADEMIC ACHIEVEMENT OF STUDENTS AT HIGHER EDUCATION INSTITUTIONS

3.1 INTRODUCTION

The previous chapter addressed the theory of SRL extensively. As fundamental concepts to SRL, the concept of knowledge and the process of knowledge acquisition were elucidated. The key concepts that are associated with SRL and the latest research on SRL, including SRL and technology-based learning, were discussed.

This chapter will address the relationship between SRL and the academic achievement of students at HEI's. A description of the characteristics that self-regulating and non-self-regulating students demonstrate, will be provided. A discussion will follow on whether SRL should be viewed as a trait or as an event, with some resultant implications for the evaluation and instruction of SRL skills.

The impact and demands on students' SRL skills in learning environments that become increasingly more electronically enhanced, will be addressed briefly. Various quantitative and qualitative tools for assessing students' SRL skills will be discussed.

The chapter will conclude with strategies for developing or enhancing the SRL skills of students at HEI's.

3.2 THE RELATIONSHIP BETWEEN SRL SKILLS AND STUDENTS' ACADEMIC ACHIEVEMENT AT HEI'S

Nelson (2010) described a survey which was conducted on a group of students that enrolled in calculus at the University of California. About 60% attained only a D or E (40% – 50%) or withdrew from their studies. Some of the students with the highest mathematics entry scores performed poorly, but the successful students who were doing the best displayed the following actions: they spontaneously formed study groups, consulted with peers and older students, and obtained old exam papers and assignments to revise. The group that was doing poorly was then invited into homework sections and they were required to do group work, consult with other students and revise exam papers. The percentage of students with a D or E symbol and those with failed modules or subjects went down from 60% to 4% (Nelson, 2010:71). As a result from his findings, Nelson (2010) stated convincingly that academically successful students exhibit certain self-regulated skills spontaneously, and he also stated that strategies for the acquisition of these skills can be taught to students who do not possess them. The actions that the above-mentioned group of successful students performed are characteristic of some of the SRL skills that have been identified by Weinstein (1988; 1998), Zimmerman and Martinez-Pons (1989), Oxford *et al.* (1993), Schunk and Zimmerman (1995; 2002), Angelo and Cross (1998), Pintrich (2000), Zeidner *et al*. (2000), Joo *et al*. (2000), McCombs (2001), Paris *et al.* (2001), Schunk (2001), Zimmerman (2002), Boekaerts and Corno (2005:169), Isaacson and Fujita (2006), and others.

According to Zimmerman and Schunk (1998), self-regulation involves a series of component skills. These include: setting specific proximal goals for oneself; adopting powerful strategies for attaining these goals; monitoring one's performance selectively for signs of progress; restructuring one's physical and social context to make it compatible with one's goals; managing one's time use efficiently; self-evaluating one's learning methods; attributing causation to results; and adapting future methods. By acquiring SRL skills, students can learn to take control over their thinking, behaviour and environment. As they become increasingly more self-regulated, students should shift their focus from comparing themselves with others to

judging their performance against their personal goals. In a study by Lindner and Harris (1992:13) it was discovered that the ability of students to self-regulate their learning processes increases with age and academic experience. Students become increasingly adapt at working independently on more complex problems and projects. These learning abilities lead to more autonomy in learning and performing learning tasks, and knowledge gained about skills that facilitate learning success. It can be assumed that students in their fourth or ensuing years of study should thus be able to divulge more knowledge about successful learning behaviour and skills than first year students.

There are prerequisites, however, for acquiring SRL skills. SRL is heavily dependent on the students' definition of goals, of being proactive, interpreting success and failure appropriately, and on translating wishes into plans (Weinert, 1994; Baumert *et al.,* 2002). It is important to distinguish between self-regulation processes, such as perceptions of self-efficacy, and the skills that optimise these processes, such as time management and goal-setting (Zimmerman, 2002), when designing a programme with strategies to develop these SRL skills. Strategies refer to actions directed at the acquisition of information or skills that involve purpose and perceptions by the students (Zimmerman, 1990:5).

- The key feature of most definitions of SRL is the systematic use of metacognitive, motivational and behavioural strategies (Zimmerman, 1989). "*Students can be described as self-regulating to the degree that they are metacognitively, motivationally and behaviourally active participants in their own learning process*" (Zimmerman and Martinez-Pons, 1986:308; 1989:4).

- The second feature is the self-oriented feedback loop (see Par 2.9.2). This loop entails a cyclic process in which the students monitor the effectiveness of their learning methods. They can react to this feedback in different ways, which includes covert changes in self-perception and overt changes in behaviour, which includes changing or altering the use of a

learning strategy (Zimmerman, 1990:5). These reactions indicate that self-regulation depends on the continuing feedback of learning effectiveness.

- The third feature of definitions of SRL is an indication of the reason why students choose a specific response or strategy. Students will only be motivated to self-regulate when the outcomes of their efforts to initiate and regulate learning strategies proactively, are sufficiently attractive (Zimmerman, 1990:6). SRL and motivation should be distinguished and treated as interdependent processes that cannot be fully understood apart from each other. According to Schunk (1989) students' perceptions of self-efficacy are both a motivation for them to learn, and a subsequent outcome of attempts to learn.

The characteristics that are demonstrated by self-regulated students are indicative of their ability to achieve academically. Zimmerman and Martinez-Pons (1989), Harris (1990:39-42), Lindner and Harris (1992:14-15) and Nelson (2010:71) stated that a substantial relationship exists between SRL characteristics and grade point average. Oxford *et al.* (1993) proved that characteristics like motivation, knowing their learning styles and strategies, and gender played an important role in academic achievement. This was also proved by Joo *et al*. (2000:5-17), who found that students' self-efficacy and self-regulated learning related positively to their academic achievement and strategy use (self-efficacy is discussed in Par. 3.3.2.1). In addition to the findings mentioned above, Wang and Newlin (2002:159) found that SRL characteristics like self-efficacy were predictive of final exam scores. Being motivationally, metacognitively and behaviourally active in their own learning leads students to work harder, persist longer and seek help when they encounter difficulties. Bandura (1994:71-81) stated that people with SRL skills motivate themselves, set goals and plan courses of action designed to realise their future plans and consequences. The opposite is true for students without SRL, as they may easily quit or avoid a task (Schunk, 1991:223).

An exposition of the characteristics of both self-regulating students and less self-regulating students will be presented in the following paragraph.

3.3 THE CHARACTERISTICS OF SELF-REGULATED STUDENTS

The components involved in SRL are contained in the description of characteristics of self-regulated students by Zimmerman and Martinez-Pons (1986:308; 1989:4). They stated that students can be described as self-regulating to the degree that they are metacognitively, motivationally and behaviourally active participants in their own learning process. It was not easy to divide the characteristics of self-regulating students into these three components, as it is clear that there are overlaps between and among these components. The researcher will discuss the characteristics in terms of the three main components of Zimmerman's definition, but she will keep the mutual dependency of the individual components of SRL in mind, as Boekaerts (1997; 1999) and Baumert *et al. (*2002) advised.

3.3.1 Metacognitively active participants in their own learning

(The first component in Zimmerman and Martinez-Pons's description)

The concept and constructs of metacognition have been discussed thoroughly in Chapter 2. What the concept entails is mentioned here briefly as background for this paragraph. Self-regulating students are aware of their cognition and of themselves as learners and are also aware of the potential usefulness of self-regulation processes to enhance their academic achievement (Zimmerman, 1990:5; 2001:5). Efklides (2008) and Koriat (2007) perceived the awareness of the student of his/her cognition as *metacognition.* Metacognition can best be defined by stating that it is both knowledge about, and control over thinking processes (Downing & Wong, 2002:2). Livingston (1996), Zimmerman (2002), De Soete *et al.* (2003), Anderton, (2006), and Laskey and Hetzel (2010) described metacognition as a SRL skill. The ways in which self-regulating students employ metacognition for their learning gains are indicated in the following paragraphs.

3.3.1.1 Phases in metacognitive learning

Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress toward the completion of a task are metacognitive in nature (Livingston, 1997:21). Berk (2003) added the activity of "redirecting unsuccessful efforts" to Livingston's description, while Dirkes (1988) described self-regulating students as metacognitively planning, monitoring and evaluating their thinking. These views correlate with the proposal by Zimmerman (1998) of the three phases of self-regulation namely *forethought, performance control* and *self-reflection,* also described as a self-oriented feedback loop. These three phases were discussed in Chapter 2 from the Social-cognitive viewpoint and were illustrated in Table 2.3.

In addition to the description of Zimmerman's three phases of self-regulation in Table 2.3, Isaacson and Fujita (2006:39-40) provided a differing description of some aspects in the three phases. A comparison between Zimmerman 's description and Isaacson and Fujita's description indicated that the first phase is more or less the same, but that the concept of monitoring is added to the latter's definition in the 2nd and 3rd phase. The SRL skill of monitoring has been underlined in the following description of phases 2 and 3 to indicate the added skill that Isaacson and Fujita include in their description.

— The second phase of *performance* or *volitional control* should include <u>self-monitoring: indicating that students attempt the learning tasks and that they monitor what they are learning</u> (Isaacson & Fujita, 2006:40). *Volitional control* involves the use of strategies aimed at monitoring the regulation of emotions, motivation and cognition while striving to attain a goal (Bartels *et al*., 2009:608). Volition differs from *motivation,* as motivation is necessary to set goals and select strategies to attain these goals; while volition is necessary to protect against abandoning goals and to maintain persistence and effort (Bartels *et al*., 2009:608; Corno, 1993).

— The third phase (*self-reflection)* indicates comparing the self-monitored information (from the second phase) with a standard or a goal, and the reactions of the students to the results. According to Isaacson and Fujita (2006:40) the students assess their success or failure, then modify their self-efficacy, make causal attributions and adapt for future learning during this third phase. The ability of students in monitoring their learning is crucial and regarded as a key building block in SRL.

The concept of *monitoring* as a SRL skill played a strong role in this description of Isaacson and Fujita, and was taken into consideration when the programme of strategies for the development of SRL skills of first year students was developed.

Self-regulated students can employ metacognition in a variety of ways to gain academic success:

(1) students who are aware of the level of their mastery of material can adjust their study time and their learning strategies to the different demands of various levels of learning (Isaacson & Fujita, 2006:41);

(2) they can even predict their summative assessment marks more accurately than less self-regulated students. Maki (1995) found that there was even greater accuracy of predictions when students were asked higher order thinking questions that did not require the verbatim recall of information.

3.3.1.2 Metacognition of knowledge and skills

One of the assumptions of this study is that the demonstration of SRL skills is linked to academic success. In this regard Isaacson and Fujita (2006:40) stated that the greatest challenge for first year students is the realisation that the implementation of a different type of knowledge for studying at a HEI is imperative. They recommend that students have to move from the implementation of Declarative knowledge that is emphasised in SEI's, to the use of Procedural and Conditional knowledge required in HEI's (see Table 2.1, and Chapter 2). Students demonstrate metacognition if they

recognise that the different demands of the HEI they are studying at, require alternative or additional approaches to studying than those of studying at a SEI, and are willing and able to make the necessary changes (Isaacson & Fujita, 2006:41). Self-regulating students realise that their learning should match the demands of the differing tasks at HEI's, and that different academic tasks (e.g. different test formats) demand different levels of learning, and adapt their learning strategies to accommodate this difference. Isaacson and Fujita (2006:42) stated that to be academically successful in HEI's, students need to have a variety of SRL and metacognitive skills - that were not necessarily essential in their school years.

Isaacson and Fujita (2006) stated that the metacognitive skills that academically successful students demonstrate are as following:

- The recognition that lecturers expect more than only the memorisation of declarative knowledge;
- The use of accurate metacognitive knowledge monitoring while studying - to assess their mastery of the required task or learning material;
- The knowledge of and ability to implement an arsenal of SRL strategies that they can choose from, to match their level of learning to the demand of the learning tasks;
- The ability to self-monitor their understanding and the demands of the learning task during evaluation to adjust their demonstration of learning – such as choosing the right question to answer during a test.

3.3.1.3 Metacognition of learning styles and strategies

In order to plan and approach a specific task metacognitively, students should be aware of themselves as learners, their learning styles and the learning strategies that are most effective for their learning. According to Shannon (2008), Kolb (1984) and Jackson (2008), learning strategies can be fitted to learning styles. Students who are able to identify suitable learning strategies according to their learning style are using

metacognition (Shannon, 2008:18). These learning styles refer to how students process and perceive information in different ways (Shannon, 2008:19).

By using assessment tools or quizzes students can establish the learning styles and the methods in which they obtain information optimally. Learning styles are the different ways in which students or learners take in information and process it (Felder & Brent, 2005:63). The *Perceptual Modality Preference Survey (PMPS)* can be utilised by students to establish which learning style will be most effective in acquiring their learning gains (Shannon, 2008:19). The learning strategies that are most effective for each learning style will be discussed fully in Chapter 6. There is a variety of learning style models, for example that of Shannon, which is implemented for identification of sensory intake methods (Shannon, 2008:20). According to Shannon and the *Institute for Learning Styles* (2003), there are seven perceptual sensory intake methods: print, aural, visual, interactive, haptic, kinesthetic and olfactory, each indicating a learning style. Other practitioners implement different approaches.

The model that Felder and Silverman developed in 1993, and that was revised by Felder in 2002; the *Index of Learning Styles (ILS)* is preferred. It consists of eight learning styles that fall within four dimensions. A variety of learning strategies is prescribed for each learning style. The model is proposed for implementation in the programme of strategies to develop SRL skills, and will be elucidated in Chapter 6.

Students who self-regulate their learning should have the metacognitive knowledge of which approach and strategies to follow when dealing with different learning tasks. The metacognitive student can pay attention to, and change his/her thinking and learning strategies and processes (Downing & Wong, 2002:2). Kluwer (1987) called these "*executive processes*". These are metacognitive functions that monitor and direct the process of problem solving (Downing &Wong, 2002:1). Self-regulating students should thus be aware of, plan, execute and be able to redirect their planning for optimal learning - thus being metacognitively active in implementing the most effective learning strategies for learning optimally.

3.3.2 Motivationally active participants in their own learning

(The second component in Zimmerman and Martinez-Pons's description)

Self-regulated students are not merely reactive to their learning outcomes, but they proactively seek out opportunities to learn, and they self-initiate the activities that promote self-observation, self-evaluation and self-improvement. They are pro-active in seeking out and profiting from learning activities – and they can be described as motivationally active participants in their learning (Zimmerman, 1990:6). Self-regulated students have the motivational advantage of 1) *self-efficacy*, 2) *intrinsic motivation* (Zimmerman, 1990:5; Baumert *et al.*, 2002:2) and 3) *outcome expectations* as described by Bandura (Zimmerman, 2001:19-20). These three concepts are evident in self-regulated students that are motivationally active participants in their own learning; namely self-efficacy, motivation and goal-setting (or outcome expectations). According to Woolfolk they are interlinked: self-efficacy influences motivation through goal-setting (1998:393). The concepts are elucidated in the following paragraphs.

3.3.2.1 Self-efficacy

The term *self-efficacy* is often used to indicate what we perceive as our abilities, and the expectation or prediction of success or failure (Woolfolk, 1998:393). Bandura defined the term as: "*The perceived ability to implement actions necessary to attain designated performance levels*" (Zimmerman, 2001:20; Bandura, 1997:601). After extensive reviews, Bandura (1997), Zimmerman (2000) and Schunk (2001) postulated that students' self-efficacy measures were related to their choice of tasks, persistence, effort expenditure and their skill acquisition (Zimmerman, 2001:20). The two constructs: self-efficacy and intrinsic motivation, aid students to envisage future consequences, and should thus help students to set goals for themselves. The setting of personal goals will not serve as self-motivation, but as the standards against which the future performance of students who set them, will be evaluated (Zimmerman, 2001:20). Motivated students will demonstrate self-efficacy when they view their goal attainment as self-satisfactory, and in doing so will continue in striving

to reach their goals. They may select causes or attributes for their academic success or failure, according to their self-efficacious feelings - a brief explanation of this behaviour is provided in the next paragraph.

The attribution theory refers to how individuals (the students in this study) explain the causes of behaviours and events. This theory emphasises that students' self-perceptions of ability (self-efficacy) influence the ways in which they interpret their academic successes or failures. Weiner (1992) stated that individuals look for an explanation of their behaviour, and they select causes for their behaviour with the association of either internal (dispositional) attributes or external (situational) attributes. When applying the attribution theory to motivation, the basic principle is that an individual's own perceptions (or attributions) for achievement or failure determine the amount of effort the individual expends on that activity.

Weiner's attribution theory stated that the explanations individuals make to explain their success or failure can be analysed in three sets of characteristics. They are explained as following:

- *An internal or external cause*. The students believe they succeed or fail because of factors they believe have their origins inside themselves, or because of factors that originate in their environment.

- *A stable or unstable cause*. If the cause is stable the outcome is likely to be the same if they perform the same behaviour on another occasion. If it is unstable, the outcome is likely to be different.

- *A controllable or uncontrollable cause*. A controllable factor is one which the students believe they can alter themselves if they wish to do so. An uncontrollable factor is one they believe they cannot alter.

According to Mayer (2002:254) students who are trained to attribute their academic success or failure to effort, are more likely to work hard to achieve their goals. Students will be most persistent at academic tasks under the following circumstances:

— If they attribute their academic successes to either (1) internal, unstable factors over which they have control; or (2) internal, stable factors over which they have little control but which may sometimes be disrupted by other factors; and

— If they attribute their failures to internal, unstable factors over which they have control (e.g. effort).

It has been indicated that self-efficacy and causal attributions play a major role in the students' motivation to perform academically.

3.3.2.2 Motivation

Woolfolk (1998:375-378) described four main theories of motivation that are mentioned briefly in this paragraph. They are the Behavioural, Humanistic, Cognitive and Social learning approaches to motivation. Although motivation is a vast and complicated subject, the researcher restricted her discussion to two kinds of motivation, for purposes of the research, namely intrinsic and extrinsic motivation. Both kinds are imperative in the development or enhancement of SRL. Intrinsic motivation should be nurtured and encouraged, while extrinsic motivation should be viewed as supporting learning (Woolfolk, 1998:375). Concise descriptions were provided for clarification between the two concepts.

Extrinsic motivation is centred outside the student/individual and is usually generated by rewards like money or grades, coercion or threat of punishment. Competition with others is generally extrinsic motivation because it encourages the student to win or beat other students. When the reason for doing something has very little to do with the task itself, this is due to extrinsic motivation (Woolfolk, 1998:374). However, the self-determination theory of Deci and Ryan (1990) proposed that extrinsic motivation can be internalised by the students, if the task is in accordance with their values and beliefs. This may then lead to the fulfilment of their basic psychological needs.

Intrinsic motivation refers to motivation that is driven by an interest or enjoyment in the task itself and exists within the individual, rather than relying on any external pressure. When one is intrinsically motivated, the activity in itself is rewarding and incentives or punishment is not necessary (Woolfolk, 1998:374). Deci and Ryan (1985:11) described it as: "*The energy source central to the active nature of the organism*". It is usually associated with high achievement and enjoyment by students and is also described in Bandura's work on self-efficacy (1997:604). Cameron and Pierce (2002:28-29) state that according to earlier researchers intrinsic motivation has a direct link with task interest – the greater the intrinsic motivation, the greater the task interest. Recent research on intrinsic motivation has indicated that it can be implemented across the whole spectrum of life. Pink (2009) states that people / individuals are more persistent when they are intrinsically motivated, which is more enduring than external motivation, because individuals do things for their own satisfaction. Pink (2009:21-28) viewed intrinsic motivation as consisting of three constructs:

- Autonomy: the desire to direct our own lives;
- Mastery: the urge to get better and better at something that matters; and
- Purpose: the desire to be a part of something that is worthwhile and larger than ourselves.

People are most productive and satisfied when their work puts them in an internally motivated state that provides them with the most satisfaction, known as "flow" or "being in the zone" (Csikszentmihaly, 2009). He views "flow" as experiencing a heightened sense of focus and a generally higher sense of satisfaction – an ultimate state of intrinsic motivation.

3.3.2.3 Goal-setting

According to Woolfolk a goal is that which a person is striving to accomplish (1998:379). When students strive to reach a learning goal, they are generally aware

of their current state of learning, the ideal state they want to reach and the discrepancy between the current and ideal state of learning (Woolfolk, 1998:379).

A clarification of the value of applicable goal-setting is deemed necessary for inclusion here. Students should understand and be taught to develop appropriate goals that are neither too simple nor too difficult, but (1) moderately difficult (Woolfolk, 1998:379). If the goals are too difficult, the students will progress too slowly towards the goals or lose motivation; and if the goals are too simple, students will not develop self-efficacy for the learning task (Anderton, 2006:157-158). When reaching challenging goals that are attainable, higher levels of commitment will be reached (Carraway *et al.,* 2003:417-427; Woolfolk, 1998:379). The existence of goals aids in motivating and helping students to understand their capabilities. Goals that are (2) specific and (3) attainable in the near future can enhance persistence and motivation (Woolfolk, 1998:379). Goal-setting also aids in students' judgment of progress and attaining self-efficacy toward a learning task (Schunk, 2001:135). Students should be taught to monitor their progress towards attaining their goals, which can be taught through selective attention, rehearsal, elaboration and structuring skills (Anderton, 2006:158). They should desire to attain their long-term or distant goals and be prepared to overcome temptations along the way. Woolfolk (1998:382) advocated goals that are clear, specific, reasonable, moderately challenging and attainable within a short period of time. A few types of goals and goal-setting are elucidated in the following paragraphs.

- **Proximal and distant/distal goals.**

Bandura (1989) argued that an individual's performance on a complex task is optimal when proximal goals (short-term goals) that are instrumental in achieving distal goals (long-term goals) are set. When assigned a distant goal only, students are not expected to do as well as those who are advised to do their best – indicating that proximal goals should be assigned besides a distal goal. Latham and Seijts (1999) conducted an investigation, and concluded that the number of learning and task-related strategies implemented by students that were assigned a distant learning goal, in conjunction with proximal goals, was higher than in any other goal condition.

This is related to self-efficacy as a characteristic of motivationally active self-regulating students. The discovery and development of task-relevant strategies affected and improved the students' self-efficacy (Latham & Seijts, 1999:424-425).

- **Mastery and performance - approach goals vs mastery and performance - avoidance goals**

Mastery and performance - approach goals can also be described as goals aimed at the attainment of (learning) competence, while the mastery and performance – avoidance goals are regarded as goals aimed at the avoidance of (learning) competence (Jared *et al*., 2008:608). An individual's need for achievement is thus associated with striving to attain a mastery or performance-approach goal. The fear of failure by an individual is associated with the adoption of goals aimed at the avoidance of incompetence, and the individual will adopt mastery or performance-avoidance goals (Jared et al., 2008:609). In order to alter the students' disposition of fearing the challenges of learning and other tasks, intervention is suggested. Experimental studies have shown that interventions are effective when they are aimed at the motivation to reduce the fear of failure - by altering the learning goals (Elliot & Church, 1997; Bartels *et al*., 2008:610). It is crucial to minimise students' fear of failure, as this fear is associated with less metacognitive awareness (Bartels & Magun-Jackson, 2009).

- **Goal-setting in the phases of Zimmerman's self-oriented feedback loop**

The three phases of Zimmerman's self-oriented feedback loop (see Figure 2.5) emphasise the importance of goal-setting and motivation. (1) In the *forethought* phase students should set goals and (2) in the *performance/volitional* phase students should monitor their learning in relation to their goals. In this second phase students attempt the learning task and monitor their mastery of the task (Isaacson & Fujita, 2006:42). Self-regulated students should be able to reflect on the application of their learning to the task and choose appropriate tasks. When given choices of tasks with varying difficulty, such as a selection of diverse test questions, the self-regulated students should be capable of choosing tasks in which they will succeed, and avoid

tasks in which they are less likely to succeed. (3) In the *reflection* stage the students should assess their success or failure in relation to their goals, through comparing their self-monitored information with their goals. They adjust their self-efficacy and their future strategies accordingly (Isaacson & Fujita, 2006:42).

3.3.2.4 Motivation and the Self-Determination theory

The motivation to self-regulate can also be traced to the Social Cognitive processes that underlie the Self-Determination Theory (SDT), as described by Deci and Ryan (1985, 1991, 2000) (*in* Andersen *et al.*, 2000:373). The SDT theorises that classroom experiences of support and psychological need satisfaction, such as *autonomy, competence* and *relatedness*, will lead to positive learning functioning. (1) *Autonomy* is the need to experience one's behaviour as integrated and endorsed within the self. When students feel autonomous, they initiate and self-regulate their learning behaviour with high degrees of performance/volitional control, and a sense of choice (Deci & Ryan, 2000:122). (2) *Competence* is the need to be effective in one's interactions with the learning environment. When students feel competent, they seek out exercising their capacities, optimal challenges and extending their skills (Deci, 1975). (3) *Relatedness* is the need to establish close and secure attachments with others. When students feel related, they feel emotionally connected and interpersonally involved (Ryan & Deci, 2000:72). It was proved that the satisfaction of these three psychological needs: autonomy, competence and relatedness, can predict students' positive academic outcomes (Jang *et al.*, 2009: 649).

These feelings of autonomy, competency and relatedness are connected to the self-efficacious feelings of perceived ability that should motivate students to self-regulate their learning (Jang *et al.,* 2009:650). Motivation is considered to be of utmost importance in student learning and academic achievement (Dornyei *et al.*, 2006; Gardner *et al.,* 1997; Schunk *et al.*, 2007; Volet & Jarvela, 2001, Zimmerman & Martinez-Pons, 1986).

3.3.3 Behaviourally active participants in their own learning

(The third component in Zimmerman and Martinez-Pons's description)

According to Zimmerman (2001:131) learning behaviour indicates those learning strategies that refer to deliberate actions performed to reach specific learning goals. Self-regulated students actively select, structure and create social and academic environments and strategies which optimise their learning processes (Baumert *et al.,* 2002:7). The efficient use of learning strategies is identified as a characteristic of students who self-regulate their learning, according to Zimmerman (1990:176). According to Baumert *et al.* (2002:8) self-regulated students can apply a differentiated repertoire of learning strategies in a flexible manner. One of the central issues of SRL is the students' ability to select, combine, and coordinate these learning strategies according to their learning style (see Par. 3.3.1.3). However, only with knowledge about learning strategies are students in the position to regulate their own learning (Zimmerman & Martinez-Pons, 1989).

3.3.3.1 The different aspects of being behaviourally active in their own learning

Efficient use of learning strategies refer to the deliberate active behaviour performed to attain goals; such as actions of *processing information, time-management, concentration, selection of main ideas, use of study aids, self-testing* and *test strategies* (Weinstein *et al.*, 1988:24). Zimmerman and Martinez-Pons (1989) added *rehearsing, memorising, goal setting, planning, self-evaluation, self-monitoring* and *purposefully seeking information* to Weinstein's list of strategies. Learning and study strategies are any behaviours, beliefs, emotions and thoughts that students engage in and that intend to influence the student's encoding processes (Weinstein & Mayer, 1983; Weinstein *et al.*, 2000:727). These strategies facilitate the acquisition, understanding, or later transfer of new knowledge and skills and thus add to the effective construction of knowledge - and they can be modified or learned (Weinstein *et al.*, 2000:728).

3.3.3.2 Implementing knowledge for optimal academic performance

Self-regulated students have knowledge about what learning strategies are (Declarative knowledge), how they are used (Procedural knowledge) and when and why they should be used (Conditional knowledge) (see Par 2.2). When students are able to apply these types of knowledge efficiently, and in the right context, they can be seen as being behaviourally active in their own learning – indicating SRL behaviour.

A clear division line cannot be drawn between the three characteristics that indicate SRL in students, namely being a: a) metacognitively; b) motivationally; and c) behaviourally active participants in their own learning. The mutual dependency of the three components of SRL (metacognition, motivation and behaviour), as stated by Boekaerts (1997; 1999) and Baumert *et al. (*2002), has been emphasised in the previous paragraphs.

3.3.4 A synthesis of the characteristics of self-regulated students

Table 3.1 depicts the known characteristics of self-regulated students. Zimmerman's division of the LASSI subscales into the three SRL components (2008:166-167) was used only as a reference for tabling the characteristics. Although SRL characteristics are tabled for the purposes of this study, there is theoretically no clear demarcation between these characteristics or clear division into the three components, for the following reasons: 1) there are overlaps between and among the characteristics; 2) they interact on each other; 3) they can replace or enhance each other; and 4) some characteristics are partly contained in the description of others.

The SRL characteristics described by Weinstein *et al*. (1986), Zimmerman (2002; 2008), Zimmerman and Martinez-Pons (1986), Pintrich *et al*. (1991), Pintrich (2000), Deci and Ryan (2000), Boekaerts and Corno (2005), Pearson (2006) and other learning specialists have been tabled in Table 3.1. This was done in order to form a synthesis of well-known and researched characteristics of self-regulated students.

Table 3.1 The characteristics of self-regulated students.

The three components of SRL	The LASSI subscales	The SRLIS	Additional characteristics / skills, derived from literature
Metacogniti vely active participants demonstrate:	• Concentration • Information processing • Selecting main ideas	• Reviewing records • Self-evaluation	• Monitoring • Volitional control • Regulation • Modifying • Self-reflection • Declarative, Procedural and Conditional knowledge • Metacognition
Motivationally active participants demonstrate:	• Attitude • Anxiety • Motivation	Self- conse quence setting: rewards/ satisfaction • Goal-setting and planning • Focusing on the learning task	• Self-efficacy • Outcome expectations • Control of learning beliefs • Self- concept/ self-confidence • Intrinsic / extrinsic goal orientation • Task valuing Test anxiety
Behaviourally active participants demonstrate:	• Time management • Self-testing • Test strategies • Use of study aids • Note-taking	• Seeking information + social assistance • Keeping records and monitoring • Environment al structuring • Organising and transforming • Rehearsing and memorising	• Self- observation • Adapting learning strategies • Self instruction • Attention focusing • Task and control strategies • Imagery • Recording of test results • Self-recording • Elaboration

			• Prediction of test results • Organisation • Critical thinking • Management of time, place of study • Effort regulation • Peer learning • Help seeking

Weinstein *et al*. (1986); Zimmerman, (2008); Pearson (2006); Zimmerman and Martinez-Pons, (1986); Zimmerman (2002); Pintrich (2000); Deci and Ryan (2000), Boekaerts and Corno (2005) and other learning specialists.

Table composed by the researcher (2011)

There are overlaps between the components and characteristics in Table 3.1 (see Par. 3.3), and some characteristics are contained in the description of others. During the planning, executing and contemplation of the table, the mutual dependency of the individual components of SRL was kept in mind, as Boekaerts (1997; 1999) and Baumert *et al. (*2002) advised. It is also taken into consideration that *Time management, prioritising goals* and *marking off completed learning tasks* (or *effort regulation*) are seen as strategies and not skills by e.g. Boekaerts and Corno (2005:205).

According to Zimmerman (2008:166-167) the division of the LASSI into the three components can be summarised as following:

- **A skill (or metacognitive) component of strategic learning**

  These LASSI scales examine students' skills and thought processes related to identifying, acquiring, and constructing meaning for important new information, procedures and ideas, and how they prepare for and demonstrate their new knowledge on tests or other evaluative procedures.

- **A will (or motivational) component of strategic learning**

  These scales measure students' receptivity to learning new information, their attitudes and interest in college/university, their diligence, self-discipline and willingness to exert the effort necessary to successfully complete academic requirements, and the degree to which they are anxious about their academic performance.

- **A self-regulation (or behavioural) component of strategic learning**

  These scales measure how students manage, or self-regulate and control the whole learning process through using their time effectively, focusing their attention and maintaining their concentration over time, checking to see if they have met the learning demands for a class, an assignment or a test, and using study supports such as review sessions, tutors or special features of a text book.

It has to be taken note of that the degree of SRL may vary among students. Table 3.1 depicts all the SRL characteristics described by the learning scientists who were acknowledged beneath the table. Some students may be regarded as self-regulated even if they don't demonstrate most of the above-mentioned characteristics, or display some SRL skills to a lesser degree than others.

Researchers investigate the same basic questions on learning. The difference between and among the different approaches lies with the task requisitions, where the freedom of choice of the student determines the difference. The prerequisites for, or the conceptual dimensions of *academic self-regulation* are depicted in the following table.

Table 3.2 Conceptual dimensions of academic self-regulation

Scientific questions	Psychological dimensions	Task conditions	Self-regulatory attributions	Self-regulatory processes
1. Why?	Motive	Choose to participate	Intrinsically or self-motivated	Self-goals, self-efficacy, values, attributes etc.
2. How?	Method	Choose method	Planned or automated	Strategy use, relaxation
3. When?	Time	Control time limits	Timely and efficient	Time planning and management, etc.
4. What?	Performance	Control performance	Aware of own performance and outcomes	Self-monitoring, self-judgment, action control, volition, etc.
5. Where?	Environmental	Control physical setting	Environmentally sensitive and resourceful	Environmental selection and structuring
6. With whom?	Social	Control social milieu	Socially sensitive and resourceful	Model selection, seeking help, etc.

Zimmerman (2002)

Zimmerman (2002) stated that an important prerequisite for SRL is the freedom of choice provided to the student/learner. This freedom of choice is reflected in the conceptual dimensions of self-regulating, depicted in Table 3.2.

Students who are less self-regulated display a lack of any, or only a few of these characteristics. Some of these characteristics are displayed minimally, when compared to the characteristics that the self-regulated students display. A discussion of these students who are less self-regulated follows.

3.4 STUDENTS WHO DISPLAY A LACK OF SRL

One of the assumptions in this study is that the degree in which students demonstrate SRL skills impacts on their academic achievement . The deduction may be made that students who perform poorly and are not self-regulated, are thus not metacognitively, motivationally or behaviourally active participants in their own learning, according to Zimmerman and Martinez-Pons' description (see Par. 3.3).

Less self-regulated students either have limited access to, or have little knowledge of effective learning strategies, or they fail to select the appropriate learning strategy for a given task (Baumert *et al.*, 2002:11). Angelo and Cross (1998:9) postulate that these students do not develop learning skills unless they receive explicit instruction on and practice in their use. Research indicates that learning is improved through the teaching of study strategies (Chiang, 1998; McKeachie, 1988; Ramp & Guffy, 1999; Paris *et al.,* 2001). In fact, research suggests that all of the tasks and assessment practices underlying students' procurement of learning skills can be facilitated by their lecturers (Black & Wiliam, 1998; Yorke, 2001; Stiggins, 2002 and Orsmond *et al.*, 2004). However, research also indicates that few, if any, lecturers explicitly teach study strategies - and most of them assume that students have already learnt or acquired them at SEI's. According to McKeachie (1988) and Barbatis (2010) not all students possess study strategies when they are admitted to HEI's. Barbatis (2010:14) ventured to state that approximately one-third of all students entering HEI's need remediation in terms of their learning behaviour.

More students gain access to study at HEI's (see Par 1.3), but they are underprepared for the amount of work, rigor and the expectations of higher education. They are not necessarily prepared or motivated for the type of critical thinking and analytical learning which is associated with Higher Education (Laskey &

Hetzel, 2010:3). Wolters, Yu and Pintrich (1996) found that negative patterns of motivation, cognition and performance contribute to a lack of self-efficacy, self-regulation and task value in these students.

When these students' lack of self-regulation is analysed, it was found that the lack occurred in one or more of the phases of Zimmerman's self-oriented feedback loop (see Fig. 2.3). The occurrence is illustrated as following:

- In the *forethought* phase less self-regulating students tend to set nonspecific and distant academic goals. They have low levels of academic self-efficacy and interest in their task.
- In the *performance* phase, they don't stay focused on their original goal and they don't effectively monitor their own learning progress.
- In the *self-reflection* phase they are likely to avoid self-evaluation, as compared to the self-regulated students. When they do make self-evaluations they tend to be negative.

The less self-regulating students are more likely to attribute their performance to ability-related causes, and thus they tend to have low self-efficacy, as they doubt their ability. Pintrich and De Groot (1990:28) stated that "*Student involvement in Self-Regulated Learning is closely tied to their efficacy beliefs about their capability to perform classroom tasks and to their beliefs that these classroom tasks are interesting and worth learning*". These students have little motivation for attaining learning gains or goals (Pintrich & De Groot, 1990:71). Sometimes students are not self-regulating because they believe they cannot improve their academic performance. This belief, as well as a belief that one cannot improve one's IQ, will be discussed in the next paragraph.

3.4.1 Beliefs about intelligence that influence SRL

Dweck (2000, 2002) postulated that students may constrain, or enable their capacity to self-regulate, due to the differing beliefs they have about the value of effort and

their intelligence. One group of students view intelligence as pre-determined, leading to the belief that effort is superfluous. This group can be informed and (1) guided by lecturers/advisers to rectify this belief as well as, or (2) through a programme focused on developing strategies to improve SRL skills, as proposed in this study. They can be rendered positive of improving their intelligence through effort (Campbell, 2009:98). The other group believes that effort can lead to success and that intelligence can be improved. This group can be made aware that their effort can be enhanced or improved even more in order to obtain optimal academic success.

In addition to changing the perceptions of intelligence being pre-determined, students can improve their SRL through goal setting (see Par 3.6), use of effective strategies, monitoring and metacognition, action and volitional control (see Par. 3.3.1.3), time management, self-motivational beliefs, evaluation, self-reflection and a congenial environment (Zeidner *et al.*, 2000:753). Baumert *et al.* (2002) mention the following prerequisites: motivational preferences, volitional approaches, efficient learning strategies and regulatory techniques, metacognitive competence and the availability of learning and problem-solving strategies.

3.4.2 The consistent/inconsistent use of SRL skills

It has also been established that some self-regulating students do not always exhibit SRL skills when learning (Winther & Achtenhagen, 2008:3-4; Anderton, 2006:157). Pintrich stated that not all academic tasks explicitly involve self-regulation (2000:454). The performance of certain tasks does not always require the student to plan, control and evaluate strategically and the execution can be performed implicitly or automatically as the student may have had prior experience and had performed the same learning procedure (Pintrich 2000:455).

The question arises whether self-regulated students always self-regulate their learning, or whether they sometimes adjust their self-regulation according to the features of their learning needs, and why. Should SRL be perceived as an aptitude or as an event? This will be debated in the next paragraph, and the implications of the two different perceptions will be discussed.

3.5 SHOULD SRL BE VIEWED AS AN APTITUDE OR AS AN EVENT?

Muis *et al.* (2007:178) postulated that SRL can be defined in a dualistic way: as an aptitude and as an event. Winne and Perry (2000) analysed quantitative measures of SRL and found that previous research considered SRL as an **aptitude**, and concluded that the construct of SRL is relatively trait-like. According to this view students have relatively stable, contextualised approaches to select and manage their learning strategies across different settings (Neville & Bennett, 2008:698). Winne and Perry (2000) defined aptitude or traits as a relatively enduring attribute of a person that can predict future behaviour. Traits are considered as stable personality qualities, general learning strategies and methods, prior knowledge, and motivational orientation (Winther & Achtenhagen, 2008:3). This view enables the prediction of future behaviour.

An alternative approach considers SRL as an **event**, which can be defined as a temporal entity with a discernible beginning and an end (Zimmerman, 2008:167). When considering SRL as an event (e.g. by Winne & Perry, 2000) or a state (Winther & Achtenhagen, 2008) students regulate their learning by metacognitively monitoring the features of their learning needs and adjusting their use of learning strategies. Winther and Achtenhagen (2008:3) view SRL as a state or an event as the actualised learning behaviour and learning reflection on the current learning situation.

Whether self-regulating students always display this aptitude or whether they adjust their self-regulation according to their learning situation will be researched during the qualitative research.

Academically successful students demonstrate SRL skills, but it is wise to indicate whether a student possesses these abilities before he/she adds to the 50% dropout figure that was indicated in the first chapter (see Figure 1.1). To establish whether students have the acquired SRL skills needed for study at a HEI, several measuring instruments have been developed. The instruments that are most widely used will be discussed in the next paragraphs.

3.6 THE MOST WIDELY USED MEASURING INSTRUMENTS FOR ASSESSING SRL SKILLS

Students who are found to be lacking in self-regulation of their learning, and who are therefore at risk of failing, should be made aware of their limitations. They should be exposed to supportive strategies that can assist them in developing these skills (Schunk & Zimmerman, 1998:70; McCombs, 2001:80).

The process of measuring the different components and processes in SRL is not a clear-cut matter and proves to be difficult to investigate (Schraw & Impara, 2000; Winne *et al*., 2002; Winne & Perry, 2000). Research using interview and questionnaire measures of students' self-regulatory strategies revealed them to be significantly correlated with measures of academic performance (Pintrich *et al.* 1993; Zimmerman & Martinez-Pons, 1986). A self-regulation strategy measure can also predict students' academic grades and their teacher's ratings of their proactive efforts to learn in class (Zimmerman & Martinez-Pons, 1988). There is evidence that self-regulatory strategies can mediate the effects of students' verbal ability measures on their outcomes in writing (Zimmerman & Bandura, 1994). In an attempt to classify and clarify instruments and methods used by researchers to measure SRL, the following division was used by Winne and Perry (2000):

I. Instruments that measure SRL as an aptitude (Par 3.5). The instruments that Winne and Perry (2000) included in this first category are *self-reporting questionnaires, structured interviews* and *teacher judgments*.

II. Instruments that measure SRL as an activity or event (Par 3.5), when SRL is viewed as actualised learning behaviour and learning reflection on the current learning situation. (Winne &Perry, 2000:37; Winther & Achtenhagen, 2008:4). These instruments are more complex measures that collect information on the states and processes the student undertakes **while** he/she is self-regulating. The instruments that Winne and Perry (2000) include in this second category are the *think-aloud protocols, methods of error detection in tasks, the trace methodologies* and *observation measures.*

Few instruments have been designed for measuring SRL in an e-based learning environment. Winne *et al.* (2006) responded to this request by developing an innovative software programme.

The researcher preferred to divide the most widely-used measuring instruments of SRL into (1) quantitative and (2) qualitative instruments.

3.6.1 Quantitative instruments

Quantitative measures are questionnaires, scaled judgments and scaled measures that observe task execution. The measuring instruments that will be discussed in this paragraph are the MSLQ and the LASSI, which are both retrospective reports (Zimmerman, 2008:168). These questionnaires are the most widely used for effective assessment of SRL as metacognitive, motivational and behavioural processes (Zimmerman, 2008:167-168). Some of the names of these processes vary in the measuring instruments, due to their differences.

3.6.1.1 The Motivational Strategies for Learning Questionnaire (MSLQ)

Pintrich, Smith, Garcia and McKeachie (Pintrich *et al*., 1991) designed this self-reporting tool with 81 items, based on the motivational model of expectancy times value (Pintrich, 2003; Wigfield & Eccles, 2000). One of the advantages of this instrument is that it has been applied and validated at different educational levels, both at universities and at non-universities. The MSLQ was developed to measure two constructs thought to be integral to academic performance:

a) Students' motivation to achieve academic success; and

b) Their use of various learning strategies.

Regarding the **first** construct, *motivation for academic success*, the authors relied on a socio-cognitive model of motivation that included three components:

- Expectancy (being able to do something);

- Value (are the outcomes of academic effort important to the student?); and
- Affect (how threatening is the prospect of taking exams and being evaluated?).

These three components are measured by six subscales on the MSLQ.

The **second** construct focuses on *learning strategies*, and is based on a model that includes three levels of strategies:

- Cognitive (rehearsal, elaboration, paraphrasing, summarizing, outlining, critical thinking);
- Meta-cognitive (goal-setting, monitoring, regulating); and
- Resource management (time management and task persistence).

The latter three components are measured by nine subscales on the MSLQ.

Table 3.3 The composition of the MSLQ

SCALE	DIMENSION	SUB-SCALES
	Expectancy components:	Control beliefs
		Self-efficacy
MOTIVATION	Value components:	Intrinsic goals
		Extrinsic goals
		Task value
	Affective component:	Test anxiety
	Cognitive and metacognitive strategies	Rehearsal
		Elaboration
		Organisation

LEARNING		Critical Thinking
SCALE	**DIMENSION**	**SUB-SCALES**
STRATEGIES		Metacognition
	Resource management strategies:	Time and place of study
		Effort regulation
		Peer learning
		Help seeking

Pintrich *et al. (*1991)

The overall consistency of the MSLQ as measured by Cohen's Alpha was .92. The statistics for the 15 subscales, however, yielded alpha coefficients ranging from .32 to .78. Adopting an alpha criterion of at least .60, nine of the subscales were not considered in the subsequent analyses.

The items in the MSLQ are constructed in a seven point Likert-scale format with response options ranging from "not at all true of me" to "very true of me". The responses are written with the expectation that the respondent is a student currently enrolled in a course (Online Format, 2009: 2-3).

3.6.1.2 The Learning and Study Strategies Inventory (LASSI)

Students' awareness of their limitations can be made possible by means of a diagnostic measuring instrument, such as the LASSI, as proposed by Weinstein *et al.* (1987:4). The LASSI was designed by Weinstein, Palmer and Schulte in 1987, after nine years of development at the University of Texas at Austin, as a means to measure the learning and study strategies and methods of students (Weinstein, 1989:2). In measuring SRL skills used by university students, the LASSI has been one of the most widely used scales (Duran, 1999, Zimmerman, 2008:168). According to McMahon and Luca (2004:427) it was used by almost 2 000 tertiary institutions in 2003, as a diagnostic and prescriptive measure. Each of the 10 scales or subfields has 8 items, except for the subfield *Selecting Main Ideas*, which has 5 items

(Weinstein, 1988:3). The LASSI yields individual scores and no total score is computed, as this is a diagnostic instrument. The focus of the LASSI is on overt and covert thoughts and behaviours that relate to learning. These thought processes and behaviours contribute significantly to success in tertiary educational institutions, and can be learned or enhanced through educational interventions (Weinstein, 1988:2). The data provided with the LASSI includes percentile score equivalents. It is a self-reporting questionnaire with 77 items, grouped into 10 scales, each measuring a different learning component. Based on each student's scale scores, prescriptions can be made.

A brief description of what each subfield entails is provided:

- **Attitude**: the student's interest and motivation to succeed at university; and willingness to perform the tasks necessary for academic success.
- **Motivation**: the degree to which the student accepts the responsibility for performing those tasks by utilizing self-discipline and hard work.
- **Time management**: the extent to which the student creates and uses schedules to manage his or her responsibilities effectively.
- **Anxiety**: the degree of anxiety the student feels when approaching academic tasks.
- **Concentration**: the ability of the students to focus his or her attention, and avoid distractions while working on school-related tasks like studying.
- **Information Processing**: The ability to process ideas by mentally elaborating on them and organizing them in meaningful ways.
- **Selecting Main Ideas**: the magnitude of the student's ability to ferret out the important information in a learning situation .
- **Study Aids**: the student's ability to use or develop study aids that help the learning process.

— **Self – testing**: the student's awareness of the importance of self-testing and reviewing when learning material; and the use of those practices.

— **Test strategies**: the measurement of the student's ability to prepare effectively for an exam and to reason through a question when answering it.

Weinstein *et al*. (1987)

Zimmerman (2008:166-167) divided the ten LASSI subscales into the three components he classified as being indicative of the self-regulation of students. This division by Zimmerman is illustrated in table 3.3.

Table 3.4 The LASSI scales as components of SRL

Zimmerman and Martinez - Pons's components of SRL	**LASSI subscales by Weinstein *et al.***
Metacognitively active participants of their own learning	Concentration
	Information processing
	Selecting main ideas
Motivationally active participants in their own learning	Attitude
	Anxiety
	Motivation
Behaviourally active participants in their own learning	Time management
	Self-testing
	Test strategies
	Use of study aids

Zimmerman (2008:166-167); Pearson (2006:2-3)

This classification by Zimmerman corresponds with the definition of SRL by Zimmerman and Martinez-Pons (1989:4), namely that students are self-regulated in

the degree that they are metacognitively, motivationally and behaviourally active participants in their own learning (see Par 3.3).

The following predictions were made by Loomis (2000:29-30) for academic achievement, corresponding with specific LASSI scales:

- *Attitude* and *motivation* are predictors for whether a student may drop out of university before the end of the year, because it measures students' perceptions of how valuable and relevant university study is to their futures. It is conceivable that those who score lower on this scale have less patience with learning because they are unable to connect this learning experience to their lives after university.

- *Time management* is a strong predictor of students' overall performance in class. The structured daily class schedule of the contact student supports those who don't possess the skills of designing a daily plan, but the social environment of a university is a challenge for some students who cannot manage their time.

- The *concentration* scale is designed to measure students' ability to focus attention, and maintain that attention, on academic tasks. Students who do not report good concentration skills are likely to be easily distracted by competing thoughts, or by other events, while studying.

- The *selecting main ideas* scale measures a student's ability to pick out the important and relevant information of a learning situation. When dealing with the huge amount of work and potentially confusing new learning environment, some students may get lost in the details of selecting information that is more important than other information.

- The *study aids* scale measures the student's ability to create and/or utilize existing study aids in learning a subject. Study aids in the traditional concept may be such aids such as emboldened or colored text, underlined text, summary statements, charts and graphs, etc. When using

technology-based learning material (see Par 2.12), the proficient use of study aids should aid the student by enabling him/her to navigate between several different folders on the course's Internet page, and then relating this material to assigned readings.

The LASSI is more than a diagnostic instrument. Pearson (2006) states the following variety of uses for the LASSI, namely that it can be:

I. A basis for improving all students' learning and study strategies;

II. A diagnostic measure to help identify areas in which students could benefit most from educational interventions;

III. A counseling tool for college orientation programmes, developmental education programmes, learning assistance programmes and learning centers;

IV. A pre-post achievement measure for students participating in programmes or courses focusing on learning strategies and study skills;

V. An evaluation tool to assess the degree of success of intervention programmes or courses.

The LASSI was used in the quantitative part of this research as a diagnostic measure to assess the SRL skills of a cohort of first year university students and will be discussed further in Chapter 4.

3.6.2 Qualitative instruments

A few widely used qualitative instruments will be discussed below, with a particular focus on the *Self-regulated Learning Interview Schedule* (SRLIS) of Zimmerman and Martinez-Pons (1989).

3.6.2.1 Think-aloud protocol measures

Thinking aloud is a protocol where the students report their thoughts and the processes and cognitive strategies they put into play while performing a task. A think-aloud protocol involves students' reports about their thoughts and cognitive processes while performing a task (Ericsson, 2006:12). One of the areas where this protocol has been used most widely is in reading (Pressley, 2000; Pressley & Afflerbach, 1995). Another area that this protocol can be used in effectively is in measuring SRL in hypermedia environments (Zimmerman, 2008:170). The use of protocol in this area will be clarified when e-learning environments are discussed in Par 3.9.

3.6.2.2 Methods of error detection in tasks

A variety of these instruments have been used. These instruments are usually implemented for evaluating the self-observation process in the area of reading comprehension. A specific amount of errors are introduced into the materials that students use for study (e.g. text books), in order to observe whether these errors are detected. These methods then observe what the students do when they discover the errors (Baker & Cerro, 2000:19).

3.6.2.3 Trace methodologies

Trace methodology instruments are based on signs or observable indicators that indicate cognitive processes implemented by students when they are performing tasks. One of the indicators that may be used to measure the process of cognitive control is whether the students write more information than is necessary in the margins of their notebooks or text books. This applies to footnotes, summaries, personal comments, diagrams, comparisons of the information with other sources, etc. (Baker & Cerro, 2000:22; Winne & Jamieson-Noel, 2003).

3.6.2.4 Measures that observe task execution

The measures in this category are based on observations made by educators as to what the students are doing while they perform their tasks (Montalvo & Torres, 2004:16). These observations are frequently complemented with interviews, and contain several advantages for evaluating SRL. The advantages are described by Montalvo and Torres (2004:16-17) as the following:

- portraying the objective measures of what the students are doing, instead of what they remember or think that they do;
- allowing relating students' behaviours to the conditions required by the tasks;
- decreasing the difficulties associated with measuring this process (e.g. the answering bias in questionnaire completion, such as answering very optimistically); and
- decreasing the students' limitations in describing cognitive processes that they use during task performance.

3.6.2.5 The Self-regulated Learning Interview Schedule (SRLIS)

The *Interview for Assessing Student use of Self-regulated Learning strategies,* developed by Zimmerman and Martinez-Pons (1989) has been used widely as a reference indicator for determining SRL skills used by academic achievers.

Zimmerman and Martinez-Pons (1986:614) developed and validated an interview for assessing students' use of SRL strategies. A number of categories of SRL strategies were identified and included in the interview. These categories derive from the Social Learning Theory (SLT) and the research based on it. The *Self-Regulated Learning Interview Schedule* (SRLIS) has been used to identify SRL skills by Pelt (2008), Wang *et al.* (2007), Magno (2010) and Chye *et al.* (2005). Pelt (2008:101) reported that the SRLIS indicated that high achieving students used more SRL strategies and more advanced strategies than low achieving students.

According to Zimmerman (2008:168) the SRLIS involves prospective answers to hypothetical learning contexts. In order to identify the SRL skills needed for academic achievement, forty students from a high achievement track and forty from other achievement tracks of a suburban high school were selected and interviewed (Zimmerman & Martinez-Pons, 1986). Zimmerman and Martinez-Pons identified fourteen categories of SRL skills from the students' answers that dealt with learning contexts, and found that high-achieving students displayed significantly greater use of these SRL skills than the underachieving or low-achieving students.

The findings by Zimmerman and Martinez-Pons (1986:625) were that:

- substantial correlation between the use of SRL strategies and academic achievement was achieved;
- that high achievers reported significantly less use of a single category of non self-regulated response than low achievers (this finding is substantiated by Pelt, 2008);
- an interview procedure can provide reliable evidence concerning students' SRL reports;
- one category of SRL that did not relate to student achievement was *Self-evaluation*; and
- achievement is heavily dependent on the use of many of the same strategies that were included in the SRL Interview Schedule.

Studies have confirmed the validity of this procedure for measuring the use of self-regulation strategies and for discriminating between high and low performance students, according to their use of SRL strategies. The fourteen categories of SRL strategies that Zimmerman and Martinez-Pons identified in 1986, are included in this interview schedule:

- **Self-evaluation**: self-regulating students can evaluate the quality or progress of their work.

— **Organising and transforming**: self-regulating students can rearrange instructional materials to improve learning overtly or covertly.

— **Goal-setting and planning**: self-regulating students set educational goals or subgoals and plan for sequencing, timing and completing the activities that are related to these goals.

— **Seeking information**: self-regulating students indicate efforts to secure further task information from non-social sources when they are undertaking an assignment or learning task.

— **Keeping records and monitoring**: self-regulating students indicate efforts to record events or their results.

— **Environmental structuring**: self-regulating students make an effort to select or arrange their physical setting to make their learning easier.

— **Self-consequences**: self-regulating students indicate the arrangement or imagination of rewards or punishment for their success or their failure.

— **Rehearsing and memorising**: self-regulating students indicate efforts to memorise their study material through overt or covert practice.

— **Seeking social assistance** (3 sources in this category): self-regulating students indicate efforts to solicit help from their peers;

— their lecturers;

— or other adults.

— **Reviewing records** (3 sources in this category): self-regulating students indicate efforts to reread tests;

— their notes;

— or their textbooks to prepare for class or further testing

Other statements: under this category all learning behaviour that is initiated by other persons; not by students themselves, and all unclear verbal responses by self-regulating students are classified.

The above-mentioned categories indicated a very high correlation with academic achievement. According to the findings of Zimmerman and Martinez-Pons (1989), 93% of the students could be classified correctly in their respective achievement group on the basis of their use of these 14 SRL categories. The two achievement groups (the high achieving group and the low-achieving group) differed mostly by their mention of the SRL skills they implemented. Some SRL skills are reported more frequently by the high-achieving group. All of the 14 SRL skills are presented in the following list, but in descending order, according to the frequency reported in the SRLIS. Thus, the most frequently reported skills are on top and the less frequently reported skills descend to the bottom, with self-evaluation as the least frequently reported skill.

A sequence for the frequency of reporting of the following SRL skills in the SRLIS:

1. Seeking Information
2. Keeping Records and Monitoring
3. Organising and Transforming
4. Seeking Teacher Assistance
5. Seeking Peer Assistance
6. Seeking Adult Assistance
7. Self-consequences
8. Reviewing Notes and Reviewing Text
9. Self-evaluation

To summarise the findings by Zimmerman and Martinez-Pons (1989):

- A substantial correlation between the use of these 14 SRL skills in the SRLIS and academic achievement was achieved;
- The high achievers reported more use of these SRL categories than the low achievers; and
- One category of SRL that did not relate to student achievement was Self-evaluation.

This interview procedure provided reliable evidence concerning students' SRL reports (Zimmerman & Martinez-Pons, 1989). The SRLIS can be implemented for research in this century (the 21st century), as the SRL skills contained in it are demonstrated by self-regulating students, and are still indicative of academic achievement (Pelt, 2010). The researcher used the SRLIS as a framework for formulating the questions that she posed to the participants during the qualitative part of her study (see Par. 4.5.2.2).

3.7 SRL SKILLS FOR ACADEMIC ACHIEVEMENT IN ELECTRONICALLY ENHANCED LEARNING ENVIRONMENTS

An aspect that needs further research is the ability of students to adapt their SRL behaviour from a traditional learning environment where only hard copy learning material and sources are available, to learning environments that become increasingly electronically enhanced (e-enhanced). Although not fully electronically-based (e-based), most HEI's follow an approach of allowing and advising students to implement electronic appliances to gain access to, and import information from the Internet by search engines such as Google.

On-campus students in a traditional contact learning environment are increasingly expected to visit e-learning platforms such as eFundi (implemented as an e-learning platform at the NWU) and the Internet, through electronic applications such as their

iPads, smart phones with Internet accessibility, laptops, tablets and notebooks. Electronically-enhanced (e-enhanced) learning environments that stimulate students to organise their own learning and to take responsibility for extending their knowledge and improving their skills are increasingly in demand (McMahon & Luca, 2001; Van Grinsven & Tillema, 2006; Njiru & Waugh, 2006:6; Zimmerman, 2008:167-170; Van der Zanden, 2009:73) (see Par. 2.10). Although having access to the Internet is not yet compulsory, the NWU has personal computer (PC) laboratories available to all students, and network access for residence students.

The effect of exposure to an increasingly electronically enhanced learning environment will be addressed in the qualitative research. Question 6 of the SRLIS is aimed at determining whether the students prefer the Internet (or library) to consulting friends or lecturers (see Par 5.5.3.6). Strategies for the development of SRL skills in an e-enhanced learning environment will be included in the proposed programme (see Chapter 6).

Students need certain skills to visit e-learning platforms and electronic sources of information, and they have to adapt their learning strategies to benefit from the change of traditional learning environments with supplied hard-copy learning material and sources, to learning environments that become increasingly more electronically enhanced. It has already been suggested by Weinstein and Mayer in 1986 that learning strategies appropriate for one type of learning situation may not be appropriate for another (Chen, 2002:11). The findings of Chen (2002), that effort regulation has a positive effect on e-learning, while peer learning has a negative effect on computerised learning environments, is in accordance with the study by Whip and Chiarelli (2007). Their study proved that students' e-learning and their contact learning strategies differ from each other.

Research on SRL indicates that e-learning demands even more SRL skills (Anderton, 2006:162) than contact-based learning. Although more SRL skills are demanded, the use of technology itself has created gaps in student learning (Laskey & Hetzel, 2010:3-4). Students do not have to search information only in libraries and on the hard copy learning material and sources and text books prescribed for them

by the lecturer, but can turn to their computers, tablets, iPods and iPhones for instant knowledge-on-demand (Van der Zanden, 2009:74), which has a profound influence on how they approach learning. It may be more difficult for these students to become self-regulated and acquire metacognition, because they do not have to monitor their behaviour (Laskey & Hetzel, 2010:4). It has been indicated in this chapter that self-regulation and metacognition are implicit characteristics of the self-regulated student (Laskey & Hetzel, 2010:4; Garrett *et al*., 2007; Schunk, 2005). Students who study through e-enhanced environments ingest information without great expenditure of motivation or work – and thus their approach to learning is less persistent and less goal-oriented (Narciss *et al*., 2006:1128-1130). However, persistence and goal-orientedness are characteristics of the self-regulated student (see Par 3.3). It can be concluded that although e-enhanced learning demands more SRL skills, this model of learning itself leads to less development of SRL skills.

The effects of sustained online activity leads to decreased comprehension and concentration and less ability to analyse or think creatively (Carr, 2010). The use of the Internet does strengthen rapid decision making, problem solving, and mental coordination, but it also encourages superficial connection to that knowledge. "*As we become more agile at multitasking online, we train our brains to process information quickly and efficiently - but without sustained attention*" (Carr, 2010:157). The implications of less sustained attention is significant for learning. The student who maintains steady, measured control over online consumption is an exception, as most students who are not self-regulated are swept into an existence with a mega-availability of information at their fingertips, with no need to process new information deeply. According to Tatu (2010) a 2008 study revealed that the number of citations of academically sound articles has plummeted, with much greater reliance being placed on more recently published articles, due to the fact that so many of them are so easily available on the Internet.

The various sources of information on the Internet can be linked together to form so-called hypermedia or hypertext (Narciss *et al*., 2006:1126). Thus it can offer the possibility to structure, adapt and integrate learning content and materials. Because

of its interactivity the Internet also enables students to process the material in accordance with their individual preferences and strategies from any place and at any time.

However, it is precisely this mega-availability of information that can be intimidating for less self-regulated students. The universal access to multiple sources of information and the non-linear structure and interactivity of the open information systems on the Internet can create additional learning and processing demands on students (Narciss *et al*., 2006:1127-1128). The amount and the structure of the learning information can thus pose difficulties, especially for less self-regulated students. The various connections between learning materials from different sources have to be implemented, but the different and various sources of information firstly should be located, examined and evaluated. Internet-based documents and sources are non-linear and some are incoherent or even unsound (Mayer & Moreno, 2002:115). The SRL skill of *evaluating the worthiness of learning something* should be applied before learning itself begins. According to Siemens (2004:3) the ability to *recognise and synthesise connections and patterns* is another SRL skill crucial for Connectivist learning (see Par. 2.4.1).

The risk of the Internet‘s mega-availability of information is that if students are not goal-oriented and self-regulated in their search for information on the Internet, they can be easily distracted from their learning objectives, or they can even lose their way in hyperspace (Narciss *et al*., 2006:1129). Students may work on too much irrelevant information or consume important information cursorily. In order to achieve academic success, students in an e-enhanced and e-based learning environment will have to be even more motivationally, metacognitively and behaviourally active in their own learning process.

To address the additional demands made of students’ SRL skills in an e-based learning environment, Narciss *et al.* (2006:1129) proposed a summary of general and media-specific requirements related to SRL with multimedia.

Table 3.5 An overview of requirements for SRL in an e-enhanced learning environment

LEVELS OF COGNITIVE SELF-REGULATION	PHASE OF THE LEARNING PROCESS
	Preparation
	Setting goals and specifying sub-goals:
General, metacognitive requirements	What do I know already?
	What do I want to know?
	Which organisational constraints have to be taken in the acquisition of SRL?
	Planning the learning process
	What sources of information are relevant for the goals?
Specific metacognitive requirements	Where can I find these sources?
	How long does it take to obtain material from these sources?
	Organising learning material + media
	Obtaining
	Scanning
Task and content-related cognitive requirements	Exploring
	Selecting
	Structuring
	Documenting

Narciss *et al. (*2006:1130)

Table 3.5 indicates the requirements for SRL when learning in an e-based or e-enhanced learning environment. These requirements refer to the phases of the learning process, as well as the different levels of cognitive and metacognitive SRL

strategies. Implementing an e-learning strategy requires the student to focus on processes, which involve more than a set of tasks. There are many implementation models for e-learning, such as the Instructional Systems Design (ISD) and the Instructional Systems Design and Development (ISDD), described by Siemens (2002).

A comparison is provided in the next table between traditional and e-enhanced learning SRL skills. The difference is indicated between the two kinds of skills necessary for academic success in each learning environment, and is an adaptation from the table in Clarke, 2008:4-5).

Table 3.6 Comparing SRL skills between traditional and e-enhanced learning environments

Traditional skills	e-Learning skills	Differences
Time management	Time management	Critical in e-learning since it provides greater opportunity to take control of own learning. Also true for open and distance learning.
Responsibility acceptance	Responsibility acceptance	e-Learning provides more opportunities to take responsibility than traditional learning.
Planning	Planning	e-Learning gives more freedom to choose where, when and how they study, while traditional courses are determined by the lecturer.
Searching skills: libraries	Searching skills: Internet	Clarke compares the scale for both environments: the Internet is enormous compared to any physical library.
Assessing quality	Assessing quality	Books and printed material have established means, while the Internet has few quality assurance mechanisms.
Listening: peers + lecturers	Listening: only podcast/video	A key learning style in traditional learning, but a minor role in e-learning
Reading: printed material	Reading; text on screen	A key skill mostly for e-learning. Browsing is done on Internet sites to locate relevant information on the Internet.
Writing: note taking	Writing: keyboard	Keyboard skills are essential for communicating online. Writing is the main method of note-taking

and summarising	skills, e-mails	and processing information online.
Creating content: arts,	Creating content: many areas	Powerfully enhanced by the availability of sophisticated equipment; digital cameras, sound recorders in e-learning..
Self- assessment	Self-assessment	Traditional learning: many opportunities, e.g. compare with peers. In e-learning there are few ways to self-assess.
Collaboration: face to face	Collaboration: communicate by software	Key difference: time. Face to face groups often agree and tasks are achieved quicker. Online groups have own time scales or time zones – takes longer to agree. Motivation is less to finish quickly.
Problem-solving: Individually/small groups	Problem-solving: individually/ distance group	In e-learning it is difficult to judge others' views It is easier to solve problems in traditional environments when working in groups.

Clarke (2008:4-5).

Not all the SRL skills that were identified in Table 3.1 were compared in this table, but a preliminary basis for comparison was provided.

There has been an increased demand for investigating how information and communication technology can support and facilitate SRL skills, and aid students to become not only cognitively but also metacognitively engaged in their own learning (Torgerson & Elbourne, 2002:138; Cavanagh & Romanoski, 2004:4; Njiru & Waugh, 2006:6). The body of research on e-based and e-enhanced learning environments and its effect on SRL is fairly minimal however, but current research indicated a growing appreciation of the need to support students' control in this environment over their learning process to ensure academic achievement (McLoughlin, 2010:28).

It is essential for the development of SRL skills that learning activities and the phases thereof are monitored and feedback demanded, including those in e-based and e-enhanced learning environments (Pintrich, 2004:395; Narciss *et al*., 2006:1130). An analysis of challenges that are posed by SRL in an e-learning environment showed that a variety of instructional interventions are necessary to

promote the necessary SRL skills. According to Narciss *et al*. (2006:1130) instructional interventions can be developed for the various phases of the learning process, taking into account the different cognitive and metacognitive strategies implemented in SRL.

Two broad categories of instructional interventions for improving SRL in e-based teaching and learning were identified by Hadwin *et al.* (2005). The categories are:

(1) tools that deliver instruction, or direct interventions, and (2) tools that guide and tutor SRL, or indirect interventions (Narciss *et al.,* 2006:1130). These interventions can be *embedded* or *non-embedded* in the learning environment (Clarebout & Elen, 2006:395).

- Metacognitive guiding, e.g. regularly prompting monitoring strategies is an example of *embedded* ***direct*** *instructional intervention* (Narciss, 2006:1130).

- An *embedded* ***indirect*** *instructional intervention* can be a well-structured overview of the available documents – in the format of a hierarchically organised table of contents (Narciss *et al*., 2006:1130-1131).

- *Non-embedded instructional* ***direct*** *interventions* are dependent on the students: SRL can be promoted with learning strategies such as highlighting or note-taking.

- Providing informative tutoring feedback in the e-based learning environment is a *non-embedded combination of* ***direct and indirect*** *instructional intervention* (Narciss *et al*., 2006:1131). This will provide the students with strategically useful information that should guide the students in a stepwise manner to complete their tasks or learning successfully, thereby assisting multiple solution attempts. This is achieved by informative tutoring feedback that delivers instruction to solve the task successfully, as well as guiding and tutoring the learning process through the provided information (Narciss *et al*., 2006:1131).

As the popularity of e-enhanced learning continues to grow, not only students but their lecturers too, need to have effective time management skills and self-regulated behaviour to be efficient in teaching on an e-basis (Raines, 2011:1). She proposed strategies for time management by these e-based lecturers, which indicates that self-regulation for teaching should also be paid the necessary attention (Raines, 2011:1-2).

An innovative online measure of SRL developed by Winne *et al.* (2006) shows great promise in providing an answer to the ultimate question of how students can acquire mastery of their own learning processes (Zimmerman, 2008:178). This technologically advanced software programme called **gStudy** will need to be modified to aid in the development of SRL processes in different academic content areas (Zimmerman, 2008:178). In the e-enhanced and e-based learning environments more and diverse support is provided with the gStudy, than by traditional instructional software, to improve learning and teach students to self-regulate their learning (Zimmerman, 2008:169). Some methods the gStudy contains in aiding the teaching of SRL skills are: *note taking, information processing* and *seeking help from others*.

The gStudy enables students to make notes, create glossaries, label and index content, construct concept maps and search for information. Students are enabled to upload texts and other materials for studying on almost any topic. When, for example, a student wants to extract key information or to write a summary of the text(s), the *note-taking function* of the programme can be used. In this case the notes are automatically keyed to the section that they refer to, or are cut and pasted to form a personalised account. This feature of note taking can be opened as a separate window, or it can remain in the background.

When the student requires help, he/she can receive coaching and even chat and collaborate with other students or lecturers online. The programme allows him/her to seek help from social sources, through guided chats with a fellow student or an informed tutor. This feature is especially helpful when the students have to collaborate more effectively, such as e.g. writing a report, or when a group of

students are required to perform an assignment and they are situated in different locations. The gStudy will also allow them to critique each other's work, paste their sections together and share insights.

Not only is the gStudy a tool to support SRL skills in learning online, but it also provides a log analyser that records demonstrations of students' methods of learning. It can thus also be implemented as an online measuring instrument of SRL skills. The frequency and pattern of students' text highlighting, accessing of various supports for learning and obtaining feedback from efforts to learn can be traced by the log analyser (Zimmerman, 2008:169). Researchers may then be able to reconstruct a description of students' methods of study from these demonstrations, which in turn can be linked to the students' methods of study, and link it to academic performance.

Another use of the gStudy is to indicate diagnostically which SRL strategies should be used most effectively for the students who are academic underachievers. The measures of their SRL processes or lack of it can be depicted in terms of frequencies or in graphic form. The students can keep a personal diary regarding judgments that are metacognitive, e.g. not understanding certain material and returning to it later (Zimmerman, 2008:169-170).

For researchers the gStudy programme provides a high level of detail about the study methods, self-beliefs and progress of students. The capacity of the programme to record the measurement of these constructs unobtrusively is extraordinary. However, demonstrations of SRL skills as indicated by the gStudy, should be interpreted in conjunction with other measures of SRL. Zimmerman mentioned that a high frequency of note-taking could imply that the student is not selective in recording information, but that this rather indicates comprehensiveness (2008:170). He advises that more additional measures of SRL, such as interviews, should be analysed in conjunction with the demonstrations obtained in the gStudy, in order to draw more valid conclusions.

The diagnostic value that SRL measuring instruments contain should be implemented to indicate to the students which SRL skills they have to develop in order to achieve academically.

3.8 STRATEGIES TO DEVELOP THE SRL SKILLS OF STUDENTS AT HEI's

Students who do not possess the SRL skills needed for study at a HEI, or who are lacking in some, can be helped to develop the necessary SRL skills. Self-regulation skills can be acquired through exposure and practise and can be strengthened, which in turn will enhance academic achievement (Zimmerman, 1990; Pintrich & De Groot, 1990).

SRL skills are not innate unchangeable personality traits – they can be learned through experience and self-reflection, and they can be taught (Paris *et al.,* 2001:259; Anderton, 2006:157; Nelson, 2010:71). According to Paris *et al.* (2001:259) specific strategies for SRL skills development can be learned through both instruction and invention. A student who does not self-regulate his/her learning can thus develop the strategies necessary for SRL. Hardy *et al.* (2006:308) postulated that when students actively engage in a process of knowledge integration and regulation of their own learning, they should become self-regulating students. According to Ertmer *et al.* (1996) this engagement which was consequently mentioned by Hardy *et al*. should include reflective thinking. (Ertmer *et al.,* 1996:1) presented a model that demonstrated that students' metacognitive knowledge of cognitive, motivational and environmental strategies can be translated into his/her self-regulating control of the learning process - through ongoing reflective thinking.

According to Anderton (2006:157), there are numerous strategies that educators can use to promote effective self-regulation in students. Zimmerman *et al*. (1996) proposed a cyclical model of SRL, which can be elucidated and implemented to improve the use of SRL strategies among students, and at the same time improve their self-efficacy (Zimmerman *et al*., 1996). The model is presented in the following figure.

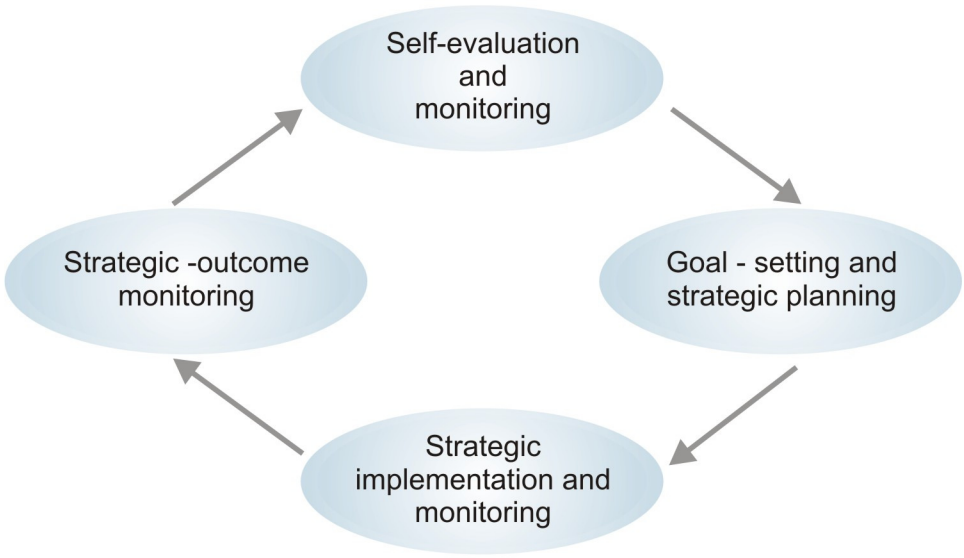

Figure 3.1 A cyclical model of SRL

Zimmerman *et al.* (1996)

The SRL cycle can be implemented to develop essential SRL skills, such as time management and planning; understanding and summarising text material more effectively, improving methods of note taking, better preparation for summative assessment, and more effective writing (Zimmerman *et al.,* 1996).

The aim of this study is to propose strategies for first year students for developing their SRL skills, and a programme for the acquisition of these strategies will be proposed in Chapter 6. The programme will also include strategies for SRL skills with regard to obtaining and re-organising information from electronic sources, as Higher Education learning environments become increasingly e-enhanced (see Par 3.7). These strategies and theoretical approaches to teach students SRL skills, focus on three main concepts that have to be facilitated, as mentioned by Anderton (2006:157-160). They are: planning, monitoring and evaluating the processes and strategies that are crucial for the development of SRL skills.

Students who master and demonstrate these SRL skills should consequently acquire the characteristics of a self-regulated student, as described by Zimmerman (1989:329; 1986:308). They should become metacognitively, motivationally and

behaviourally active participants in their learning process. The proposed strategies for developing SRL skills are as follows:

I. Metacognitive strategies that include planning, monitoring learning actions, and evaluating by the student of his or her progress, by ticking off accomplished goals or objectives.

II. Motivational strategies that include high self-efficacy and self-attribution promoting through obtaining knowledge of 1) the process of knowledge acquisition, 2) the academic infrastructure, and 3) his or her learning style and appropriate strategies, as well as 4) goal-setting and establishing intrinsic interest in the learning task.

III. Behavioural strategies that include the implementation of learning strategies and managing of the learning environment in order to promote the students' learning experiences. According to the SRLIS that was proposed by Zimmerman and Martinez-Pons (1989) (see Par 3.6.1.1), the students' management of the environment includes choosing, adapting and creating a learning environment to promote optimal study.

An elucidation of the instruction for developing/enhancing these three processes is provided in the following paragraphs.

3.8.1 Strategies for the development of metacognitive skills

Livingston (1996), Zimmerman (2002), Daley (2002), Anderton (2006), and Laskey and Hetzel (2010) noted that metacognition is not an innate characteristic, but can be seen as a teachable skill. There are several studies that point to the fact that metacognitive knowledge can be trained, but that it needs to be taught explicitly in order to develop (De Soete *et al.*, 2003:192). Daley (2002) described how she used concept mapping to help adult learners to become more aware of and understand their learning processes. Kuiper (2002) used SRL strategies to help nurses improve their metacognition in order to function more effectively in practice (Imel, 2002:2).

Daley (2002), Kuiper (2002) and Peters (2000) pointed out how the use of constructivist learning, with its basis of self-reflection and knowledge construction, can contribute to the development of skills in metacognition.

When the knowledge of study strategies is regarded as metacognitive knowledge, it requires awareness of how and why we use certain kinds of knowledge (Peirce, 2004; Anderton, 2006). The three kinds of knowledge: *Declarative, Procedural* and *Conditional* knowledge were described in Par. 2.2. Students should be made aware of what the knowledge is they need to gain to attain their learning goals, and how, where and why to implement it.

Livingston (1996) advised that the teaching of metacognition can be very successful. The method of teaching metacognition involves three aspects, namely:

- Providing the student knowledge of their cognitive processes, learning styles and learning strategies – this can be referred to and used as metacognitive knowledge;
- Providing the student with practice in using both cognitive and metacognitive strategies;
- Providing the student with opportunities to evaluate and if necessary, adapt the outcomes of their efforts (which will develop metacognitive regulation).

However, Livingston (1996:12) warned that providing the student with knowledge only without experience, and vice versa, will not develop metacognition. The reason is that: (1) the knowledge of strategies; (2) the skill acquired through experience in using learning strategies; and (3) the self-evaluation of strategies are all necessary for the development of metacognition. Zimmerman and Schunk (1998) are in accordance with Livingston that self-regulation involves a series of component skills.

Two instruments that were initially developed to assess a student's level of metacognitive awareness, can serve as instruments to develop metacognitive

learning skills (Weimer, 2011:2). They are the: *Metacognitive Awareness Inventory* (Schraw & Dennison, 1994:465-470) and the *Metacognitive Activities Inventory* (Cooper & Sandi-Urena, 2009:240-245). By administering one of these instruments self-reflection is prompted by the student who completes it. The completion also provides effective feedback on the student's metacognitive awareness, with the potential of improving subsequent academic performance (Weimer, 2011:2). Although taking note of these instruments, the researcher did not implement them.

3.8.2 Strategies for the development of motivational skills

First year students' reference and knowledge of learning stem from the SEI environment that differs from a university, and they will have to be informed that they must adapt their learning skills to those demanded by a HEI. They will be empowered by a SRL programme, and will be informed that academic support structures are in place when they need academic support. They should be empowered at the onset of their studies with knowledge of the process of learning, their preferred learning styles and the strategies that accompany a specific style, and the learning milieu they prefer and have to structure to promote optimal study.

Regarding the teaching of motivational SRL skills, Woolfolk (1998:393) advised the following:

- students should adopt goals that are not too long-term, or should divide their long-term goals into short-term goals;
- choose goals that are moderately difficult, clear and precise (see Par 3.3.2.3);
- nurture their intrinsic motivation through striving for personal challenges; and
- improve their self-efficacy: motivated students will improve or enhance their self-efficacy when they view their goal attainment as self-satisfactory, and continue to strive to reach their goals.

3.8.3 Strategies for the development of behavioural skills

First year students can be taught to regulate their knowledge through planning, prediction, monitoring, testing, revising and evaluating strategies (Anderton, 2006:158). The strategies include the selection and implementation of efficient learning strategies and environments to optimise their learning processes (Baumert *et al*., 2002:7). In order to choose the most effective learning strategies, the students should be cognisant of their learning styles. The appropriate learning strategies can then be identified and implemented according to their learning styles. Students should be introduced to a variety of learning strategies, if they are not yet confident of the strategy that is most effective for optimising their learning.

Other behavioural strategies that should be included in a SRL programme are:

- seeking help when the students are unsure of their learning material as well as being unsure of the effectiveness of their learning,
- planning and managing their learning environment;
- revising and studying;
- working out previously set exam papers;
- information seeking and re-organisation of learning material of different formats;
- keeping records and results;
- self-consequating/self-rewarding, and
- differentiating between learning material, learning tasks and levels of learning.

Some strategies that are identified in this paragraph as developing behavioural skills, will also strengthen the students' metacognitive and motivational skills. As a result the proposed strategies for developing SRL skills will be cyclical and interconnected.

3.9 CONCLUDING REMARKS

In order to help first year students become more metacognitively aware of their learning capabilities or constraints, lecturers at HEI's need to implement strategies to increase SRL skills (Laskey & Hetzel, 2010; McCombs 2001). Lecturers who provide constructive and timely feedback on papers and tests (Formative assessment) facilitate a metacognitive strategy for students who study in a contact mode of lecturing. Written or oral feedback, that is a truthful appraisal of students' learning achievement, will aid these students in becoming realistic about their actual abilities. Students lacking in SRL skills may wait in anticipation for the feedback that they will receive, because they need the reassurance that they are performing adequately, or that they need to adapt their learning strategies. Feedback will also facilitate metacognition for the students lacking in SRL skills when they actually performed poorly, but believe that they did well. Feedback is important for these students in providing external, positive reinforcement to stimulate their motivation towards academic achievement as well as facilitating metacognition.

Lecturers can integrate metacognitive strategies to develop SRL skills for their students into their learning content (Laskey & Hetzel, 2010:12). The use of various methods are suggested such as: group work, presentations, hands-on activities, solving problems out loud, overtly demonstrating covert thinking skills and following the process of analysis. According to Nietfeld *et al.* (2005) and Laskey and Hetzel (2010) students who actively participate in the learning process activate their ability to think critically. When they think critically and evaluate what they know against the requirements of what they should know, they should enhance their metacognitive learning abilities.

McCombs (2001:192) recommended interventions to strengthen students' deficiencies in self-knowledge and self-regulating skills and processes. An intervention such as providing opportunities for self-reflection should be an essential feature in study guides and reading compendiums. Lecturers can plan more than one opportunity for self-reflection during a contact session and can also incorporate self-reflection in their hard copy and e-enhanced learning material. The electronic

learning platforms that are implemented at universities, such as eFundi at the NWU, should contain a variety of opportunities for self-reflective thinking.

The changes from traditional classrooms to e-enhanced and e-based learning environments - to a more or lesser extent, have brought challenges and adaptations for students' skills of learning, in order to acquire academic success. Not enough research has been done so far to answer questions regarding the SRL skills necessary for studying in an e-enhanced learning environment, but an important prerequisite for promoting SRL in these environments is the awareness of essential changes in learning (Narciss *et al*., 2006:1129).

It is acknowledged that there are many impediments to academic success such as: financial constraints, reading ability, language barriers, emotional factors and poor lecturers. First year students have to acquire the ability to achieve academically in circumstances that they are not familiar with, and that contain inherent obstacles and limitations.

In the next chapter, the research design and methodology that was followed in the empirical part of the research will be discussed.

CHAPTER 4
RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

In the previous chapter the relationship between self-regulated learning and the academic achievement of students at higher education institutions was discussed. In this chapter the research design and methodology will be discussed.

4.2 RESEARCH AIM AND OBJECTIVES

The primary aim of this research was to develop and propose strategies for the development of SRL skills of first-year university students. Related to the primary aim the researcher formulated the following secondary research objectives:

- To analyse the results of the LASSI, which was conducted on a cohort of first year students (n=2421) who registered for their studies at the Potchefstroom Campus of the NWU in 2007;
- To determine whether the SRL skills of the cohort, as assessed by the LASSI, significantly predicted their academic achievement;
- To determine whether biographical variables such as gender, age and Grade 12 results relate to the SRL skills and academic achievement of the cohort;
- To determine by means of interviews based on the SRLIS which self-regulated learning skills influenced the academic achievement of a selected group of students in their fourth year of study, in addition to the SRL skills that were assessed by the LASSI; and

- To integrate both the quantitative and the qualitative results to identify the SRL skills that were related to the academic success of the students.

4.3 RESEARCH DESIGN AND METHODOLOGY

According to Gelo *et al.* (2008:269) scientific research implies more than the use of research methods, because research methods include only the technical aspects regarding the practical implementation of a study. Scientific research is also characterised by theoretical and philosophical assumptions regarding the nature of knowledge (epistemology), reality (ontology) and the principles that inspire scientific research (research methodology), which are connected to each other during the execution of all scientific research (Gelo *et al*., 2008:269).

Leech and Onwuegbuzie (2010:76) stated that philosophical and educational views play a very important role in all decisions made by researchers when designing a research study. From this statement it can be deduced that a research approach is the blueprint according to which research should be done. According to Gelo *et al.* (2008:272) the research design binds the research methodology of a research approach and the research methods together. Gelo *et al*. (2008:272), as well as Johnson and Onwuegbuzie (2004:22) postulated that research designs are used to acquire creditable, dependable and legal answers to research questions/problems.

Until the second half of the previous century quantitative research approaches were regarded as sufficient for research in behavioural sciences (Gelo *et al*., 2008:268). During the latter half of the previous century researchers started to criticize the applicability of quantitative approaches for researching human nature. These researchers suggested a more holistic and naturalistic conception of humans, that became known as qualitative research (Gelo *et al*., 2008:268). The existence of a second research method led to the debate whether a quantitative or qualitative research design should be implemented for research in behavioural sciences (Patton, 1988:130). According to Gelo *et al.* (2008:268) some researchers started taking a pragmatic stand through the reconciliation of the two approaches and

started to follow mixed method research designs. Since 1985 mixed methods research designs have developed substantially (Leech & Onwuegbuzie, 2010:73).

According to Bergman (2008:14), Denzin (1997:318), Maree (2007:261) and Onwuegbuzie *et al.* (2009:14) mixed methods research was developed with the purpose of integrating the different methodologies and research methods of both quantitative and qualitative approaches in order to:

- alleviate the shortcomings of the one method with the other method;
- use one approach to confirm the results obtained by the other; and
- address different research questions..

For the purposes of this study, a mixed method research design was followed and both quantitative and qualitative research methods were used, as discussed in Paragraphs 4.4 and 4.5 below.

4.4 THE QUANTITATIVE PART OF THE RESEARCH

4.4.1 The study population

The study population and participants were selected on the grounds of a *purposeful convenience sample*, because the study population and participants were conveniently and easily available (see Maree, 2007:177), and the study population also constituted the biggest available first year student population, compared to the other two campuses (Mafikeng and Vaal Triangle campuses) of the NWU. The study population consisted of all the first year students (n=2421) who completed the LASSI in 2007 at the Potchefstroom Campus of the NWU.

In order to gain access to the biographical data of the study population, the researcher obtained the permission of the Institutional Registrar of the NWU to consult their student records (Please consult Appendix 3 for the letter of permission).

The following information was obtained from the student records: Age, gender, Grade 12 marks and academic results.

Information regarding the participants' courses of study as well as the faculties wherein they registered was also obtained from the student records.

4.4.2 The variables

The independent variables were *gender, age,* and *Grade 12 results*, as well as the LASSI results of the participants. The dependent variable was the academic performance of the study population in their first year of study, as well as in their consecutive years of study.

4.4.3 Data collection

Data can be collected directly or indirectly (Gelo *et al.*, 2008:275). Direct data is referred to as *primary data* and is collected in quantitative research through the use of tests and/or standardised questionnaires that measure achievement, attitudes, motivation, and self-perception - which require the reduction of an occurrence / phenomenon to numerical values for statistical analysis. Indirect data is also referred to as *secondary data* and is a collection of data from personal or official documents and research archives (Gelo *et al.*, 2008:275).

The data in the quantitative survey was collected by means of a standardised questionnaire - the LASSI, and the researcher gained access to these results in the student records of the cohort (n=2421). Thus, for the purposes of statistical analysis, secondary data were used.

4.4.3.1 The measuring instrument

The LASSI was developed by Weinstein, Palmer and Schutte from the University of Texas in 1987 (Weinstein *et al.*, 1987). It was designed as a diagnostic instrument for the purpose of gathering information about individual learning and study practices, attitude, motivation and anxiety of students. It contains 77 statements and

is divided into 10 subscales (Weinstein, 1987:2). The 10 LASSI subscales were described in Chapter 3 (see Par. 3.6.1.2). These subscales indicate the characteristics of self-regulated students, and according to Zimmerman (2008:166-167) can be implemented to measure SRL skills. In Chapter 3 an exposition was given of the division of the subscales of the LASSI according to Zimmerman and Martinez-Pons's description of a self-regulated student (see Table 3.4). The LASSI was translated into Afrikaans and was available in both English and Afrikaans to the first year students who completed it in 2007.

4.4.3.2 The validity and reliability of the LASSI

The LASSI has high content, construct and interface validity; and high measurement reliability (Weinstein, 1987:3-5). The Cronbach Alpha coefficients for the subfields range from .68 to .86, and test–retest correlation coefficients range from .72 to .85 (Weinstein, 1987:3). Factor analyses were conducted on the LASSI that the first-year students completed in 2007, to determine the construct validity (see Tables 5.6 – 5.15) and Cronbach's Alpha coefficients were calculated to establish the reliability of the different subscales (see Table 5.16). The Alpha coefficients calculated in the LASSI that was completed by the study population range from .61 to .85 - a slight difference from the coefficients reported in the LASSI manual. The number of first year students who were assessed by the LASSI in 2007 (n=2421) is much larger than the number of freshmen (n=880) that was mentioned in the LASSI manual (1987:5). Due to the diversity of the subfields being measured in psychological constructs, values below .70 can be accepted (Kline *in* Field, 2009:668).

The calculated Cronbach's Alpha coefficients, as well as the results of the factor analyses indicate that the LASSI can be considered valid and reliable (see Par. 5.2.2.3 for more information).

4.4.3.3 The administration and scoring of the LASSI

The study population (n=2421) that completed the LASSI in 2007 did so during their first two weeks at the Potchefstroom Campus of the NWU. They completed the

LASSI during their orientation week, and the administration of the questionnaire was conducted by lecturers who were specifically trained for this purpose. The first year students were divided into their respective faculties, and were then subdivided into groups for the administration of the LASSI. The lecturers administered the LASSI in accordance with the instructions contained in the LASSI manual. In cases where students were uncertain about the completion of the questionnaire the necessary assistance was given to them. The students filled in their student numbers on the answer sheets and further biographical details were extracted from their student records. Pencils and erasers were provided to those students who needed it.

The time for completion of the LASSI was 30 minutes as indicated in the manual. The lecturers obeyed this time frame, and after completion of the questionnaire they assisted the students to calculate their scores in the different subfields according to the directions in the LASSI manual. They then assisted the students on drawing their individual profiles. Students discussed their individual profiles with the lecturers. The LASSI answer sheets were sent to Statistical Consultation Services at the Potchefstroom campus of the NWU for further data analysis.

4.4.4 Quantitative data analysis

A statistical analyst from Statistical Consultation Services of the NWU was responsible for the analysis of the LASSI results. In all statistical tests p-values (probability values) smaller than 0.05 were accepted as indicators of statistical significance (Gall *et al*., 2003:767).

The following tests were conducted:

1. Factor analyses were conducted to determine the construct validity of the LASSI. Cronbach's Alpha coefficients were calculated to establish the reliability of the LASSI.

2. Independent t-tests (Gall *et al.* 2003:391).were conducted to determine whether differences exist between the LASSI results of male and female students.

3. Analyses of variance (ANOVA) were done to determine whether differences exist between LASSI results of the 8 faculties. (Gall *et al.*, 2003:392).

4. Correlation coefficients were calculated to determine the relationship between LASSI subscales scores and the academic performance of the students

5. Stepwise regression analyses were done to determine which of the independent variables were the best predictors of academic performance.

Effect sizes were calculated in all instances to determine the practical significance of results. Using Cohen's d-values (Gall *et al.*, 2003:402) for the difference in means, the following guidelines for the interpretation was used:

0.2 = small effect, 0.5 = medium effect and 0.8 = large effect.

The effect size for the interpretation of correlations / regression is the correlation coefficient itself, where:

0.1 = small effect, 0.3 = medium effect and 0.5 = large effect.

4.5 THE QUALITATIVE PART OF THE RESEARCH

The primary research aim of this study was to propose strategies for the development of SRL skills of first year students at universities. In order to gain a more complete picture of the SRL skills required at a university it was decided to conduct interviews with students in their fourth year of study regarding their implementation of SRL skills. The selection was done on the basis of gaining the optimal amount of information on the research question. The participants were selected according to specific criteria (see Par 4.5.1). The interviews were conducted to add more light on the quantitative findings of the study (see Par 4.4).

4.5.1 The criteria for the selection of the participants

The participants were purposefully and not randomly selected, as a purposeful sample is not designed to achieve population validity, but is based on the assumption that the researcher selects participants from whom the most can be learnt regarding the research question (Gall *et al.*, 2003:218). Using a criterion-based sampling strategy added to the elimination of bias. The element of personality impact if volunteers had been interviewed was thus eliminated as a possible cause of bias. It has been proven that if volunteers are asked for interviews, the more self-assured, confident and successful student will volunteer (Reddon & Darrell, 2006:163). The participants were from heterogenous study directions and were not told who the others were or what their study directions were. They could thus render individual, independent interpretations of their learning experiences.

The participants who were interviewed during the qualitative part of the research were selected according to specific criteria. Only students who conformed to the following criteria were selected:

1) **The first criterion**: Students who were in their first year of study in 2007 and who completed the LASSI at the Potchefstroom Campus of the NWU (n=2421).

2) **The second criterion**: Students who filled in the LASSI in 2007 and who were students in their fourth year of study in 2010 (n=1401).

3) **The third criterion**: The selection of students for the interviews was based on the means of their LASSI results, as compared to their academic averages during their four years of study. Students were selected by means of a statistical search on the grounds of a difference of 10% or more between their LASSI mean scores and their academic averages, calculated from their first year in 2007 to their fourth year in 2010. The LASSI mean score was used as point of departure – students who obtained academic averages that differentiated with 10% - 50% from the LASSI mean, were selected as participants. It was expected from

these participants to be able to identify the SRL skills that lead to their good academic performance, or to identify which SRL skills they lacked and as a result performed poorly.

4.5.2 The rationale for selecting students in their fourth year of study.

Theoretical sampling was used when selecting the participants (Charmaz, 2006:100-121). The participants were not selected to represent a population or to increase the statistical generalisability of the results, but selected for conceptual and theoretical development (Charmaz, 2006:101).

Participants were selected in their fourth year of study because they were regarded as being the best sources of information on the use of SRL. This view is based on the premise that self-regulatory capacities change over time because of changing self- assessment capacities, growth in knowledge about learning, and altering needs (Boekaerts & Cascallar, 2006:206). Boekaerts and Corno regard SRL as a developing and dynamic process (2005:208). Students' autonomy of learning should increase from their first year of study to their fourth year, as indicated by *The Level Descriptors for the South African Qualification Framework* (SAQF, 2010*).* (*s*ee Appendix 3 for SAQF level descriptors).

In their fourth year of study students are expected to exercise a high degree of autonomy of learning and be able to demonstrate autonomous learning skills (SAQF, 2010). An excerpt from the National Qualifications Framework (NQF) Level 8 (the fourth year of a qualification) is provided from the document to elucidate this point:

> According to the level descriptor for NQF Level 8, students should be able to demonstrate the following:
>
> "f. *Accessing, processing, and managing information*, in respect of which a learner is able to demonstrate an ability to critically review information gathering, evaluation and management processes in specialised contexts in order to develop creative responses to problems and issues.

i. *Management of learning*, in respect of which a learner is able to demonstrate an ability to apply, in a self-critical manner, learning strategies which effectively address his or her professional and ongoing learning needs and the professional and ongoing learning needs of others.

j. *Accountability*, in respect of which a learner is able to demonstrate an ability to take full responsibility for his or her work, decision-making and use of resources, and full accountability for the decisions and actions of others where appropriate."

According to the descriptions above, students in their fourth year of study should be knowledgeable about their learning skills and learning styles. They should be critical regarding the acquisition of knowledge, and be self-critical regarding their learning strategies. It can be deducted from this level descriptor that students in their fourth year of study should be able to reflect on their learning skills and provide reasons for successful study, or reasons for not studying successfully. It is this assumed self-knowledge that will enable the researcher to extract more information on the SRL skills employed by students in their fourth year of study.

A more detailed profile of each of the participants will be provided in Chapter 5.

4.5.3 Data collection

4.5.3.1 Interviews

A structured, open-ended interview format, based on the SRLIS, was chosen for the qualitative research, because it allowed the participants to express their viewpoints and experiences fully, and eliminated researcher bias (Creswell, 2007; Gall *et al*., 2003; Turner, 2010). The same questions were asked in a predetermined sequence to eliminate the possibility of bias (Gall *et al.,* 2003:310). The interview format was structured in terms of the wording of the questions and the questions were worded in such a manner that the answers were open-ended, as described by Turner (2010:756).

4.5.3.2 Questions asked in the interview

The interview schedule comprised a compilation of ten questions based on the SRLIS (Zimmerman & Martinez-Pons, 1989), with three additional questions formulated by the researcher. All the questions were directed at the SRL experiences of the participants. Two of the additional questions (not included in the SRLIS) were asked at the beginning of the interview and instantly directed the students to self-reflection on their study practices. The last question, which was also an additional question and not included in the SRLIS, was asked with the aim of concluding the interview and obtaining information regarding the learning advice the participants would like to offer to first year students at a university.

4.5.3.3 The process of data collection

The researcher obtained the participants' contact details from their student records and contacted each participant telephonically to inform him or her of the purpose of the research. The participants were then invited to attend an interview with the researcher voluntarily. The researcher set aside two hours for each of these interviews. The participants could indicate which day and time suited them best. They could indicate whether they preferred their interview to be in Afrikaans or in English. All the participants preferred to be interviewed in Afrikaans. The appointments were confirmed per cell phone through a short message service (sms) by the researcher and a reminder was sent to each one of them. The procedure that was followed was the same for each participant.

The interviews were conducted in the researcher's office, which is within walking distance for most of the participants. They were welcomed by the researcher and assured that all information provided in the interviews would be confidential. To establish rapport with the participants, the researcher explained the main aim of the research and requested the voluntary cooperation of each interviewee. They were requested to read and sign the standard consent form that was presented to them (see Appendices 1 and 2). The interviews were conducted in Afrikaans as requested by the interviewees, but afterwards the questions and responses were translated into

English by the researcher for the purposes of this study. The participants' responses to the open-ended questions were recorded on audio tape and the remarks made by the researcher were written down unobtrusively.

As the interviews proceeded, the researcher reacted on statements that could shed more light on the aspect that was being discussed, by asking probing questions (Boyce & Neale, 2006:5). This helped the participants to articulate their meanings and intentions, and some refined their previous answers in the course of the interview (Charmaz, 2006:26). The participants who revealed that they had experienced traumatic situations, or very significant influences during their studies, were gently prompted to tell how that influenced their learning. This data was added as two additional theoretical concepts (see Par. 5.7.4).

The researcher's role was to focus on the dynamic and flowing dimensions of the participants' learning behaviour during their study years (Johnson & Christensen, 2004:32; Blodgett *et al.*, 2005:8) and her data collection was done to understand the learning behaviour and experiences of each of the participants. The interviews were conducted within the framework of the participants' narratives of their personal learning experiences which the researcher had to facilitate through the questions in the interview schedule (Creswell, 2003:175-176; Johnson & Christensen, 2004:34; Blodgett *et al.,* 2005:9).

4.5.4 Qualitative data analysis

The method used for the analysis of the standardised open-ended interviews was by means of interpretative content analysis, as described by Kohlbacher (2006: 24) and Ahuvia (2001: 29). Titscher *et al*. (2000:66) stated that content analysis will always be used if communicative content is of the greatest importance.

The questions derived from the SRLIS, as well as the additional questions formulated by the researcher, provided a conceptual frame for generating the data. The analysis of the data rested strongly on basic interpretative content analysis.

Large quantities of raw data were captured on audio tape, and were transcribed verbatim within a day of each recording to ascertain correct transcription within the shortest possible time lapse (Padgett, 1998:75). The transcriptions were analysed to identify the essential information it contained. The analysis took place through the coding of fragments of the transcribed interviews into meaningful units, which were then categorised and further analysed to establish theoretical concepts/findings (Charmaz, 2006:54; Leech & Onwuegbuzie, 2010:76).

The method of data analysis that was implemented can also be described as the identification and connection between categories/ themes (Gelo *et al.*, 2008:274). The aim was to develop a conceptual analysis of the answers given during the interviews. Coding, according to Charmaz (2006:186), is the process of defining what the data is about. Charmaz (2006:46) states that coding is the pivotal link between the collection of data and developing an emergent theory to explain the data. It helps to define what is happening in the data and to endeavour an understanding of the data.

The first step in the analysis can be described as *open coding.* (These codes are provisional, comparative and grounded in the data. By comparing and analysing the participants' remarks about their learning experiences, the researcher could code the initial findings and separate it. These codes were presented in the first columns in a boxed format (see Tables 5.32 -5.44).

The second step: *Axial coding.*: Strauss and Corbin (1990, 1998:86) proposed the term axial coding and defined it in 1990 as " *A set of procedures whereby data are put back together in new ways after open coding, by making connections between categories*." After the data was open coded, a coding structure was established (Smith-Bontempi, 2003; Charmaz, 2006:57-63). This step implies conceptualising SRL skills on the first level of abstraction. These concepts were compared as more data were added, and were eventually modified and renamed as categories of SRL skills. By doing so, the information gathered during the semi-structured interviews were thus separated into categories of information (Mills *et al.*, 2006:5; Charmaz,

2006:186). The axial coding categories were presented in the second columns of Tables 5.32-5.44.

The third step: *Theoretical analysis* followed after axial coding and the main categories which emerged were interconnected with each other (Punch, 2005:121; Charmaz, 2006:61).

Findings were the result of *axial coding*, specifying possible relationships between the categories the researcher has developed (Charmaz, 2006:63-66). These findings were added underneath Tables 5.32-5.44.

It could be deducted from the findings that self-regulated students do not follow a single, rigid learning pattern. To illustrate this point the learning patterns of some participants that emerged from the data were described (see Par. 5.7.1-5.7.3). Two additional theoretical concepts/findings were developed from the data and were added to the discussion in Par. 5.7.4.

4.6 TRUSTWORTHINESS AND GENERALISABILITY

Lincoln and Guba (1985:300) and Seale (1999) endorsed the term: *dependability* as a concept in qualitative research. Dependability aligns with the term *reliability* in quantitative research. Both Golafshani (2003:601) and Lincoln and Guba (1985:290) stated that in qualitative paradigms the terms *credibility, neutrality, consistency or dependability* and *applicability* should be regarded as the essential criteria for quality in qualitative research.

To lend trustworthiness to the qualitative part of the research three methods were employed to establish which SRL skills the academically successful participants employed during their studies. The methods were the interviews that were recorded and transcribed, taking the academic profiles of the participants, and taking their LASSI results into consideration.

Trustworthiness was also ensured through the implementation of criteria for the selection of the participants, ensuring that participants were selected on an objective

basis by means of a computer process. The participants consisted of students who had good academic records, as well as students who had poor academic records. The criteria also ensured that neutrality existed regarding the gender, age and qualifications of the participants.

Generalisability or external validity could not be effected by the study, as the group who participated in this study was very homogeneous. They were fulltime, on-campus students at the Potchefstroom Campus of the North-West University, and 93,8 % were Afrikaans speaking (see Table 5.5).

4.7 TRIANGULATION

Triangulation facilitates the validation of data through cross verification from more than two sources, and can be implemented as an alternative to traditional criteria like reliability and validity, especially in the social sciences. It can be defined as a combination of methodologies, such as secondary data sources, questionnaires, interviews, and document analysis, implemented in the study of a phenomenon or construct (Altrichter *et al*., 2008:147).

In research, triangulation is the process where multiple approaches are used to investigate the same occurrence/ phenomenon in order to give more validity to research studies and to validate research findings (Anderson & Arsenault, 2000:131; Bergman 2008:22). The principle of triangulation is based on the premise that the implementation of more than two investigation methods should produce similar findings. If the findings are completely different, the research question needs to be reframed, the methods reconsidered, or both (Altrichter *et al*., 2008:149). Leech and Onwuegbuzie (2010:79) and Patton (2002:247) stated that the mixed method research methodology can consist of a strong implementation of triangulation of methods, which should confirm the findings of a study.

The researcher implemented triangulation in this study to investigate, analyse and interpret the obtained results through the following four methods of data gathering and sources of information:

(1) an extensive literature survey;

(2) an analysis of the LASSI results;

(3) an analysis of data obtained from the interviews; and

(4) an analysis of data contained in the student records.

The findings were corroborated by the multiple sources and methods of data collection and it can be stated conclusively that the triangulation in this study added to the trustworthiness, rigor and quality of the research.

4.8 ETHICAL ASPECTS

The Ethics Committee of the NWU approved the study in November 2009. The permission of the Institutional Registrar of the NWU was obtained in 2009 to gain access to students' academic records for the purposes of the quantitative and qualitative research (see Appendix 4 for the consent form).

For the purposes of the qualitative research, the participants were selected on the basis of the differences between their LASSI and academic performances, ensuring an objective, completely unbiased selection of participants. The selection of participants for the interviews was done by means of a computer search (see Par. 4.6.1). The researcher did not ask for volunteers to participate in the study, because volunteering is usually done by participants that tend to be more self confident, have higher intelligence, are more sociable and less conforming than non-volunteers (McMillan, 2004:116; Blodgett *et al.*, 2005:1). The motive for performing a search for participants on a completely objective basis was to include students who performed poorly, as well as academically successful students.

Informed consent was obtained from each of the participants who participated in the qualitative research (see Appendices 1 and 2). This consent is described as being "*at the heart of ethical research*" (Blodgett *et al.*, 2005:8). Before the interviews, the purpose of the research was explained to the participants, and it was clearly stated

that the participants had the right to discontinue their participation at any time (Anderson & Arsenault, 2000). The participants were reassured that no-one would be implicated or identified during the research, and that all information would be dealt with anonymously and confidentially.

4.9 CONCLUDING REMARKS

The research design and methodology used in this study were discussed in this chapter. In the next chapter the findings and results of the empirical investigation and the analysis thereof will be presented and discussed.

CHAPTER 5
RESULTS

5.1 INTRODUCTION

In the previous chapter the research design and methodology were discussed. In this chapter the results emanating from the quantitative and qualitative investigations will be presented and discussed.

The quantitative part of the research involved a study population, and thus the quantitative findings were not interpreted in terms of statistical significance, but in terms of practical significance (effect sizes; d-values). However, for the sake of clarity, the statistical significance of the findings (p-values) was reported throughout the quantitative part of the research.

5.2 QUANTITATIVE RESULTS

5.2.1 Biographical information about the study population

As previously mentioned in Par. 4.2 in Chapter 4, the LASSI was administered to a group of first year students (n= 2421) who registered for their studies at the Potchefstroom Campus of the NWU in 2007.

The LASSI was administered as a diagnostic instrument to provide the first year students with information regarding their use of SRL skills. Although 3061 students registered for their first year of study at the Potchefstroom Campus in 2007 (Management Information, NWU: 2010), only 2421 completed the LASSI. The fact that 640 first year students did not complete the LASSI in 2007, may be due to the

repetition of their first year of study, in which case the repeaters did not complete the LASSI for a second time.

As previously mentioned in Par. 4.4.1, biographical information about the participants was obtained from the student records, after permission was granted by the Institutional Registrar of the NWU for research purposes. In Tables 5.1 to 5.5 information is provided about the participants' Grade 12 results, their age, gender, enrolment per faculty and home language.

5.2.1.1 Grade 12 results

Information regarding the Gr. 12 results of the participants is given in Table 5.1 below.

Table 5.1 Gr. 12 results

N	Mean percentage: Grade 12 (%)	Minimum (%)	Maximum (%)	Std. dev. (%)
2234	69.133	39.22	95.74	9.38

The Grade 12 results were not requested in the LASSI, but were obtained for 2234 of the participants. With regard to the range of Grade 12 results: one of the participants was admitted for studies with an average Grade 12 result of 39.22%, while another participant was admitted with an average of 95.74%.

5.2.1.2 Age of the participants

Information regarding the age of the participants is given in Table 5.2 below:

Table 5.2: Age of the participants

N	Mean age (yrs&mths)	Minimum age (yrs&mths)	Maximum age (yrs&mths)	Std. dev.
2383	18 years, 5 months	17 years, 5 months	29 years, 4 months	7 months

The age of the participants were not requested in the LASSI, but were obtained for 2383 of the participants. Regarding the range of their ages: the youngest of the participants was 17 years and 5 months old, and the eldest was 29 years and 4 months old.

5.2.1.3 Gender of participants

Information regarding the gender of the participants is given in Table 5.3 below:

Table 5.3 Participants' gender

Gender	Number	%
Female	1459	59 %
Male	962	41 %
Total	2421	100 %

5.2.1.4 Enrolment per faculty

The following table displays the participants' enrolment figures per faculty

Table 5.4 Participants' faculty enrolment figures

Faculty	Number	Percentage
Arts	147	5,89 %
Education Sciences	364	14,59 %
Engineering	162	6,49 %
Health Sciences	516	20,68 %
Theology	20	0,80 %
Natural Sciences	201	8,06 %
Economical and Managerial Sciences	821	32,90 %
Law	190	7,62 %
Total	**2421**	**100,00 %**

5.2.1.5 Participants' home language

Information about the participants' home language can be found in Table 5.5 below:

Table 5.5: Participants' home language

Home language	n	%
Afrikaans	2271	93,80
English	74	3,06
Other	76	3,14
Total	**2421**	**100%**

5.2.1.6 Biographical profile of the participants

On the basis of the information contained in Tables 5.1 to 5.5 above, the following biographical profile of the participants emerged:

- The participants achieved relatively well at school if the average of their Grade 12 marks (69.13%) is taken into consideration;
- The participants were relatively young in terms of their mean age (18yrs and 5 mths);
- The majority of the participants were female (59%);
- Most of the participants registered in the Faculty of Economical and Managerial Sciences (32,9%), whereas the smallest number registered for studies in the Faculty of Theology (0,8%); and
- The largest majority of participants were Afrikaans speaking (93,8%).

5.2.2 Validity and reliability of the LASSI

5.2.2.1 The validity of the LASSI

In order to determine the construct validity of the LASSI which was administered to a study population of first year university students at the Potchefstroom Campus of the NWU, confirmatory factor analyses were done. According to Pietersen and Maree (2007:219) a factor analysis is usually done to establish which items belong together and thus measure the same construct.

Principal component factor analyses were done to establish the construct validity of each subscale of the LASSI. Principal components are uncorrelated and orthogonal, and are linear combinations of weighted, observable variables (Truxillo, 2003:17). A Varimax rotation was performed to aid the interpretability of the components. Kaiser's criterion (1960) was used, namely that factors with "eigen values" larger than 1, should be withdrawn (Field, 2009:647). *Eigen values* indicate the degree of

variance explained by each principal component, or each factor (Truxillo, 2003). Correlations smaller than 0.3 are not important in practice (Field, 2009:32; Hair *et al.*, 1998). Therefore factor loadings with correlations less than 0.3 were not reported in Tables 5.6 – 5.15. The factor loadings less than 0.4 in Tables 5.6 and 5.13 were suppressed for clarity of the factor pattern.

5.2.2.1.1 Attitude.

Two factors, that explained 42% of the variance in the subscale: *Attitude* were extracted. The communalities of the items varied between 0.34 and 0.58 which indicated that the extracted factors adequately accounted for the items and that not too much information was lost. Communalities refer to the percentage of each item's variance which is accounted for by the two extracted factors. According to Hair *et al*. (1998) communalities should be larger than 0.3. This means that more than 30% of the variance of each item should be retained.

Table 5.6 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Attitude*.

No.	LASSI items	Factor 1	Factor 2
5	I don't care if I finish my studies as long as I find a husband/wife.	.625	
18	I would rather not be at university.	.623	
69	In my opinion, what is taught in classes is not worth learning.	.574	
45	I only study the subjects I like.	.456	
14	I feel confused and undecided as to what my educational goals should be.	.439	
38	I don't care about getting a general education, I just want to get a good job.		.714
29	I often feel like I have little control over what happens to me at university.		.586
51	I dislike most of the work in my classes.		.570

Table 5.4 indicates that two factors were identified by the factor analysis. The factor loadings less than 0.4 were suppressed for clarity of the factor pattern (see Par. 5.2.2.1). Five questions loaded on Factor 1, and three questions loaded on Factor 2.

Factor 1 relates to uncertainty about educational goals, and Factor 2 relates to negativity regarding attending classes. The interpretation of the results for these questions are briefly explained as following:

(1) Factor 1 (uncertainty about educational goals).

Questions 5, 18, 69, 45 and 14.

(2) Factor 2 (negative feelings about classes).

Questions 38, 29 and 51.

When analysing the responses to these items it should be borne in mind that the students had not attended classes at the time that they completed the LASSI. The LASSI was completed during the participants' Orientation and Awareness period that was conducted during the first two weeks of their first year. They could thus not respond with hands-on experience of classes, subjects, educational goals and studies. They could not evaluate studies at the NWU at the stage they completed the LASSI.

The results from table 5.5 give evidence of acceptable construct validity for the *Attitude* subscale. Although two factors were indicated for the answers to the eight questions, the researcher does not want to distinguish between these factors that evaluated the participants' attitude, and only the scores for *Attitud*e will be reported.

5.2.2.1.2 Motivation.

One factor, that explained 37% of the variance in the subscale: *Motivation,* was identified. The communalities of the items varied between 0.30 and 0.52, which

indicated that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.7 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Motivation*

No.	LASSI items	Factor 1
28	I work hard to get a good grade, even when I don't like a course.	.721
10	I am up-to-date in my class assignments.	.679
13	Even when study materials are dull and uninteresting, I manage to keep working until I finish.	.643
56	I read textbooks assigned for my classes.	.633
49	When work is difficult I either give up or study only the easy parts.	.577
41	I set high standards for myself at university.	.565
16	I come to class unprepared.	.552
33	I talk myself into believing some excuse for not doing a study assignment.	.493

These results of the factor analysis give evidence of acceptable construct validity for the subscale *Motivation*.

5.2.2.1.3 Time Management

One factor, that explained 44% of the variance in the subscale: *Time management,* was identified and construct validity can thus be accepted. The communalities of the items varied between 0.34 and 0.64, indicating that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.8 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Time management*

No.	LASSI items	Factor 1

66	I put off studying more than I should.	.803
36	When it comes to studying, procrastination is a problem for me.	.769
42	I end up “cramming” for almost every test.	.692
74	I tend to spend so much time with friends that my coursework suffers.	.636
58	When I decide to study, I set aside a specific length of time and stick to it.	.618
22	I only study when there is the pressure of a test.	.605
3	I find it hard to stick to a study schedule.	.579
48	I make good use of daytime study hours between classes.	.531

These results give evidence of acceptable construct validity for the subscale *Time management*.

5.2.2.1.4 Anxiety

One factor, that explained 44% of the variance in the subscale: *Anxiety*, was identified and construct validity can thus be accepted. The communalities of the items varied between 0.34 and 0.63, indicating that the extracted factors adequately accounted for the items and that not too much information was lost

Table 5.9 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Anxiety*

No.	LASSI items	Factor 1
57	I feel panicky when I take an important test.	.799
63	I get so nervous and confused when taking an examination that I fail to answer questions to the best of my ability.	.743
54	Worrying about doing poorly interferes with my concentration on tests.	.739
31	Even when I am well prepared for a test, I feel anxious.	.710

25	I am very tense when I study.	.675
9	I get discouraged because of low grades.	.584
1	I worry that I will flunk out of university.	.515
35	When I begin an examination, I feel pretty confident that I will do well.	.494

These results give evidence of acceptable construct validity for the subscale *Anxiety*.

5.2.2.1.5 Concentration

One factor, that explained 50% of the variance in the subscale: *Concentration*, was identified and construct validity can thus be accepted. The communalities of the items varied between 0.40 and 0.64, indicating that the extracted factors adequately accounted for the items and that not too much information was lost

Table 5.10 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Concentration*

No.	LASSI items	Factor 1
68	My mind wanders a lot when I study.	.803
46	I am distracted from my studies very easily.	.781
43	I find it hard to pay attention during lectures.	.776
55	I don't understand some course material because I don't listen carefully.	.722
39	I am unable to concentrate well because of restlessness or moodiness.	.702
61	I concentrate fully when studying.	.686
6	I find that during lectures I think of other things and don't really listen to what is being said.	.633
11	Problems outside of the university – being in love, financial difficulties, conflict with parents etc. – cause me to neglect my studies.	.477

These results give evidence of acceptable construct validity for the subscale *Concentration*.

5.2.2.1.6 Information processing.

One factor, that explained 42% of the variance in the subscale: *Information processing*, was identified. The communalities of the items varied between 0.33 and 0.58, indicating that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.11 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Information processing*

No.	LASSI items	Factor 1
47	I try to relate what I am studying to my own experiences.	.758
40	I try to find relationships between what I am learning and what I already know.	.713
67	I try to see how what I am studying would apply to my everyday living.	.709
76	I try to interrelate themes in what I am studying.	.705
32	When I am studying a topic I try to make everything fit together logically.	.665
15	I learn new words or ideas by visualising a situation in which they occur.	.578
12	I try to think through a topic and decide what I am supposed to learn from it rather than just read it over when studying.	.523
23	I translate what I am studying into my own words.	.472

These results give evidence of acceptable construct validity for the subscale *Information processing*.

5.2.2.1.7 Selecting main ideas.

One factor, that explained 46% of the variance in the subscale: *Selecting main ideas*, was identified. The communalities of the items varied between 0.37 and 0.64, indicating that that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.12 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Selecting main ideas*.

No.	LASSI items	Factor 1
77	I have difficulty identifying the important points in my reading.	.798
60	It is hard for me to decide what is important to underline in a text.	.757
72	Often when studying I seem to get lost in details and "can't see the forest for the trees".	.680
2	I am able to distinguish between more important and less important information during a lecture.	.608
8	I try to identify the main points when I listen to lectures.	.496

These results give evidence of acceptable construct validity for the subscale *Selecting main ideas*.

5.2.2.1.8 Use of study aids.

Two factors, that explain 45% of the variance in the subscale: *Use of study aids,* were identified. The communalities of the items varied between 0.33 and 0.60, indicating that sufficient variance of items was extracted.

Table 5.13 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Use of study aids*

No.	LASSI items	Factor 1	Factor 2

53	I make simple charts, diagrams, or tables to summarise material in my courses.	.776	
50	I make drawings or sketches to help me understand what I am studying.	.750	
7	I use special study helps, such as italics and headings, that are in my text books.	.643	
19	My underlining is helpful when I review text material.	.532	
62	I use the chapter headings as a guide to identify important points in my reading.	.461	
24	I compare class notes with other students to make sure my notes are complete.		.759
44	I key in on the first and/or last sentences of most paragraphs when reading my text.		.576
73	When they are available, I attend group review sessions.		.429

Table 5.13 indicates that two factors were identified by the factor analysis. The factor loadings less than 0.4 were suppressed for clarity of the factor pattern (see Par. 5.2.2.1). Five items loaded on Factor 1 and three loaded on Factor 2.

Factor 1 relates to the creation and use of visual study aids, and Factor 2 relates to using existing study aids. The items are listed below:

(1) Factor 1 (Creation and use of visual study aids)

Items 53, 50, 7, 19 and 62.

(2) Factor 2 (Using existing study material and social resources)

Items 24, 44 and 73.

The results of the factor analysis give evidence of acceptable construct validity for the subscale *Use of study aids*. Although two factors were identified by the factor analysis, the researcher does not want to further distinguish between the factors that

relate to the participants' use of study aids, and only the factor scores for the *Use of study aids* will be reported.

5.2.2.1.9 Self-testing.

One factor that explained 38% of the variance in the subscale: *Self-testing* was identified. The communalities of the items varied between 0.33 and 0.47, indicating that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.14 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Self-testing*

No.	LASSI items	Factor 1
21	I try to identify potential test questions when reviewing my class material.	.682
37	I check to see if I understand what the lecturer is saying during the lecture.	.672
26	I review my notes before the next class.	.633
65	I test myself to be sure I know the material I have been studying.	.620
4	After a class, I review my notes to help me understand the information.	.607
70	I go over homework assignments when reviewing class materials.	.604
17	When preparing for an exam, I create questions that I think might be included.	.576
30	I stop periodically while reading and mentally go over or review what was said.	.423

Acceptable evidence of construct validity is assumed for the subscale *Self-testing*.

5.2.2.1.10 Use of test strategies.

One factor that explained 42% of the variance in the subscale: *Use of test strategies* was identified, and construct validity can be accepted. The communalities of the items varied between 0.39 and 0.44, indicating that the extracted factors adequately accounted for the items and that not too much information was lost.

Table 5.15 Confirmatory principal component factor analysis with Varimax rotation for the subscale *Use of test strategies*.

No.	LASSI items	Factor 1
34	When I study, I have trouble figuring out just what to do with the learning material.	.740
52	I have trouble understanding just what a test question is asking.	.662
20	I do poorly on tests because I find it hard to plan my work within a short period of time.	.661
75	In taking tests, writing themes, etc. I find I have misunderstood what is wanted and lose points because of it.	.655
71	I have difficulty adapting my studying to different types of courses.	.655
27	I am unable to summarise what I have just heard in a lecture or read in a text book.	.564
59	When I take a test, I realise I have studied the wrong material.	.453
64	I memorise grammatical rules, technical terms, formulas etc., without understanding them.	.442

These results give evidence of acceptable construct validity for the subscale *Use of test strategies*.

5.2.2.1.11 Conclusion: Construct validity of the LASSI

The results of the factor analyses reported in Tables 5.6 to 5.15 confirm the construct validity of each of the 13 LASSI subscales.

5.2.2.2 The reliability of the LASSI

Different methods may be implemented to determine the reliability of measuring instruments. In this study Cronbach's Alpha Coefficients were calculated to determine internal consistency reliability (Fraenkel & Wallen, 2008:158; Jacobs & Sorensen, 2010: 246). Internal consistency reliability indicates the level of conformity among the items that measure a specific construct (Fraenkel & Wallen, 2008:154). When the items correlate strongly with one another, their internal consistency is high and the Alpha Coefficient should be near to 1.0. If the items do not correlate strongly the internal consistency is lower and the Alpha Coefficient should be near to 0. The following scale is used to interpret the reliability of Alpha coefficients (George & Mallery, 2003:231):

_>.90 – high/excellent, >.80 – good, _>.70 – acceptable, _>.60 – questionable, _>.50 _ poor, and _<.50 – unacceptable.

In Table 5.16 below the calculated and reported Cronbach Alpha Coefficients from both the LASSI manual (1986:6-10) and this study are provided:

Table 5.16 Cronbach's Alpha Coefficients

LASSI Subscale	Cronbach's Alpha for study population	Cronbach's Alpha in the LASSI manual
Attitude	.61	.72
Motivation	.76	.81
Time management	.81	.86
Anxiety	.82	.81
Concentration	.85	.84
Information Processing	.79	.83
Selecting main ideas	.70	.74
Use of study aids	.68	.68

Self-testing	.75	.75
Test strategies	.75	.83

Indications of reliability: _>.90 – high/excellent measure of reliability,_>80 – good measure of reliability, _>70 – acceptable measure of reliability, _>.60 – questionable measure of reliability.

The calculated reliability coefficients in Table 5.16 indicate that the LASSI can be viewed as reliable. Alpha values **substantially** lower than .70 may indicate an unreliable scale, according to Nunnally and Bernstein (1994). However Kline (1999) *in* Field (2009:668), stated that when dealing with diverse and psychological constructs, values below .70 can be expected. This is due to the diversity of the constructs being measured in psychological constructs. The subscales *Attitude* and *Use of study aids* both have reliability coefficients of above .60, and the other 8 subscales all have reliability coefficients of above .70.

The reliability coefficients for the study population are slightly lower than the reliability coefficients reported in the LASSI manual. The slight differences may be ascribed to the fact that the students in this study population completed the questionnaire during a very heavily laden orientation week. This may be viewed as a less than ideal time to complete the LASSI due to a factor such as fatigue, whereas the LASSI manual stated that 880 incoming freshmen were tested under presumably more ideal conditions (LASSI Manual, 1987:5).

The *Use of study aids* subscale for both the administrations reported the same reliability coefficients namely .68, and the subscale *Self-testing* also reported the same reliability coefficients, namely .75. The largest difference between reliability coefficients was found in the subscale *Attitude* which reported a reliability coefficient of .61 for this study, and .72 in the LASSI manual.

On the whole, the calculated reliability coefficients indicate that the LASSI can be accepted as a reliable instrument.

5.2.2.3 Conclusion: Validity and reliability of the LASSI

It can be concluded that the LASSI can be considered valid and reliable, when the results of the factor analyses and the calculated Cronbach's Alpha coefficients are taken into consideration.

5.2.3 Descriptive statistics for the LASSI subscales

5.2.3.1 The mean, median and standard deviation

In Table 5.17 descriptive statistics (means, medians and standard deviations) are provided for the ten LASSI subscales.

Table 5.17 Means, medians and standard deviations (n=2421)

Subscales of LASSI	Mean (%)	Median (%)	Lower Quartile	Upper Quartile	Std. dev.
Attitude	58.4	60.00	35.00	80.00	27.0
Motivation	53.4	50.00	30.00	80.00	28.1
Time management	58.7	60.00	40.00	80.00	25.5
Anxiety	44.1	45.00	25.00	65.00	26.3
Concentration	63.3	65.00	45.00	90.00	26.8
Information processing	58.5	60.00	40.00	85.00	26.4
Selecting main ideas	55.2	55.00	30.00	75.00	28.1
Use of study aids	65.7	70.00	45.00	90.00	26.5
Self-testing	55.5	55.00	30.00	85.00	28.4
Test strategies	52.5	50.00	30.00	80.00	28.9

On the basis of the results in Table 5.15, it can be assumed that the participants used *Study aids* (Mean= 65.7%) extensively in Grade 12 to gain entrance to the HEI.

The subscale *Concentration* also indicates a higher than average mean (63.3%), while *Time management* (58.7%), *Information processing* (58.5%), S*elf testing* (55.5%), *Selecting main ideas* (55.2%) and *Test strategies* (52.5%) scored at more than the average mean. These scores indicate a positive result - that the participants implemented the study strategies tested by the LASSI at an above average rate.

The subscale *Motivation* (53.4%) indicates that the participants were not wholly motivated for study, although it tested above average. However, the subscale *Attitude* (58.4%) indicates that they viewed their studies positively. The subscale *Anxiety* obtained the lowest mean (44.1%), which is positive in the sense that students thus covertly indicated confidence in their studies.

The subscale *Time management* indicated the lowest standard deviation (26), while *Test strategies* indicated the highest standard deviation (29). Thus, it can be assumed from these results that the 10 subscales showed approximately the same spread in the data.

5.2.3.2 Correlations among the LASSI subscales

The correlations among the LASSI subscales are reported in Table 5.18 below:

Table 5.18 Correlations: LASSI subscales

LASSI Subscales	Att	Mot	Tmt	Anx	Con	Inp	Smi	Sta	Sts	Tst
Attitude (Att)	1.00	.52	.47	.38	.55	.19	.44	.20	.29	.55
Motivation (Mot)	.52	1.00	.61	.20	.57	.33	.41	.40	.54	.47
Time management (Tmt)	.47	.61	1.00	.24	.62	.18	.37	.33	.49	.42
Anxiety (Anx)	.38	.20	.24	1.00	.47	.14	.41	.01	.09	.55
Concentration	.55	.57	.62	.47	1.00	.21	.52	.21	.39	.62

(Con)										
Information processing (Inp)	.19	.33	.18	.14	.21	1.00	.38	.48	.51	.23
Selecting main ideas (Smi)	.44	.41	.37	.41	.52	.38	1.00	30	.40	.64
Use of study aids (Sta)	.20	.40	.33	.01	.21	.48	.30	1.00	.52	.17
Self-testing (Sts)	.29	.54	.49	.09	.39	.51	.39	.52	1.00	.28
Test Strategies (Tst)	.55	.47	.42	.55	.62	.23	.64	.17	.28	1.00

A synopsis of the results in Table 5.18:

The following LASSI subscales correlated practically significant with the other subscales:

- the subscale *Attitude* with 5 other subscales: *Motivation, Time management, Concentration, Selecting main ideas* and *Test strategies;*
- the subscale *Motivation* with 7 other subscales: *Attitude, Time management, Concentration, Selecting main ideas, Use of study aids, Test strategies* and *Self-testing;*
- the subscale *Time management* with 6 other subscales: *Attitude, Motivation, Concentration, Self-testing* and *Test strategies;*
- the subscale *Anxiety* with 3 other subscales: *Concentration, Selecting main ideas* and *Test strategies;*
- the subscale *Concentration* with 6 other subscales: *Attitude, Motivation, Time management*, *Anxiety, Selecting main ideas* and *Test strategies;*

- the subscale *Information processing* with 2 other subscales: *Use of study aids* and *Self-testing;*
- the subscale *Selecting main ideas* with 5 other subscales: *Attitude, Motivation, Anxiety, Concentration* and *Test strategies;*
- the subscale *Use of study aids* with 3 other subscales: *Motivation, Information processing* and *Self-testing;*
- the subscale *Self-testing* with 5 other subscales: *Motivation, Time management, Information processing, Selecting main ideas* and *Use of study aids;* and
- the subscale *Test strategies* with 6 other subscales: *Attitude, Motivation, Time management, Anxiety, Concentration* and *Selecting main ideas.*

On the basis of the findings above, it can be assumed that all of the LASSI subscales correlate practically significant with most of the other subscales.

5.2.4 The relationship between the different biographical variables and participants' LASSI results

In this section, the relationship between the biographical variables *gender, faculty of enrolment, age* and the participants' LASSI results will be examined.

5.2.4.1 Gender

Independent t-Tests were conducted to indicate whether there is a significant difference between male and female participants regarding their LASSI results. These are tests using the t-statistic that establishes whether two means collected from independent samples differ significantly (Field, 2009:734).

This quantitative study involved a *study population* and not a random sample. The finding that all the p-values are < 0.05 (thus statistically significant) may be ascribed to the large size of the study population (n=2421). This finding resulted in the

decision to implement the effect sizes (d) to indicate the practical significance of differences.

Table 5.19 The LASSI results for gender (Male=962, Female=1459)

LASSI SUBSCALE	MALE: Mean	MALE: standard deviation	FEMALE: mean	FEMALE: standard deviation	P - level	EFFECT SIZES d
Attitude	52.9	27.8	62.5	25.6	.0000	.35
Motivation	46.4	28.0	58.5	26.9	.0000	.43
Time management	53.0	25.3	62.9	24.7	.0000	.39
Anxiety	46.8	26.5	42.6	26.0	.0002	.16
Concentration	59.9	27.4	65.9	26.2	.0000	.22
Information processing	57.0	25.5	59.7	26.9	.0142	.10
Selecting main ideas	53.3	27.6	56.7	28.4	.0029	.12
Study aid use	56.7	27.5	72.0	23.9	.0000	.56
Self-testing	50.6	28.0	59.0	28.1	.0000	.30
Test strategies	48.9	29.0	55.0	28.5	.0000	.22

d ≈ 0.2 small effect size; d ≈ 0.5 medium effect size; and d ≈ 0.8 large effect size

A synopsis of the results from Table 5.19

- A medium effect size was recorded for the *Use of study aids,* and can thus be accepted as indicating practical significance for this research. This may be the result of female students recording their highest mean score (72.0) for this subscale - while the mean score obtained by the male students was 56.7.

- The subscales: *Attitude, Motivation, Time management, Concentration, Self-testing* and *Test strategies* indicated small to medium practical significance between genders, while *Anxiety, Information processing* and *Selecting main ideas* indicated small or no practical significance.

- The male students recorded a higher mean than their female counterparts on only one subscale: *Anxiety* (46.8). Their highest mean was for the LASSI subscale of *Concentration* (59.9) and the lowest score for *Motivation* (46.4).

- The female participants recorded a higher mean than their male counterparts on 9 scales, especially in the subscale *Use of study aids*.

It can be assumed from these findings that:

(1) in general, the female participants displayed more SRL skills at the beginning of their first year of study than the male participants;

(2) female students used *Study aids* more significantly than their male counterparts; and

(3) small or insignificant differences existed between the male and female students with regard to *Processing of information, Selection of main ideas* and *Anxiety.*

5.2.4.2 Faculty enrolment

A comparison of the LASSI subscales among the eight faculties was deemed necessary as it could indicate that certain SRL skills are more applicable to one faculty than to another. The comparison is provided in Table 5.20.

Table 5:20 The results of the LASSI questionnaire for the eight faculties on the Potchefstroom Campus

FACULTIES	Arts		Educ. Science		Engi-neering		Health Science		Theology		Natural Science		Econ+ Manag. Sc		Law		
LASSI SUBSCALES	means	std dev.	means	std dev.	means	std dev.	means	std dev.	means	std dev.	means	std dev.	means	std dev.	means	std dev.	P-level
Attitude	59.85	26	56.33	28	63.06	28	59.90	27	61.45	27	58.66	26	57.10	27	61.25	28	.0676
Motivation	54.51	28	52.18	27	58.60	28	55.51	28	47.25	31	52.11	28	52.26	28	54.91	28	.0832
Time management	55.99	26	62.29	23	59.24	26	62.25	25	56.25	28	55.70	26	56.67	26	60.83	26	.0005
Anxiety	47.68	27	39.77	25	50.38	29	43.05	26	55.95	26	47.74	27	43.83	26	43.05	27	.0000
Concen-tration	63.31	27	60.31	27	71.79	24	65.37	26	71.20	22	63.91	27	61.71	28	64.92	26	.0006
Information processing	65.86	25	54.43	26	67.12	25	58.00	27	67.15	24	59.71	26	57.54	27	57.99	26	.0000
Selecting main ideas	57.37	28	51.95	28	59.99	26	56.10	28	60.00	29	54.79	29	54.20	28	59.39	28	.0205

FACULTIES	Arts		Educ. Science		Engi-neering		Health Science		Theology		Natural Science		Econ+ Manag. Sc		Law		
Study aids	68.66	26	69.15	25	60.69	28	68.94	25	60.55	24	61.17	28	64.47	27	65.02	28	.0001
Self-testing	56.73	29	56.53	28	60.67	27	56.18	28	51.30	28	52.01	30	53.56	28	60.40	29	.0068
Test strategies	56.24	29	47.94	29	60.67	29	52.51	28	62.25	27	55.45	29	51.54	29	53.48	29	.0001
Average LASSI results for each faculty	**58.74**		**55.92**		**61.27**		**57.83**		**59.26**		**56.25**		**55.48**		**58.38**		

NB Although the LASSI questionnaire is used for diagnostic purposes, the average for each faculty is calculated here for the purpose of this study

The effect sizes of the differences in the means of the LASSI subscales between faculties are reported in Table 5.21.

Table 5.21 Effect sizes of differences in the means of LASSI subscales

	ATT	MOT	TMT	ANX	CON	INP	SMI	STA	SFT	TST
Arts & Edu	.13	.08	.21	.29	.11	.44	.19	.02	.01	.29
Edu & Eng	.24	.23	.09	.37	.39	.49	.28	.30	.15	.44
Eng & Hlth	.11	.11	.12	.26	.21	.34	.13	.30	.16	.29
Hlth & Theo	.06	.26	.22	.50	.22	.36	.13	.34	.17	.34
Theo & Nat	.10	.16	.02	.31	.27	.30	.18	.02	.02	.23
Nat & Econ	.06	.01	.04	.15	.08	.08	.02	.12	.05	.13
Econ & Law	.15	.09	.16	.04	.12	.02	.18	.02	.24	.07
Arts & Eng	.12	.15	.12	.09	.28	.05	.09	.29	.14	.15
Edu & Hlth	.13	.12	.03	.13	.19	.13	.15	.01	.01	.16
Eng & Theo	.06	.36	.11	.20	.02	.01	.00	.01	.34	.06
Hlth & Nat	.05	.12	.26	.18	.05	.06	.05	.28	.14	.10
Theo & Econ	.16	.16	.02	.46	.34	.37	.20	.15	.08	.37
Nat & Law	.09	.10	.20	.10	.04	.07	.16	.14	.28	.07
Law & Hlth	.00	.04	.24	.17	.08	.30	.04	.01	.02	.13
Edu & Theo	.19	.16	.19	.63	.41	.51	.28	.34	.18	.50
Eng & Nat	.16	.23	.14	.09	.26	.29	.18	.02	.29	.18
Hlth & Econ	.10	.11	.22	.03	.13	.02	.07	.17	.09	.03
Theo & Law	.01	.25	.16	.41	.24	.36	.02	.16	.32	.30
Arts & Theo	.06	.23	.01	.30	.30	.06	.09	.32	.19	.21
Edu & Nat	.08	.00	.23	.30	.13	.20	.10	.29	.15	.26
Eng & Econ	.21	.22	.10	.23	.33	.36	.20	.14	.25	.32

Hlth & Law	.05	.02	.06	.07	.02	.00	.12	.14	.15	.03
Arts & Nat	.05	.09	.01	.00	.02	.24	.09	.27	.16	.03
Edu & Econ	.03	.00	.19	.15	.05	.12	.08	.18	.10	.12
Eng & Law	.06	.13	.06	.19	.23	.35	.02	.15	.01	.24
Arts & Econ	.10	.08	.03	.14	.06	.31	.11	.16	.11	.16
Edu & Law	.18	.10	.03	.19	.17	.13	.26	.15	.14	.19
Arts & Law	.05	.01	.18	.10	.06	.30	.07	.13	.13	.09

The names of the faculties were abbreviated as following: ***Arts*** *for Art and Literature,* ***Edu*** *for Educational Sciences,* ***Eng*** *for Engineering,* ***Hlth*** *for Health Sciences,* ***Theo*** *for Theology,* ***Nat*** *for Natural Sciences and* ***Econ*** *for Economical and Managerial Sciences.*

NB Although the LASSI is used for diagnostic purposes, the differentiation between faculties is indicated in this table for purposes of this study.

Results of the LASSI subscales for each faculty (Table 5.20):

- The Faculty of Engineering obtained the highest scores of all 8 faculties for the LASSI subscales *Attitude, Motivation, Concentration* and *Self-testing.*
- Both Faculties of Engineering and Theology obtained the highest scores in the LASSI subscales *Information processing* and *Selecting main ideas*.
- The Faculty of Theology obtained the highest scores for the LASSI subscales *Anxiety* and *Test strategies,* while the faculty obtained the lowest score for *Motivation*.
- Both Faculties of Education Sciences and Health Sciences obtained the highest scores of all 8 faculties for *Time management*.

- The three faculties: Arts, Education Sciences and Health Sciences obtained the highest score for *Use of study aids*.

- The Faculty of Education Sciences obtained the lowest score of all the faculties for *Anxiety*. *Anxiety* obtained the lowest mean scores of all the subscales in each of the faculties.

- *Concentration* obtained the highest mean scores of all the subscales in each of the faculties, from 60.31for Education Sciences to 71.79 for Engineering.

- The lowest mean score was 39.77 (Education Sciences: *Anxiety*) and the highest mean score was 71.79 (Engineering: *Concentration*).

- Participants from the Faculty of Engineering recorded the highest mean scores for 6 LASSI subscales: *Attitude, Motivation, Concentration, Information processing, Selecting main ideas, Self-testing*, of which they share two of these highest mean scores: *Information processing* and *Selecting main ideas*, with the Faculty of Theology.

- Participants from the Faculty of Education recorded the lowest mean scores for 6 LASSI subscales: *Attitude, Anxiety, Concentration, Information processing, Selecting main ideas* and *Test strategies*.

- Participants from the Faculty of Theology indicated the highest mean scores for *Anxiety* (55.95) and the lowest mean scores for *Motivation* (47.25) of all faculties.

Results from Table 5.21:

Effect sizes larger than .40, indicating practical significance, were reported for:

- Faculties of Arts and Education Sciences: *Information processing (*d=.44*);*

- Faculties of Education Sciences and Engineering: *Information processing* (d=.49*)* and *Test strategies (*d=.44);

- Faculties of Health Sciences and Theology: *Anxiety* (d=.50);

- Faculties of Theology and Economic and Managerial Sciences: *Anxiety* (d=.46);

- Faculties of Education and Theology: *Anxiety* (d=.63), *Information processing* (d=51) and *Test strategies* (d=.50)*;*

- Faculties of Theology and Law: *Anxiety* (d=.41*)*.

A synopsis of the results from table 5.21:

- No differences of practical significance was indicated by the results of the 8 faculties for *Attitude, Motivation, Time management, Concentration, Selecting main ideas, Use of study aids,* and *Self-testing*.

- Differences of practical significance among the 8 faculties were indicated for only three LASSI subscales: *Anxiety, Test strategies* and *Information processing*.

- According to the results of Table 5.21, the Faculty of Theology, more than any other faculty, differed practically significant from the other faculties in the subscale: *Anxiety.*

The following correlations: between age and LASSI subscales, Grade 12 results and LASSI subscales, and NWU marks and LASSI subscales are indicated by correlation coefficients as following: *r ≈ 0.1 indicates a small correlation; r ≈ 0.3 indicates a medium correlation and r ≈ 0.5 indicates a large correlation* (Steyn, 2009:3-4).

5.2.4.3 Age

The following correlation coefficients were found between *age* and the LASSI results.

Table 5.22 Correlation coefficients: age and LASSI subscales

VARIABLE	ATT	MOT	TMT	ANX	CON	INP	SMI	STA	SFT	TST
Age	.06	.01	.05	.02	.04	.05	.02	.05	.05	.06

r ≈ 0.1 indicates a small correlation; r ≈ 0.3 indicates a medium correlation and r ≈ 0.5 indicates a large correlation.

A synopsis of the results from Table 5.22:

The correlation coefficients between *age* and the LASSI subscales are not practically significant for any of the subscales. This may be due to the restricted age range of the students (see Table 5.2).It can be concluded that *age* does not correlate significantly with the LASSI results for this study population.

5.2.4.4 Grade 12 results

The following correlation coefficients were found between the *Grade 12 marks* and the LASSI results.

Table 5.23 Correlation coefficients: Grade 12 results and LASSI subscales

VARIABLE	ATT	MOT	TMT	ANX	CON	INP	SMI	STA	SFT	TST
Gr. 12 Marks	.16	.28	.11	.15	.22	.21	.13	.09	.20	.28

r ≈ 0.1 indicates a small correlation; r ≈ 0.3 indicates a medium correlation and r ≈ 0.5 indicates a large correlation.

A synopsis of the results from table 5.23:

The correlation coefficients between the Grade 12 results and the LASSI results are of medium practical significance for the following subscales: *Motivation* and *Test strategies,* followed by *Concentration, Information processing* and *Self-testing.*

5.2.4.5 Academic performance of students in their third year of study

The following correlation coefficients were found between the participants' *average*

NWU marks (in their third year of study) and the results of the *LASSI subscales.* These NWU marks of the LASSI participants were recorded during the second semester of their third year of study.

Table 5.24 Correlation coefficients: average NWU marks and LASSI subscales

VARIABLE	ATT	MOT	TMT	ANX	CON	INP	SMI	STA	SFT	TST
Avg mark NWU 1^{st} - 3^{rd}	.13	.25	.19	.01	.17	.07	.05	.09	.16	.15

r ≈ 0.1 indicates a small correlation; r ≈ 0.3 indicates a medium correlation and r ≈ 0.5 indicates a large correlation.

A synopsis of the results from table 5.24:

The correlation coefficients between the participants' average NWU marks in their third year of study and their results in the LASSI subscales are of small to medium practical significance for the subscales: *Motivation* and *Time management,* followed by *Concentration, Self-testing* and *Test strategies*.

When comparing the Grade 12 results (Table 5.23), as well as the NWU marks (Table 5.24) with the LASSI subscales, *Motivation* remained a significant subscale, while *Time management* also indicated a correlation with academic achievement at the NWU. *Test strategies, Information processing, Concentration* and *Self-testing* indicated a lesser correlation with NWU marks. These four SRL skills can thus be regarded as important for obtaining entrance to a HEI, but *Time management* plays a more important role than them for academic achievement at a HEI. *Motivatio*n remains the most significant SRL skill for both school and university performance.

5.2.5 The prediction of academic achievement of students at the NWU

Different regression analyses were conducted to identify the best predictors of academic success in the **third year of study**. The average percentage of the participants' marks was calculated for each of the participants as an indicator of academic success (depending on whether they were still in the system in 2007, 2008 and 2009).

An indication of the practical importance in regression is provided as following: $R^2 \approx 0.01$ *indicates small effect;* $R^2 \approx 0.1$ *indicates medium effect, and* $R^2 \approx 0.25$ *indicates large effect* (Steyn, 2009:3-4).

5.2.5.1 Standard regression for LASSI subscales

Standard regression is the analysis that was performed to establish to what extent the subscales of the LASSI can predict academic achievement.

Table 5.25 Standard regression for the LASSI subscales

Subscales of the LASSI	Beta coefficient	Standard error of Beta	p-value
Attitude	.01	.05	.8144
Motivation	.14	.06	.0090
Time management	.03	.06	.6284
Anxiety	.03	.05	.5091
Concentration	.09	.06	.1300
Information processing	.004	.05	.9379
Selecting main ideas	.11	.05	.0390
Use of study aids	.05	.05	.3430
Self-testing	.09	.06	.1505
Test strategies	.08	.06	.1716

The coefficient of determination (R^2) is 6,5%, while the Adjusted R-square (R^2) is 4,9%. This is of small to medium practical importance. According to Table 5.25 *Motivation* and *Selecting main ideas* made statistically significant unique contributions towards academic achievement, as indicated by the Beta coefficients and p-values.

It can thus be assumed that *Motivation* and *Selecting main ideas* were the best indicators of academic achievement in Grade 12. The finding that *Motivation* is the biggest/best predictor of academic achievement agrees with the correlation coefficients in Table 5.24; where it was indicated that *Motivation* correlates significantly with the NWU marks in the third year of study.

Through forwards and backwards stepwise regression the data was explored further to compare the results with the results from the standard regression.

5.2.5.2 Forwards stepwise regression

This regression is used to indicate the best predictors for academic success. Forwards stepwise regression adds the subscales sequentially from the most important to the least important (Field, 2005:226).

Table 5.26 Forwards stepwise regression for the LASSI subscales.

Subscales of the LASSI	Beta coefficients	Standard error of Beta	p-value
Motivation	.15	.05	.0034
Selecting main ideas	.12	.05	.0261
Concentration	.09	.05	.0950
Self-testing	.08	.05	.0845
Test strategies	.06	.06	.2156
Use of study aids	.05	.05	.3161

The coefficient of determination (R^2) is 6,35%, while the Adjusted R-square (R^2) is 5,4%. This is of small to medium practical importance. According to Table 5.26

Motivation made a statistically significant unique contribution towards academic achievement, as indicated by the Beta coefficients and p-values. The Adjusted R^2 is more than the 4,9% for Standard Regression, which indicates that these 6 subscales have a better prediction value than all 10 subscales.

The following table gives an indication of the percentage of unique variance declared by each variable.

Table 5.27 Summary of stepwise regression for LASSI subscales

Subscales of LASSI	Step	Multiple R	R-square changed	p-level / value
Motivation	1	.2171	.0471	.0000
Concentration	2	.2280	.0049	.0789
Selecting main ideas	3	.2367	.0040	.1090
Self-testing	4	.2435	.0033	.1502
Test strategies	5	.2489	.0026	.1966
Use of study aids	6	.2520	.0016	.3161

Table 5.27 indicates that the subscale *Motivation* was entered as the most important predictor, explaining 4.7% of the variance in academic achievement. The subscale *Concentration* was entered as the next important predictor but made a much smaller contribution, namely .5%, which is not of practical importance. The subscales: *Selecting main ideas* with .4%; *Self-testing* with .3%; *Test strategies* with .3% and *Use of study aids* with .2%, contributed minimally to the variance in academic achievement.

The LASSI subscale *Motivation* made a small to medium practical significant contribution towards academic achievement. None of the other subscales made any practically significant contribution towards the predication of academic achievement. The results in Table 5.27 confirm that *Motivation* is the most important LASSI predictor of academic achievement.

5.2.5.3 Backwards stepwise regression

Backwards stepwise regression starts with all the predictors and those who contribute the least to academic achievement are removed in a stepwise manner.

Table 5.28 Backwards stepwise regression

Subscale of LASSI	Beta coefficient	Standard error of Beta	p-value
Motivation	.22	.04	.0000

The coefficient of determination (R^2) is 4,71%, while the Adjusted R-square (R^2) is 4,56%. This is of small to medium practical importance. According to Table 5.28 *Motivation* made a statistically significant unique contribution towards academic achievement, as indicated by the Beta coefficient.

As indicated in Table 5.28, *Motivation* is in practice the only meaningful predictor of academic success when the LASSI subscales are entered in the regression calculations. It can be assumed that *Motivation* is the best LASSI subscale predictor of academic achievement at the NWU.

The finding that *Motivation* is the best predictor of academic achievement in both the forward and backward stepwise regression analyses, agrees with the findings of the correlations coefficients in Tables 5.23 and 5.24; where it was indicated that *Motivation* correlates significantly with both Grade 12 marks and NWU marks.

5.2.5.4 Forwards stepwise regression with biographical variables included

The independent biographical variables: *Grade 12 marks, gender* and *age* together with the LASSI subscales/subscales were included in the stepwise regression to determine if they can better explain the percentage of the variance in academic achievement.

This regression is used to indicate the best predictors for academic success. Forwards stepwise regression adds the subscales from the most important to the least important.

Table 5.29 Forwards stepwise regression for biographical variables together with the LASSI subscales

Variables	Beta	Std. error of Beta	Beta	Std. error of Beta	p-value
Grade 12 marks	.57	.03	.79	.05	.0000
Gender	-.19	.03	-5.00	.88	.0000
Age	.15	.03	2.34	.51	.0000
Tmt	.12	.04	.06	.02	.0014
Inp	-.08	.04	-.04	.01	.0199
Tst	-.06	.04	-.03	.02	.1325

The coefficient of determination (R^2) is 36,74%, while the Adjusted R-square (R^2) is 36,13%. The 36,74% of variance in academic achievement is explained by the variables that indicate practical importance. The 6 independent variables that were entered into the equation are the three biographical variables: *Grade 12 marks, gender,* and *age;* and the three LASSI subscales*: Time management, Information processing* and *Test strategies*.

According to Table 5.29 the biographical variable: *Grade 12 marks* made a statistical significant contribution towards academic achievement and is statistically the most significant variable. It is followed by *gender, age, Time management, Information processing* and *Test strategies.*

5.2.5.5 Summary of stepwise regression for the biographical variables and significant LASSI subscales.

The summary indicates the variables from the most significant to the least significant for academic achievement. This information is depicted in the table below.

Table 5.30 Summary of stepwise regression with independent biographical variables and LASSI subscales

Variables	Step	Multiple R	R-square change	p-value
Grade 12 marks	1	.5420	.2938	.0000
Gender	2	.5751	.0369	.0000
Age	3	.5923	.0200	.0000
Tmt	4	.5981	.0069	.0101
Inp	5	.6040	.0070	.0104
Tst	6	.6060	.0024	.1325

The conclusion drawn from Table 5.30 is that when the three independent biographical variables are entered together with the LASSI subscales, *Time management* is the most significant LASSI subscale (0.7%), followed by *Information processing* (0.7%). *Test strategies* was the least significant (0.2%).

The biographical variables had a larger contribution to academic achievement. *Grade 12 marks* (29.4%) was the largest contributor to and practically significant in explaining the variance in academic achievement. It was followed by *gender* (3.7%) and *age* (2%), both with small to medium effects.

It can be concluded that the three independent biographical variables are the most important predictors of academic achievement at the NWU, when combined with the LASSI subscales/subscales.

5.3 SUMMARY OF THE RESULTS EMANATING FROM THE QUANTITATIVE PART OF THE RESEARCH

- The profile of the participants in the quantitative research represented the typical profile of the students at the Potchefstroom Campus of the NWU in 2007 with regard to biographical variables such as gender, age, home language and faculty enrolment (see Tables 5.1 – 5.5).

- The results of the factor analysis and the calculated Cronbach Alpha coefficients confirmed the validity and reliability of the LASSI. (see Tables 5.6 – 5.16).

- The 10 subscales of the LASSI correlated significantly with each other (see Table 5.18).

- Female students obtained significantly higher scores in the *Use of study aids* than their male counterparts (see Table 5.19). They also demonstrated more SRL skills than male students.

- Scores on the subscales *Motivation* and *Attitude* were the least differentiated in all the faculties. The results further indicated that participants from the Faculty of Engineering achieved higher scores than any other faculty in 6 of the LASSI subscales*: Attitude, Motivation, Concentration, Information processing, Selecting main ideas, and Self-testing,* followed by the Faculty of Theology. The participants from the Faculty of Education Sciences achieved lower scores than any other faculty in 6 of the LASSI subscales: Attitude, Anxiety, Concentration, Information processing, Selecting main ideas, Test strategies (see Table 5.20).

- The age of the participants didn't have an effect on their LASSI results (see Table 5.22).

- Participants' Grade 12 marks correlated with the LASSI subscales: *Motivation, Test strategies, Information processing, Concentration* and *Self-testing* (see Table 5.23).

- When only the LASSI subscales were analysed, *Motivation* was the best predictor of academic achievement in both the forward and backward stepwise regression analyses (see Tables 5.27 and 5.28) and correlated significantly with both Grade 12 marks and NWU marks (see Tables 5.23 and 5.24).

- *Time management* correlated with NWU marks, but not with Grade 12 marks (see Tables 5.23 and 5.24).

- When the LASSI subscales as well as the independent biographical variables are analysed together, Grade 12 marks is statistically the most significant variable, followed by gender, age, *Time management, Information processin*g and *Test strategies* (see Table 5.29). However, *Test strategies* is of very little significance.

- The results of the regression analyses (see Tables 5.26 – 5.31) regarding predictors of academic achievement in Grade 12 and at the NWU are summarised in Table 5. 32 below:

Table 5.31 Summary of predictors for academic achievement of first year students.

LASSI SUBSCALES	Grade 12 marks	NWU marks
Motivation	✓	✓
Time management		✓
Concentration	✓	
Information Processing	✓	
Self-testing	✓	
Test strategies	✓	
Grade 12 marks		✓
Age		✓
Gender		✓
Time management		✓
Information processing		✓

Please note that the percentages of the correlation with academic achievement is not indicated in Table 5.31, as these correlations had already been reported in Tables 5.23 to 5.30. The predictors are presented in order of significance in Table 5.31.

Table 5.31 reveals the following when the LASSI subscales, without the biographical variables, were considered as predictors of academic achievement:

- *Time management* did not correlate with Grade 12 marks, but it correlated with academic achievement at the NWU.
- *Concentration*, *Information processing, Self-testing* and *Test Strategies* were not identified as predictors of NWU marks, but correlated with Grade 12 marks.
- *Motivation* correlated with both Grade 12 and NWU marks.

When the LASSI subscales together with the biographical variables were considered as predictors of NWU marks, Grade 12 marks, age and gender were identified as biographical predictors and to a lesser degree *Time management* and *Information processing* as LASSI predictors for academic achievement at the NWU.

The conclusion is that *Motivation, Time management* and *Information processing* were the only LASSI subscales that correlated with academic success at a university.

5.4 DISCUSSION OF THE QUANTITATIVE RESULTS

5.4.1 The relationship between faculties and LASSI results

5.4.1.2 Faculty of Engineering

It was indicated that students from the Faculty of Engineering attained the highest count of all the faculties for six of the ten LASSI subscales (see Table 5.20). It can be deduced that this is because the admission requirements for Engineering students are the highest of all the faculties. The Admission Percentile Score (APS) for a degree in Engineering in 2007 was 28 (NWU Admission Requirements, 2007).

The APS is calculated by adding the total of four designated subjects and two other subjects, excluding the subject *Life Orientation* (see Appendix 7).

5.4.1.2 Faculty of Education Sciences

The APS requirement for the Faculty of Education was the lowest in 2007, namely 18 (NWU Admission Requirements, 2007). This very low admission requirement can be the reason why the first-year students from the Faculty of Education performed poorly in the LASSI and scored the lowest of all the faculties in six of the ten LASSI subscales (see Table 5.20).

The poor performance is an area of concern and consideration should be given to increase the APS score for admission to the Faculty of Education.

5.4.1.3 Faculty of Theology

Another area of concern is the high count in *Anxiety* and low count in *Motivation* for the first year students in the Faculty of Theology (see Table 5.20). Surely a theologicial student and future spiritual leader and adviser should be more motivated and less anxious? This result is difficult to explain.

5.4.2 The best LASSI predictors for academic success at university

5.4.2.1 Regression analyses when only the LASSI subscales were entered into the equation

Motivation correlated with both Grade 12 marks and NWU marks and was the only LASSI subscale that made a practically significant contribution towards academic achievement. It was also found to be the least differentiated in all the faculties, and the deduction is made that it is crucial for successful studies. *Time management* correlated with high NWU marks, but the other LASSI subscales did not correlate significantly with high NWU marks (see Table 5.24). Only *Motivation* and to a lesser degree *Time management* predicted academic achievement at the NWU. It was deduced that the LASSI as a whole had not accurately predicted academic

achievement at the NWU. It can however be used successfully as a diagnostic instrument when feedback is provided before or after a course on learning (Boekaerts & Corno, 2005:216).

5.4.2.2 Regression analyses when the LASSI subscales as well as the biographical variables were entered into the equation

Motivation was not indicated as a predictor when the LASSI subscales were calculated together with the independent biographical variables (see Table 5.30). The deduction can be made that the learners who obtain the desired high marks for admission to a university are very motivated while learning for their Grade 12 marks. The researcher came to the conclusion that *Motivatio*n is covertly contained in the learning skills that Grade 12 learners have to demonstrate in order to gain admittance to university.

The independent biographical variables: Grade 12 marks indicated the highest correlation with good NWU marks, with age and gender contributing much less, followed by *Time management* and *Information processing* (see Tables 5.29 and 5.30). Literature does not substantiate the finding that Grade 12 marks are the best predictor for university success (see Chapter 1), and the contradicting results at the NWU is an aspect worth further researching.

5.4.2.3 The LASSI subscale *Motivation*

Motivation is an important SRL skill for successful studies both in the Grade 12 year and at university. Students grapple continuously to achieve academically in circumstances that contain limitations and obstacles. First year students have to adapt to a different learning environment than the one in Grade 12. Being motivated to complete their studies successfully should help students to surmount these adversities. Boekaerts *et al*. (2005:212) stated that *Motivation* is one of the SRL components that provides students with the capacity to adjust their actions and goals to perform successfully while taking the changing environment into account.

5.4.2.4 The LASSI subscale *Time Management*

Time management correlates with NWU marks, because students have to demonstrate the ability to manage their time well. Not only does the volume and degree of difficulty of study material and academic tasks increase at university, but other non-academic student activities demand good time management as well. However *Time management* did not correlate with the Grade 12 marks, and the only conclusion that can be drawn is that learners generally have their time planned and managed for them by teachers and parents while at school. Learners receive a high degree of support and advice from teachers and parents (see Par. 1.2).

5.4.2.5 The LASSI subscale *Information processing*

Information processing was indicated as almost as significant as *Time management* when the biographical variables were calculated together with the LASSI subscales. This important skill of comprehension monitoring through various methods e.g. summaries, re-structuring of information and elaboration is a way of saving information from the working (short-term) memory to the long-term memory (see Fig. 2.1). It was deduced that the skill is not as important in Grade 12, because the volume of work was not so large then. Learners were able to memorise their school work to a large extent. At university the volume and degree of difficulty increases, and new information has to be processed in various ways.

It can be concluded from findings in the quantitative research that most SRL skills that correlate with academic success for university study, differ from those that correlate with high Grade 12 marks. However, there are more SRL skills that self-regulated students should possess than the skills identified in the quantitative research. These additional skills were identified by means of interviews that were based on the questions contained in the SRLIS developed by Zimmerman and Martinez-Pons (1989). The findings from the interviews were analysed after transcription of the recorded interviews with the selected participants....

5.5 THE QUALITATIVE RESEARCH

The conducted interviews provided in-depth information regarding the participants' experiences and viewpoints of learning experiences during their four years of study.

The correct, unbiased analyses of the responses to the questions asked during the interviews provided detailed information on the self-regulation of learning. When participants did not answer questions directly, probing questions were asked (Boyce & Neale, 2006:5). Probing questions were also used to gather more information when a participant was reluctant to share information..

5.5.1 The academic profile of the participants

In the second semester of 2010 twelve students were selected according to the specified criteria (see Par. 4.5.1), but only ten turned up for their interviews. The profile of the participants is presented shortly.

- The participants came from the following faculties: two students from Economical and Managerial Sciences; three from Education Sciences; one from Engineering; one from the Law faculty and one from Health Sciences.
- Four male and six female students participated.
- Their mean age was twenty-two years and ten months.

The participants can be divided into two groups according to criterion 3 mentioned in Par. 4.5.1. A group of 7 students performed better academically than they did in the LASSI when their academic mean scores (calculated over the four year period) were compared with their 2007 LASSI mean scores. A second group of 3 students did worse academically than they did in the LASSI when their academic mean scores (calculated over the four year period) were compared with their 2007 LASSI mean scores.

No names are supplied for reasons of privacy, but a short academic profile of each participant is provided.

Participant 1 was a male student in the Faculty of Economic and Business Management. He studied for a B.Comm degree in Entrepreneurship and Law. He had an excellent academic record and the academic mean score for his four years of study was 76%. He changed his course of study after his third year of study and was registered as a third year student in 2010.

Participant 2 was a male student in the Faculty of Economic and Business Management. He studied for a B.Comm degree in Forensic accountancy. He had an excellent academic record and the academic mean score for his four years of study was 75%. He changed his study direction after his first year of study and was registered as a third year student in 2010.

Participant 3 was a female student in the Faculty of Education Sciences. She studied for a B.Ed degree in the Foundation Phase; a four year degree in Education. She had an excellent academic record with an academic mean score of 79% for her four study years. She was registered as fourth year student in 2010.

Participant 4 was a female student in the Faculty of Economic and Managerial Sciences. She studied for a B.Comm degree in Risk Management. She had a good academic record with an academic mean score of 71% for her four years of study. She was registered as fourth year student in 2010.

Participant 5 was a female student in the Faculty of Engineering. She studied for a B.Eng degree in Chemical Engineering. She had a good academic record and an academic mean score of 70% for four years of study. She was registered as a fourth year student in 2010.

Participant 6 was a female student in the Faculty of Education Sciences. She studied for a B.Ed degree in the Foundation Phase. She had a good academic mean score with an average of 74% for her four years of study. She was registered as a fourth year student in 2010.

Participant 7 was a male student in the Faculty of Economic and Managerial Sciences. He studied for a B.Comm degree in Economics and Law. He had a poor

academic mean score of 53% for his four years of study and failed his first year of study and the first semester of his third year. He indicated during his interview that he was not going to write the end of year exam, and that he was going to drop out of university. He was registered as a third year student in 2010.

Participant 8 was a female student in the Faculty of Law. She studied for a LI.B degree. She had an academic mean score of 60% for her four years of study. She failed her third year of study and the first semester of her 2nd third year of study. She was registered as a third year student in 2010.

Participant 9 was a male student in the Faculty of Health Sciences. He studied for a degree in Pharmacy. He had a good academic record and the academic mean score for his four years of study was 71%. He was registered as a fourth year student in 2010.

Participant 10 was a female student in the Faculty of Education Sciences. She studied for a B.Ed degree in the Foundation Phase. She had an excellent academic record and the academic mean score for her four years of study was 78%. She was registered as a fourth year student in 2010.

The data collection process was described in Chapter 4 (see Par. 4.5.2).

5.5.2 Steps in the analysis of the data derived from the interviews

The process of data analysis was described in Par. 4.5.3 as *interpretative content analysis*. In short, the process was as follows:

- The results from the **open coding** of the categories from the interviews were presented in a boxed format in Tables 5.32-5.44.
- The results from the **axial coding** were added to Tables 5.32 – 5.44.
- **Findings** were identified by means of **axial coding,** and added underneath the tables. **The findings were summarised in** Par. 5.6.

- The findings were **discussed** in Par. 5.7. Two additional findings were derived from the answers to the thirteen questions, and added to the others in the discussion.

5.5.3 The questions in the interview schedule

The questions asked by the researcher and the ensuing answers from the participants were tabled in 13 categories. Ten questions were based on questions from the SRLIS, and three questions were added namely 5.5.3.1, 5.5.3.2 and 5.5.3.13. The introductory question (5.5.3.1) was asked to aid the participants in focusing immediately on how they studied. Question 5.5.3.2 was asked to determine whether the participants were aware of, or could indicate how their study methods changed from Grade 12 to their fourth year of study. The concluding question (Question 5.5.3.13) was asked as it was assumed that students in their fourth year of study should be knowledgeable about studying successfully, or unsuccessfully (in the case of participants 7 and 8).

5.5.3.1 Question 1. "Are there specific study methods that you use for studying successfully? Please describe them."

Table 5.32 Study methods used for studying successfully

Participant	Open coding	Axial coding categories
1	Motivation, use of study aids, differentiates between volumes of learning material, makes use of summaries, use of highlighters and brain charts	• *Study aids and techniques.* Only one student didn't use study aids. Highlighters were used by 5 students. Brain charts were used by 2 students for studying. One student used brain charts for planning her study. Seven students made summaries, and six students made notes with explanations and one cut and pasted her work. One student made rhymes and another divided his work into segments.
2	Reading, writes and memorises theorems, reads and re-formulates theory, no brain charts or study aids used	
3	Reads and comprehends, uses summaries, highlights, brain charts, comprehension important by means of	

	self- testing, motivation due to positive feedback	• *Knowing lecturers.* Two of the students could follow learning hints from their lecturers. • *Motivation.* Seven students indicated motivation. • *Surroundings.* Five students indicated preference for a structured quiet surrounding like the library, and two didn't like group work or discussions. • *Comprehension.* Three students indicated they had to comprehend the material before learning. • *Different types of knowledge.* Student 4 indicated she knew what, why and how of theories. • *Knowledge of learning.* Student 9 took a learning course and student 10 knows her learning style. Student 4 prefers the see-hear-say method of learning – a well-known method. • *Differentiation.* Student 10 indicated different learning methods for different subjects.
4	Calculations, summaries, notes, uses the text book, forms a holistic picture, explanations, writing, no group work or discussions, prefers the library for structure, indicates motivation. Knows what, how and why of theories.	
5	Loves studying, memorisation, time management, work through problems, makes notes, summarises to memorise, reads, knowing the lecturers, revises for comprehension.	
6	Prefers solitude, repetition, rhymes, summaries, highlights, cuts out and pastes, different methods of studying.	
7	Reading, rehearsing, highlights.	
8	Learn and write, surroundings, memorisation but no comprehension, motivation.	
9	Memorisation, break after 45-60 min., segmenting, learns all the work and took a learning course.	
10	Maths: repetition, exercises sums for comprehension and remembering, English: summaries, highlighters, red for headings, knows learning style, brain charts for planning studies, motivation	

Findings:

1) Students made *use of study aids and techniques*. The students named the use of highlighters predominantly as a study aid. A study technique named by three students was brain charts. Brain charts were used for learning the study material as well as for planning a student's study.

2) Students *organised and transformed and re-formulated* the theoretical study material through summaries, segments, rhymes, cut-and-paste and notes with explanations were implemented.

3) Students indicated *learning preferences*: whether they preferred solitude and structure, or group discussions while studying. Half of the students preferred quiet structured surroundings such as the library, and two did not like group discussions.

4) Students could *differentiate*. Students indicated the use of different learning strategies for different subject matter or purposes. Most students indicated that they differentiate between the types of learning material because of the different volumes for each subject, and adapted their learning methods accordingly.

5) Students were *motivated* for their studies. Seven students overtly indicated motivation for their studies or that they loved it. They gave a variety of reasons, such as their lecturers in their fourth year, when they do well, because of positive feedback and because their second study programme was more challenging than the first one for which they initially enrolled.

6) *Learning cues* were followed. Students followed learning cues from their lecturers.

7) Students had *knowledge of their learning*. Three students either indicated cognition of their learning style or of a preferred known method. Student four indicated metacognition – by indicating Declarative, Procedural and

Conditional knowledge ("One has to know the underlying theories and how and why to apply it").

5.5.3.2 Question 2. "Have your study methods changed from your first year of study to your fourth year? Can you describe how they changed?"

Table 5.33 Change of study methods from the first year of study

Participant	Open coding	Axial coding categories
1	Yes, highlighters and brain charts due to more work, summarising, self-testing.	• *More use of study aids and techniques*. Eight students made more use of study aids and techniques, mainly because the work increased in volume. They used highlighters, brain charts, coloured pens, summarising, self-testing, additional information noted through a pointer or selecting main ideas. • *Coping with large volumes of work* They used different study methods to cope with large volumes of work. • *Change of social preference*. More time was spent on individual study, with more summaries for difficult work, slides studied and text books consulted on their own. • *Adapting goals*. No more aims for distinctions
2	No, but comprehension is important.	
3	Yes, more comprehensive work, summarising, highlighters, coloured pens.	
4	No, still using the same study method.	
5	Yes, because of amount of work, information noted, main facts noted, importance indicated.	
6	Yes, uses more study time due to volume, individual study, less group work.	
7	Yes, more study time necessary due to volume	
8	No, memorisation but without comprehension	
9	Yes, summaries, highlighters, overview formed, studies to pass.	
10.	Yes, time management for volume of work, prepare and plan ahead, groups the material for exam, preparation, summaries before studying, motivation, makes time to summarise in order to study more.	

		were set in some cases – due to the reality of studying at a university. • *Time management*. Time management improved by making time for summaries before learning - to have more time for studying; six started to prepare and plan their studying ahead.

Findings

1) Participants *used different study methods* to cope with the larger volume of work at university. Seven of the participants indicated that their study methods had changed, but three indicated they had not. Two of the three already knew their preferred learning style when they enrolled at university and did not need to adapt. However, the remaining participant who did not change her study methods, realised only in her fourth year of study that it was too late to change. One participant indicated that he only had to study for a longer time.

2) They set *more realistic goals* for themselves and did not aim any longer for distinctions when they studied for a "difficult" degree that demanded more hard work than some other degrees.

3) Participants *managed their study time more effectively*. Three participants indicated why and how their study methods changed. Their marks improved mainly because of better time management and the adaption of different learning strategies.

4) They *gained self-knowledge of their study methods*. Some participants gave indications of self-knowledge gained in the four years of study about their study methods and themselves as learners.

5) *More use of study aids and techniques*. The participants made more use of study aids and techniques because of the increase in the volume of learning material.

5.5.3.3 Question 3. "Do you self-evaluate yourself or your study methods while you are studying - and how do you self-evaluate?"

Table 5.34 Self-evaluation while studying.

Participant	Open coding	Axial coding categories
1	Yes, self-questioning, self-evaluation, repetition.	• *Self-evaluation is performed*. All the students except one (no 8) evaluated themselves. • *Different types of self-evaluation were used*. Four students did self-questioning and/or self-evaluation, one used self-reflection; one implemented practising for a practical subject. • *Different evaluation practices were used* They were used for different subjects, such as answering exam questions in old exam papers. Anticipation of exam questions was also used.
2	Usually, differentiates.	
3	Yes, through self-questioning	
4	Yes, self-testing.	
5	Yes, reflection.	
6	Yes, through evaluating and repetition, but no self-testing.	
7	Yes, through questioning.	
8	No.	
9	Yes, through practicing. The reason why: the difficult study direction.	
10 10	Yes, self-questioning, rhymes and highlights for volumes of study material, but exam questions for comprehension, can anticipate questions, pays attention in class.	

Findings

1) *Most of the students made use of self-evaluation* while studying.

2) *Different types of self-evaluation were performed*, e.g. by self-questioning, compiling tests that they answer themselves, reflecting, practice, answering old exam papers and working out anticipated questions .

5.5.3.4 Question 4. "Do you re-organise your study material when you are studying? How do you re-organise?"

Table 5.35 Re-organisation of the study material

Participant	Open coding	Axial coding categories
1	Yes, comprehension, then summaries	• *Sequences differ*. Two participants first tried to understand the work and then make summaries/re-organise, while another first re-organised the work (re-arranged and transformed). • *Different methods were used for re-arrangement of work*. Pointers, rhymes and highlights, summaries, re-formulation, synonyms. • *Differentiation was made*. Participants differentiated in their re-organisation and some demonstrated it only for large volumes, CD's, different types of assessment, or for degrees of difficulty in their learning requirements.
2	Yes, re-formulation, comprehension, writing and memorising, re-organising	
3	Yes, only for summaries or re-formulation	
4	Organise, re- arrange and transform, walking, differentiation	
5	Yes, pointers and notes	
6	Yes, rhymes and study aid	
7	Yes, for summaries of large volumes	
8	Yes, re- phrasing and synonyms	
9	Inconclusive, but adjusting learning to study material	
10	Yes, only for summaries of certain material (CD's)	

Findings

1) Most participants *re-arranged and transformed their study material*.

2) Re-organisation was done by *different methods*. Most participants re-formulated in different ways such as: making summaries, using pointers, notes, rhymes, study aids, synonyms and re-phrasing. Participants differentiated in re-organising their study material. Some implemented different kinds of re-organisation for the different types of study material or different volumes of work.

5.5.3.5 "Do you set goals and plan your study activities? Which goals are set and how are your study activities planned to reach them?"

Table 5.36 Goal-setting and planning of study activities

Participant	Open coding	Axial coding categories
1	Yes, a percentage or distinction, motivation is money	• *All the participants set goals*. The goals varied: some were intrinsic and others were extrinsic. • *Some goals were high and definite and others were low and indefinite*. Time management and planning for high goals went hand in hand. • *Some goals were adjusted* Adjustment was done in accordance with the demands and level of difficulty of the learning material. • *Duration*. Some goals were long-term, whereas others were short-term.
2	Yes, goals are set	
3	Yes, distinctions	
4	Yes, for distinctions - works harder	
5	Yes, goals set, planning and time management for goals, divide chapters into comprehensive for more time, easiest work learnt last and skimread, high marks is a goal, studies longer for a distinction	
6	Yes, goals set, when met student is motivated to study further	
7	Yes, to pass, adjusts input to goals	
8	Indefinite – time managing for assignments.	
9	Yes, long-term goals: degree, gives best.	
10	Yes, high goal: distinction in English	

Findings

1) *The duration and types of goal*s the participants set varied. Some goals were long-term and specific, like getting a degree or distinction. Some goals were short-term and specific, like getting high marks for a test or exam.

2) *There were different expectancies*. Some participants had higher expectancies than others: while some studied for a distinction, others just wanted to pass a subject.

3) *Intrinsic and extrinsic rewards played a role in the goal setting*. Some participants studied for monetary rewards, others for the satisfaction of reaching their goals.

4) Participants adjusted their goals. Some participants adapted their goals to meet the demands or the level of difficulty of the learning material.

5.5.3.6 Question 6 "When you are not sure of the study material, do you look for more information regarding it? Where do you look for information?"

Table 5.37 Information-seeking

Participant	Open coding	Axial coding categories
1	Yes, library, Internet	• *Information-seeking* All the participants looked for information when they were not sure of the study material • *Non-human sources* Some participants preferred the
2	Yes, Internet, library and friends	
3	Yes, library and Internet	
4	Yes, library, Internet or books.	
5	Yes, friends, study guides or books.	

6	Yes, friends, book, lecturers, only lastly the Internet.	Internet and library as sources of information • *Human and non-human sources* Some consulted friends in addition to the library and Internet • *Only human sources* One participant did not consult the internet or library and preferred social interaction • *All known sources and a programme on the Internet* One participant indicated more than ordinary interest in searching information by consulting a programme on the Internet as well as her group of class friends, the lecturers, text books, library and Internet sites.
7	Yes, the Internet, library and friends	
8	Yes, the Internet, study guides and text books	
9	Yes, lecturers, friends in interaction is necessary.	
10	Yes, text books, the library, a programme was consulted, Internet sites, group work and lecturers	

Findings

1) *All the participants looked for more information* when they were not sure of the study material or if it was inadequate.

2) Clear preferences were given. Some participants indicated clear preferences for consulting either the Internet and by means of the library *(non-human), or human sources* of information.

3) Some participants consulted *both human and non-human sources*. This indicates that they were comfortable either having interaction with persons or depending on the material, consulting the Internet and by means of the library.

4) The sources indicated their *social orientation*. Social participants usually preferred human sources and less social participants preferred sources contained in the Internet or by means of the library.

5) *Consulting more than the ordinary sources indicated motivation*. One participant followed a programme on searching information and searches on the campus Internet site, **in addition to** consulting the other sources.

5.5.3.7 "Do you keep records and results of your academic performances, and why?"

Table 5.38 Keeping of records.

Participant	Open coding	Axial coding categories
1	Yes, for distinctions, and comparing to establish input for future marks	• *Keeping records* All but one of the participants kept records of their academic performances • *The reasons for keeping varied* They mostly keep records so as to establish what marks they should obtain in the exams for obtaining distinctions, or to pass in the exam (benchmarking). Records were kept for goal-setting • *Differentiation* One participant differentiated between attaining marks for short-term and long-term goals.
2	No	
3	Yes, filed records, additional material filed	
4	Yes, records for short-term and long-term goals, extra input for difficultness	
5	Yes, monitoring - for motivation	
6	Yes, to monitor marks	
7	Yes, for purposes of passing. Compares marks for exam admission: learns hard , but poor motivation, prefers individual study	
8	Yes, comparing records for passing purposes.	
9	Yes, comparing records for passing purposes.	
10	Yes, keeps and compares records for	

	obtaining distinctions.	

Findings

1) *The participants' reasons for keeping records were for comparison*. Keeping records of participation marks were mostly to establish what their exam marks should be.

2) *Records were kept for goal setting*. Some kept it as a reference for distinctions, others for passing.

3) *Participants used the records as a benchmark*. If they needed a higher mark than the participation mark for the exam, they adapted their learning and studied harder.

5.5.3.8 Question 8 "Do you re-structure your learning environment to improve your learning? How do you re-structure?"

Table 5.39 Re – structuring of learning environment

Participant	Open coding	Axial coding categories
1	Yes, monotonous sounds, music, neat and structured	• *All the participants re-structured their environment*. The participants all organised their surroundings for learning and some organise their study material to be neat and filed. • *Differences in structure*. Some participants preferred a very structured learning surrounding; others not. • *Sound/ music played*. Some participants preferred music, some monotonous sound, one preferred Baroque music, and others preferred silence. • *Lighting*. One participant was adamant on the correct lighting • *Sustenance*. One participant preferred comfort, with sustenance. • *Differentiation*. One participant indicated that she differentiated between playing music or preferring silence - in accordance with her different study techniques.
2	Yes, organised, needs sounds and other students	
3	Yes, neat and orderly, filed material, correct lighting.	
4	Yes, structured environment, organised study material	
5	Yes, high degree of structuring, tests, notes, study material all arranged, monotonous sound and music	
6	Yes, neat, structured Surroundings, either music/silence, study book and study materials	
7	Yes, quiet surroundings, comfort with eats and drinks.	
8	Yes, organised, notes printed and filed, when finished it is then filed.	
9	Yes, neat surroundings, a structured environment, neat and organised material, specific music	
10	Yes, group study, organised surroundings, music for Math calculations but silence for memorisation, unstructured surroundings	

Findings

1) *Preferring structured or unstructured surrounds when learning*. Depending on their learning style the participants preferred either a structured, or an unstructured learning environment.

2) *Individual participants indicated specific preferences*. A participant indicated his preference for comfort and sustenance while studying, another participant specified the lighting, while another one a specific type of music to learn by.

3) *Music, sound or silence is important for studying*. Some participants preferred silence but others preferred sound/music/monotonous sounds.

4) *Self-knowledge was indicated by some participants*. They profess to be social learners or have an auditive learning style.

5.5.3.9 Question 9. "Do you or anyone else reward yourself for good academic performance? How are you rewarded?"

Table 5.40 Rewards for good academic performance

Participant	Open coding	Axial coding categories
1	Yes, for distinctions: money and gadgets.	• Disagreement. Some participants disagreed, but acknowledged that they did experience covert, internal rewards • *External rewards.* Some participants have external rewards such as: money, gadgets, chocolates, a break, coffee, celebrations. • *Internal rewards.*
2	No - success is the reward.	
3	No – but social time with friends.	
4	Yes, chocolate, a break, watching TV. The finished study gives satisfaction.	
5	No - internal - SASOL bursary.	
6	Yes, recreation, coffee, reaching goals.	
7	Yes, celebrating, friends.	
8	Yes, not learning the day before	

9	Yes, satisfaction with progress, same qualification as family.	Some have internal rewards such as: being successful, socialising, passing, time for studying hard enough, satisfaction; the assurance of good time management.
10	Yes - for herself, eats out, socialises, keeping to plan: motivation, tick-off list.	

Findings

1) *Some participants interpreted the question differently*. They interpreted this question as a reference to physical/tangible rewards. When prompted, they mentioned internal rewards, such as satisfaction etc.

3) *Some rewards were external*. These rewards were mostly physical, such as chocolates, coffee or money.

4) *Some rewards were internal*. One participant indicated the SRL skills of excellent time management and control of her studies, which lead to internal reward. Some participants enjoyed internal rewards such as being successful, or satisfaction with their results.

5.5.3.10 Question 10. "Do you rehearse or memorise the study material?"

Table 5.41 Rehearsal or memorisation of study material

Participant	Open coding	Axial coding categories
1	Required by Law subjects.	• *Memorising mostly for certain subjects* Participants indicated that they memorised and/or rehearsed for some of their studies. • *Some subjects require memorising/rehearsing* Law, English literature, Biochemistry, mathematical theorems. • *Comprehension before memorising* One participant indicated that he only memorised when he understood • *Differentiation* Three participants only memorised for specific subjects, such as theorems and formulas.
2	For mathematical theorems, but for a long question: rehearse.	
3	Sometimes.	
4	Reading until comprehension – then memorising.	
5	Only for one subject: Biochemistry, problem-solving for the others.	
6	Agree	
7	Formulas only, other subjects require reading	
8	Agree, uses three senses learning	
9	Repeating learning until comprehension	
10	Frequently, but brain charts for planning of study	

Findings

1) *Only some subjects require memorising*. There are certain subjects that require memorising, and others require rehearsing.

2) *The participants differentiated between their subjects* and could distinguish which aspect of a subject needs memorising or rehearsing, even within the subjects.

3) *Indicating the stages of learning*. A participant indicated he had to comprehend the work before memorising or rehearsing.

4) Indications of metacognition were given. Some knew why they had to memorise and could elaborate on the process (Declarative, Procedural and Conditional knowledge).

5.5.3.11 Question 11. "Do you seek assistance from others when you encounter difficulties during studying and from whom?"

Table 5.42 Assistance-seeking when encountering difficulties

Participant	Open coding	Axial coding categories
1	Yes, friends, lecturers.	• *Nearly all participants asked assistance from others.* Some participants preferred asking their class friends before they asked the lecturers; the other participants preferred asking both friends and lecturers. • *Numbers in class determined approachability.* One participant indicated that the student numbers influenced her decision of whom to ask. • *Seniority brings self-confidence in asking* Senior students felt more at ease to consult their lecturers.
2	Yes, study group, friends, not lecturers. Father started a study group in Gr 12.	
3	Yes, class friends, lecturers.	
4	Yes, class friends in her undergraduate years, Lecturers postgraduate: involved.	
5	Yes, friends, lecturers.	
6	First autonomous, then friends.	
7	Yes students, class friends, not lecturers.	
8	No, Internet	
9	Yes, lecturers, class friends	
10	Yes, class friends, lecturers: sympathetic.	

Findings

1) *Participants preferred asking their friends*. Most participants approached class friends before approaching their lecturers.

2) *Social skills may determine who are approached*. Depending on their social skills or good relationships with other persons, the participants would seek assistance from either friends, lecturers, study groups or the Internet.

3) *Participants felt more at ease to consult lecturers*. They felt the lecturers were more approachable when they were in their senior years of study, than when they were in their junior years of study.

5.5.3.12 Question 12. "Do you work out previous tests and exam papers on the subject you are studying for, or try to find answers before you write an exam paper or a test? Why and how do you do so?"

Table 5.43 Working out tests and exam papers

Participant	Open coding	Axial coding categories
1	Yes, to see how questions are asked: long or short, repetition.	• *Determine the format of questions* Some participants could infer the way in which papers and tests are asked. • *Repetition of questions.* Most participants mentioned the repetition of questions asked by the lecturer/ examiner. • *Sequence of learning.* Some preferred to work out summative assessment papers and
2	Yes, repetition, why and when.	
3	Yes, but after learning	
4	Yes, for revision, see how asked.	
5	Yes, first comprehension - then for reviewing.	
6	Yes, first comprehension, then for reviewing knowledge.	
7	Yes, repetition, but no pattern.	
8	Yes, for revision and self-evaluation.	

9	Yes, after learning, self-testing vs exam paper.	memos only after they completed learning for a subject, while some work it out as a method of learning;
10	Yes, works through exam questions, determines types of questions, infers questions from lecturers, repetition.	

Findings

1) Some *participants indicated metacognition of assessment*. They could infer how, why and when questions are asked.

2) Assessment was used a learning method. Some participants worked out tests and exam papers as a method of learning.

3) *The order of working out and learning differed*. Some participants first tried to understand their work, before working out exam papers.

4) *Lecturers/examiners repeat questions in exam papers*. Participants commented on the repetitive manner that exam questions are set.

5.5.3.13 Question 13. "What is the advice for studying successfully you would give first-year students at a university, and which study hints would you suggest for them?"

Table 5.44 Suggested advice and study hints for first-year students at university

Participant	Open coding	Axial coding categories
1	Adapt to university, summarise- more work than at school, find own study strategy, change study methods for large	• *Adapt.* Realise that the work, support and

	volume.	expectancies differ at a university.
2	Know your study strategy, know which study direction you are interested in and what it entails, know why and when to use theory, sleep enough, music, balance, sport.	• *Know your study style and strategy*. Know yourself as learner and your own successful study habits. • *Define your interest and follow that study direction (career guidance).* Follow the advice in Grade 12 on a study direction obtained from psychometric or other tests, and advice from knowledgeable persons.
3	Manage time, know subjects and time for spending, comprehension helps studying, highlighters, coloured pens. music, adapt study methods: volume and increasing degree of difficulty, work on own.	• *Time management and planning.* This is very important for successful studies. • *Adapt study strategies from Grade 12 studying.* The volume and degree of difficulty of study material increase at university.
4	School principal gave interviews and advice on study direction, self-regulated, self-disciplined. Sleep enough, study on time, revise, long-term memory, organisation, goals reached. Adapt to volume and degree of difficulty, break large volume into chunks, learn what to study and what to leave.	• *Know your subjects.* Differentiate between subjects which are more difficult, or require more input than others, and adapt your time planning. • *Differentiate between the subject matter.* Some study strategies are more successful for specific types of study material or subjects.
5	Manage time, adapt to university, volume increase - learn more. Adapt to less routine and caring, sleep enough, take part in sport.	• *Attend classes and get to know your lecturers.* Keep up to date with your work and tests. Lecturers may stress the
6	Study alone: comprehension, then reflect with friends, time planning and management, read more. A difficult subject: requires attention and more study time, know own study method and use with confidence. Set up study plan, plan studies with dates in mind - less time for easy subjects.	

	Manage social life, prioritise, self-confidence, seek help. Motivation: Father's role to reflect on study methods, highlight.	concepts that are important and will be asked in the exam • *Know which type of questions are asked.* Different study techniques work for different types of questions • *Be self-disciplined and responsible.* Less support is provided and more autonomous learning is expected at university. • *Set your own study schedule.* Plan your studies and keep to your schedule with a diary and tick-off list. • *Prioritise.* Get enough rest and sleep, lead a balanced student life and don't stress too much. • *Be pro-active.* Plan and manage your goals and studies.
7	Notes, summarise, study hard. Only one subject loved. Lecturers not to the point, should study on own – quicker.	
8	Memorisation with comprehension is important.	
9	Balance, learn and be social, sleep enough, time management, not only old notes consulted.	
10	Plan ahead, keep to your study schedule. Time planning: use diary, lists and tick offs. Know your study style, know lecturers, infer exam questions, attend classes, file results. Plan studies and breaks, sleep enough. Start studying early - little stress is good, but no Red Bull (a high caffeine drink).	

Findings

The following clusters of advice were given for first year students and are written as concepts:

1) *Students who receive or look for guidance on learning will be more successful*. The successful participants received guidance on studying

and study directions from a parent, principals at school or lecturers, or took a course on studying.

2) *Students who reflect on their learning styles or habits will be more successful*. If they do not know what their own learning style and study strategies are, they should find out and use it with confidence.

3) First year students should realise that the university milieu is different.

- They have to *adapt their input and tempo* to that demanded by a university.
- *Time management and planning* is very important for first year students as they have to adapt to an increase of volume and degree of difficulty of study material.
- They should *set attainable and specific goals and objectives*.
- They should be able to *differentiate* between which learning strategies or techniques are effective for the different types of learning material or subjects, and then alternate the use of study aids or techniques.

4) Students should *attend classes* and keep up to date with work.

5) Students should *know their lecturers* and consult with them or other knowledgeable persons.

6) Students should *set and keep to a study schedule*. They should prioritise and keep a balanced study schedule with e.g. tick-off lists.

7) Students should *work out previous exam papers*. They can do that either after first learning their work or as a method of learning (assessment **as** a learning method). The way in which exam papers are asked can be *inferred* through this as some lecturers ask questions repetitively.

8) Students should *learn differently for different types of questions*. They learn best through summaries for long questions, by solving problems for Mathematics and through memorising for theorems.

5.6 SUMMARY OF THE RESULTS EMANATING FROM THE QUALITATIVE RESEARCH

The participants who were successful in their studies knew they had to adapt to a university milieu and were motivated in doing so. They could alternate between different kinds of study aids, methods and techniques and knew when and how to apply their self-gained or facilitated knowledge on successful learning.

The participants who were not successful did not adapt as they didn't receive the correct guidance in time, or did not realise timely that they had to adapt their learning habits from a school environment to the university milieu.

5.7 DISCUSSION OF THE RESULTS EMANATING FROM THE QUALITATIVE RESEARCH

Arum and Roksa (2011) stated that undergraduates often arrive at a university with strong convictions about their abilities, described as self-efficacy (see Chapter 2). They may feel that the study habits they formed in their high school years should be sufficient for academic success at a university. In contrast with this the researcher found in the qualitative research that the participants who realised in their first year that they had to adapt to the different academic and student life requirements of the NWU, performed better academically than those who did not. In addition to this finding, it was found that the participants who already had knowledge of their learning style and successful strategies in Grade 12, adapted to the university study milieu with ease.

Self-regulated students quickly learn in their first year to differentiate between the types of study material to be learnt, and adapt their study methods and management of time to accommodate large volumes, different kinds of study material, subjects

varying in degrees of difficulty and the differing requirements that are demanded by a variety of summative and formative assessment opportunities. They realise that different academic tasks require different levels of learning and then they adapt their learning strategies to accommodate this difference (Isaacson & Fujita, 2006:41). They know the following:

(1) they have to adapt their study methods, which indicates Declarative knowledge of studying;

(2) how to differentiate and adapt, which indicates Procedural knowledge of studying; and

(3) when and why they have to use specific study methods, which indicates Conditional knowledge of studying.

Demonstrating these three kinds of knowledge indicates metacognition (see Par. 2.2).

Most of the participants were confident of their study methods and could describe their individual study methods and preferences. The successful participants applied a differentiated repertoire of learning strategies in a flexible manner, as described by Baumert *et al. (*2002:8). They were able to follow this strategy because they had a knowledge base about what their most effective learning strategies were, and how, when and where to use a variety of learning strategies (Boekaerts & Corno, 2005:201).

The two unsuccessful participants did not indicate that they knew they had to adapt from Grade 12 to the university. They also conveyed the impression that they did not give much thought to learning as an ability that can be procured, nor that they were motivated to improve their learning skills or that they looked for help when they realised they were falling behind. Benton (2011:19) stated that many students do not consult with their lecturers or knowledgeable people when they experience study problems and as a result perform poorly. The two unsuccessful participants demonstrated the truth of this statement by Benton.

It was indicated in Chapter 3 that self-regulated students demonstrate most of the SRL skills that were indicated in Table 3.1. However, some very successful participants who demonstrated metacognition developed their own individual learning patterns and behaviours. The learning patterns of two of these participants as well as the two unsuccessful participants, are discussed in the following paragraphs.

5.7.1 An emerging learning pattern of the unsuccessful participants

These two participants were clearly not motivated, either to study at a university, or to adapt their study methods. They did not indicate the possession and demonstration of knowledge of the study methods required at a university. They did not seek advice from informed persons although it was available, and both of them had low and indefinite goals.

Student 7 stated that a distance-learning model of studying would have suited his learning style more. He would have been more motivated if he had known his study preferences, before embarking on fulltime studies at a contact university. Student 8 did not change or adapt the study methods that she used in Grade 12. She preferred to seek assistance from the Internet and not through social contact. This may have led to her not getting help and support early on to adapt her study methods.

The researcher came to the conclusion that the poor academic progress of both of these students could have been prevented by timely, additional knowledge about studying at a university. They should have been informed of their learning preferences and made aware that they would have to adapt - whether as a fulltime contact student, or as a distance-learning student. They could have been helped to reach their potential – and it calls for concern that they were so poorly informed of the required study methods and the academic requirements of the university.

5.7.2 Emerging learning pattern of student 2

The student indicated that he didn't use study aids, and also indicated that he didn't keep records of his academic performance. These are two of the SRL skills that are

assumed to be demonstrated by self-regulated students, but a student can still be regarded as self-regulated even though not all SRL skills are demonstrated (see Par. 3.3.4). He was informed of his learning style and effective study methods that accompany it before he started attending classes at the university, and stated that his study methods did not change since Grade 12. He indicated that he implemented Declarative, Procedural and Conditional knowledge when working out old exam papers – trying to detect what the questions were, when and where they were asked, and also why they were asked. He demonstrated knowledge and confidence in his learning style and strategies, leading to motivation and self-efficacy.

5.7.3 Emerging learning pattern of student 10

Participant no 10 indicated excellent time management strategies, in addition to adapted study strategies, by making summaries before studying. She indicated Declarative, Procedural and Conditional knowledge of her adapted study methods, as well as of her self-evaluation - what she did to self-evaluate, how and also why she self-evaluated. She also indicated differentiation of study methods between different subjects, and a high degree of metacognition. She indicated the SRL skill of seeking information with initiative by means of a programme she took. The participant demonstrated most of the SRL skills contained in the LASSI and the SRLIS. She quickly realised in her first year that she had to adapt to the study requirements of the university, although she didn't have information of the adaption beforehand (when still in Grade 12). Her interest in study methods was acquired during her first year of study. Although she had to obtain information by herself on her learning style and strategies, her efforts were of such a nature that they lead to high self-efficacy and motivation.

5.7.4 Additional findings:

The researcher deducted two additional findings from the interviews. They were not included in the thirteen questions, but were considered of sufficient relevance to be added.

5.7.4.1 Motivated students are not easily deterred by negative experiences.

From the interviews it could be deducted that notwithstanding negative experiences, motivated students can still be successful in their studies. Three participants serve as an example to illustrate that repeating a year, or a parent's death, need not have a negative impact on their studies (participants 1, 2 and 5). The two unsuccessful participants (7 and 8) serve as an example that when a student is not motivated, he/she will experience difficulties in studying successfully and completing his/her studies.

Boekaerts and Corno (2005:202) stated that when students have transformed their motivation to study into a firm intention to act on it, they will not revert back easily on their goals.

5.7.4.2 Support and encouragement have a big influence on the academic success of the participants.

Some of the participants were encouraged by their parents, principals or other knowledgeable persons to discover their learning styles and preferences in Grade 12 already (Participants 2, 3, 4, 6 and 9). This helped them to gain knowledge of their learning skills and ability. Reflecting on learning enabled them to realise that they had to adapt their learning strategies and skills from the SEI to the university. Participant 10 indicated that her lecturers supported and motivated the students, which included taking the fourth year students on an overseas tour to England for literature review purposes. Participant 1 stated that his father gave him the reassurance of a monetary reward for distinctions. Although this is an external reward, this led to him achieving academically, and also indicated interest from a parent.

The researcher concluded that successful students are encouraged by their parents or other persons to find out which study methods they can use with success. Their parents or their lecturers are interested in their studies and support them in their studies, which contributes to their feelings of self-efficacy and motivation. Boekaerts and Corno (2005:208) described this as *co-regulation*, which helps to shape and

develop the SRL process. The SRLIS includes a category for “Other statements” that indicates learning behaviour which is initiated by others.

Not all first year students have interested and encouraging parents or lecturers who can co-regulate their studies, and the researcher recommended the establishment of a *First Year Academy* to serve this purpose in Chapter 7. As indicated in Chapter 1 the number of first year students is escalating while the number of lecturers does not grow proportionally. First year students need an approachable, helpful institution within the university that serves the purpose of co-regulator. An academy such as this can offer help and encouragement on many different levels, especially to students at risk of failing or dropping out.

5.8 CONCLUSIONS BASED ON THE QUANTITATIVE RESULTS AND THE QUALITATIVE FINDINGS OF THE EMPIRICAL RESEARCH

- The LASSI results indicated that first year students from the Faculty of Engineering demonstrated the most SRL skills, while students from the Faculty of Education demonstrated the least SRL skills.
- The LASSI results also indicated that female students demonstrated more use of study aids than their male counterparts.
- The analysis of the LASSI results indicated that *Motivation, Time management* and *Information seeking* were the best LASSI predictors of academic success
- The biographical variable *Grade 12 results* was the most significant predictor for academic success.
- The results from both the quantitative and qualitative investigations indicated that the SRL skill *Motivation* was the best predictor of academic success at the university.

- It was found that *Time management* correlated positively with academic achievement in the quantitative results, and the participants also endorsed the importance of it during their interviews.

- Successful participants learnt to prioritise by means of volitional learning strategies and schedules to achieve their goals and objectives.

- Successful participants indicated during the interviews that they had high but realistic academic expectations and goals, but still enjoyed social and sporting activities.

- The SRL skill *Information processing* correlated with high academic results. This finding was endorsed by the findings of the qualitative research. During the interviews the *Re-organisation of study material* skill was performed by all the students in various ways.

- *Motivated* students were not easily deterred by negative life experiences and still managed to study successfully.

- Successful participants were encouraged to study by parents, principals or lecturers. This is known as co-regulation.

5.9 CONCLUDING REMARKS

The researcher came to the conclusion that knowledge of the academic university milieu and its study requirements plays a crucial role in determining academic success in the first and the consecutive years of study. First year students (and Grade 12 learners) have to acquire knowledge of the process of learning, their individual learning styles and appropriate learning strategies, the study environment, setting of goals and objectives, planning and managing of time, and maintaining a study schedule and monitoring their learning. Knowledge about these aspects will empower first year students and keep them motivated for their studies and persistent

towards mastering their study goals (Vermeer *et al*., 2001). Having obtained metacognition will further help these students to transform their motivation to study into a firm intention to act. They can do so successfully when realistic goals are implemented, and the SRL actions and knowledge to achieve them are set into motion (Boekaerts & Corno, 2005:202).

It was stated in Chapter 3 that SRL skills can be facilitated, and the main aim of this study was to propose strategies to facilitate the development of SRL skills among first year students. In the next chapter these strategies will be proposed and elucidated.

CHAPTER 6
STRATEGIES FOR THE DEVELOPMENT OF SRL SKILLS OF FIRST YEAR UNIVERSITY STUDENTS

6.1 INTRODUCTION

The primary research aim of this study was to propose strategies for the development of SRL skills of first year university students. The strategies contained in the following SRL Programme is based on: 1) the LASSI subscales which correlated the best with the academic success of the first year students; 2) the SRL skills that academically successful participants conveyed during the interviews; 3) weaknesses with regard to the knowledge and demonstration of SRL skills that academically unsuccessful participants conveyed during the interviews; 4) findings regarding SRL skills emanating from the literature review; 5) findings emanating from the literature review regarding the transition from Grade 12 to the first year at university; and 6) findings stemming from the advice that participants conveyed during the interviews regarding the transition from Gr. 12 to the first year of study at a university.

Briefly summarised, the academically successful participants said the following:

- they realised from the onset of their first year that they had to adapt to the different study environment and academic requirements demanded by the university milieu;
- they were already familiar with, or quickly obtained knowledge of their learning styles and the learning strategies they had to implement; and
- they learnt to differentiate between the requirements of their learning tasks, and adapted their learning strategies to the demands of these tasks

(see Par 5.6 - 5.7).

The proposed SRL Programme entails: (1) Purposeful thoughts about studying effectively in a learning environment that requires additional skills to those required by a SEI; (2) Deliberate actions that are directed towards the acquisition of information about learning; (3) Actively planning, managing and monitoring time and goals by means of a study schedule; (4) Maintaining the learning process and differentiating between the learning requirements; and (5) Actively implementing feedback from the strategies by the students themselves to improve their learning.

The **cyclical and interconnected nature** of the SRL Programme is demonstrated by the implementation of Action Step 7 and Action Step 16. Both steps provide opportunities for the students to acquire the strategy of developing the SRL skill of differentiating between learning tasks and assessment opportunities. There are more interconnectedness between strategies, such as the setting of questions on learning material to determine how deeply information is processed, in both Action Steps 13 and 17.

The SRL Programme also demonstrates a **chronological nature**. Participation in and completing the first two strategies should enable the first year students to master the next four strategies. Right from the onset of their studies, the strategies provide students with multiple opportunities to receive and implement feedback, which should be applied to contribute towards their academic success. The strategies may be adapted, as a strategy will rarely be successful if it is inflexible.

6.2 RECOMMENDATIONS FOR IMPLEMENTING THE PROGRAMME

6.2.1 Establishment of a unit

One of the recommendations that are made in Chapter 7 is the establishment of a First Year Academy (FYA).. This unit should provide support and assistance to students throughout their first year of study, and provide advice to lecturers on how to plan and implement SRL activities in their first year classes.

The FYA personnel should consist of a dedicated manager and advisers who are allocated for each faculty, equipped with the subject knowledge which is essential for support to students. The FYA advisers have to be carefully screened and undergo intensive training, which should include knowledge of SRL and subject-specific ways of implementing SRL in class. They should be able to advise the lecturers in the faculty they are allocated to, on how to implement SRL in class and how to develop ways to improve the students' SRL skills. The advisers should keep an academic profile of each first year student in the faculty they are allocated to.

A compulsory module that is designed specifically for determining and developing first year students' computer skills is offered at the NWU. Another module at the NWU that is designed for determining and developing first year students' reading skills is also compulsory. It is recommended that the two units responsible for these modules should be part of the FYA, if such an academy is established.

The objective of having one unit - the FYA - is that it should facilitate follow-up of students, as an academic profile of each first year student can be compiled from the onset of their first day of study. By studying the profiles the FYA advisers can be alerted by big deviations in the marks their students obtain, and identify the students who are at risk of failing or dropping out in their first year. The profiles should be carefully monitored and pro-active steps should be taken to support the students who indicate that they experience difficulties on academic, emotional or any other levels.

The objective of profiling first year students and taking pro-active steps to prevent them from failing and dropping out is derived from the finding that successful students seek and experience support and encouragement from adults or other knowledgeable persons (see Par. 5.7.4.2). Knowing that a visible, approachable, knowledgeable group of advisers is available for help and support should aid in the prevention of the large dropout rates of first year students that currently exist at HEI's.

6.2.2 Presenters of the programme

The programme of strategies for SRL skills development will be referred to as a "*SRL Programme*" and can serve as an induction programme for all first year students. It will require a work-intensive input from the FYA when the first year students start their orientation week at the university, and the collaboration of additional lecturers should be available. The faculties on each campus should appoint dedicated lecturers for the duration of the SRL Programme. The number of lecturers for each faculty will be determined by the number of first year students that enroll in the faculty. These lecturers together with the advisers from the FYA will form the team of facilitators who present and manage the SRL programme.

6.2.3 Length and duration of the programme

The first five strategies can be subdivided into 17 contact sessions or classes of 40 minutes each. Each of the classes should contain the appropriate prescribed learning material, learning content, assessment strategies and an assessment plan on the NQF level as described by SAQA for the first year of study, namely NQF level 5 (SAQA level descriptors, 2010).

The amount of credits should be accommodated in the policy and year books of the HEI. It is suggested that the programme in the format of a compulsory 8 credit module in the first semester is taken into consideration when the year books of each faculty are planned. Including the development of SRL skills as a compulsory module will impact on the curriculation, and should be given the appropriate consideration.

Allocating 8 credits to the programme should allow ample time for completing it successfully, namely 80 notional study hours. According to SAQA (2010) one credit indicates 10 notional study hours. The programme should include 17 contact sessions during which the lecturers facilitate the learning of the material. Class and semester assignments, and formative and summative assessment opportunities are included in the time allocation of 80 study hours. In each of the 17 proposed contact sessions a subdivision of the programme of strategies is facilitated (see Par. 6.3). As

the amount of time for preparation for, and homework performed afterwards, as well as the contact sessions themselves should amount to 40 notional study hours, the remaining 40 study hours should be divided between the completion of two assignments and preparing for a summative assessment opportunity, such as a written exam. Integrated assessment is advisable to allow the students to form a holistic perspective of the SRL skills they obtained.

The sixth SRL strategy *differentiation* is both strategy (to learn how to differentiate) and skill (to be able to differentiate) that is obtained by acquiring knowledge, skills and competencies through the preceding strategies. Differentiation is covertly included in the previous 17 contact sessions

6.2.4 Learning material for the programme

The recommended material is a diary and a calendar for the year that the students' study commences, and a booklet. A pro forma of such a booklet is added as Appendix 6. It should become the property of the first year students and serve as a source of reference to the information they obtained about their personal learning habits and SRL skills in the SRL Programme. The booklet will also serve as source of information regarding the academic infrastructure with a map indicating the various classrooms, the phone numbers of the FYA advisers and the programme facilitators, the campus layout and important dates. Directions in using the non-social sources of information such as the library or the electronic learning programme implemented at the university (eFundi in the case of the NWU) should be indicated in the booklet.

To facilitate the acquisition of the skills conveyed through the strategies in the SRL programme, the booklet should also contain the following (see Appendix 6):

- Space for the calculation of their notional study hours for each module, as well as estimated hours for social, cultural and/ or sporting activities, as mentioned in Par. 6.3.1.2;

- space for a written declaration to confirm the student's commitment to

his/her study at the university; as mentioned in Par. 6.3.1.3;

- Woolfolk's diagram of the information processing system, but adapted for the students and the description of the process; as mentioned in Par. 6.3.2.1;
- the 8 learning styles with their corresponding learning strategies and its alternative learning strategy, as mentioned in Par. 6.3.2.2;
- space for noting their preference of a physical learning setting, as mentioned in Par. 6.3.2.3;
- information for setting an individualised study schedule, as mentioned in Par. 6.3.3.1;
- space for noting long term goals and short term objectives, as mentioned in Par. 6.3.3.2;
- three to four pages or more of learning material from the students' specific study direction, as mentioned in Par. 6.3.4.1, with advice for information-seeking and processing;
- advice for information seeking and processing of learning material from the Internet, as mentioned in Par. 6.3.4.2;
- space for noting their preferences for use of study aids, as mentioned in Par. 6.3.4.3;
- space for self-reflective questions on different learning methods for different types of learning tasks and material, as mentioned in Par. 6.3.5.1;
- previously set exam papers, tests and other assessment opportunities in their study direction; as mentioned in Par. 6.3.5.2;
- a rubric with space for goals and objectives, and degrees of performance; as mentioned in Par. 6.3.5.4;

- space where they can indicate the subject study group they have formed, as mentioned in Par. 6.3.5.5;

- different kinds of learning material: (1) an example of a textbook paragraph with factual information, (2) an article interpreting (or analysing) that document with directions of how to approach these two formats; as mentioned in Par. 6.3.6;

- The diagram illustrating how SRL skills can be developed through the strategies contained in the SRL Programme (Figure 6.1).

6.2.5 The time line before the programme commences

The time line starts the week before the first year students enroll:

1) The FYA personnel receive names from each faculty dean of the additional facilitators for the programme in their faculty.

2) These facilitators are briefed by the FYA with regard to the classrooms, dates and time they have to present the SRL Programme.

3) The facilitators receive the calendars, diaries and booklets for the number of students allocated to them.

6.2.6 Evaluation of the programme

At the end of their first semester the students should be evaluated to ascertain that their SRL skills are imbedded in their learning strategies. This evaluation can be done by means of a questionnaire that is based on the SRLIS. Feedback on the questionnaires should inform the advisers of an action plan for those students who still indicate little or no acquisition of the SRL skills developed by the SRL Programme. These students should receive additional information and coaching.

The feedback can also be used to evaluate the effectiveness of the programme, leading to an action plan to improve the programme if it is necessary, and where weak points were indicated by the questionnaire.

6.3 THE PROPOSED PROGRAMME OF STRATEGIES FOR THE DEVELOPMENT OF SRL SKILLS OF FIRST YEAR UNIVERSITY STUDENTS

The definition of the term *strategy* is derived from military origin (Oxford Dictionary, 2005:1461). It refers to a plan intended to achieve a particular purpose, and putting the plan into action in a skilful way. Horwath (2006:2) stated that a strategy teaches the use of engagements to achieve the objective. According to Zimmerman, strategies refer to deliberate actions that are taken to reach specific goals (2001:131). In this study the desired skills that students should possess to be self-regulated (see Chapter 5) are the objectives or goals that the researcher proposes to develop through a programme of strategies or deliberate actions in a parsimonious and clear way. The characteristics of parsimony and clarity are desirable for strategies to be successful (Satell, 2011:3).

The term s*trategies* in the context of this study is used to include motivational, metacognitive and behavioural strategies. Although some learning methods are described as *skills* in the literature survey, they are proposed as strategies for the purposes of the study.

6.3.1 The initial strategy: critical self-reflection on studying at a university

CONTACT SESSION 1

The goal of the first strategy is to determine and strengthen the first year students' motivation and attitude towards their study. If the first year students do not perceive studies at a university as relevant to their life goals and aspirations, it will be very difficult to generate the level of motivation necessary to self-regulate their learning. Being motivated is essential to provide the capacity for the adjustment of goals and

learning actions to the university milieu (see Par. 5.4.2.3).

Welcome extended: The very first words from the facilitators should include a welcome to the university and an introduction to the FYA, with an invitation to make use of its expertise. The facilitators should then mention that the students demonstrated specific learning skills and motivation in Grade 12 to attain the required APS score for admittance to studies in the faculty, but that they have to acquire additional learning skills for successful study at the university (see Appendix 7 for the calculation of APS scores).

6.3.1.1 The following information should now be supplied:

- Examples of academic disorganisation, failure and the dropout rate at universities in general, with specific reference to the university where they are enrolled.
- Students should now be made aware that they can improve their learning ability for studies at a university.
- They have to be informed that their learning ability and their intelligence are not rigid, that effort is not superfluous, and that they can be empowered to study successfully with the aid of knowledge and skills that are gained by means of the proposed strategies.

ACTION STEP 1

The facilitators should inform the students of the information about dropout rates for first year students, which is obtainable from the Student administrative system (SAS). They should then supply sources of research that underlie the view that intelligence and learning ability can be improved. One such source is quoted in the booklet (see Appendix 6).

The objective of Action step 1: to create awareness by first year students of the difference between the learning environment at the SEI they attended and that of a university.

6.3.1.2 Critical contemplation and acknowledgement that additional learning skills are imperative.

What is required as part of this strategy, is that the first year students acknowledge that they need additional learning skills and abilities for their studies at the university. Students have to realise that the study environment at a university or a HEI differs greatly from a SEI, and that they will have to adapt their learning to the volume of work, the academic rigor and expectations of the university. Even if they already know that additional learning strategies are required, they will still have to adapt their time management strategies to cope with the volume of work that is required. In order to help first year students to create this type of awareness, they will have to:

(1) Add the number of credits for all their modules in the first year, to calculate the time in notional hours that they should spend on studying.

(3) It is imperative that they should realise that the total number of hours includes contact sessions, preparation for classes, studying for formative and summative assessment opportunities, and the time spent on examinations and other types of assessment opportunities.

(4) They should also calculate the number of hours that they wish to devote to non academic activities (sport, cultural, social). It is also imperative for them to realise that study at a university demands additional learning skills for successful study, and that they are responsible themselves for the acquisition of these skills.

ACTION STEP 2

The facilitators should show the students how to do the calculation, by doing it on a blackboard or on a slide. They should then inform the students that they will have to develop a time table in *Action step 10*, using this calculation.

The students should then perform the calculation individually (not in groups) on the first day of the programme. They should fill in the total number of hours in the booklet in the space provided, (see Appendix 6).

The objective of this step: being informed of this time should help them to realise that they will have to manage their time very carefully and constructively.

6.3.1.3 Self-reflection on studying at a specific university and in a specific course of study

First year students should now self-reflect critically and truthfully on the following questions:

(1) why do I want to study?;

(2) do I prefer receiving facilitation and instruction by means of contact instruction, or through distance instruction?;

(3) will the university that I have chosen be instrumental in fulfilling my academic aspirations?;

(4) is the course of study I chose the best for me?;

(5) what is the minimum number of years that I have to complete my studies in?; and

(5) am I determined to complete my studies in the required time?

ACTION STEP 3

The facilitators of the SRL programme should divide the first year students according to their study directions in study groups, facilitate a discussion that should follow these questions in the groups, and process the feedback.

The students have to commit themselves to the university by signing an agreement with the university. Space for an agreement is provided in the booklet (see Appendix 6). If the first year students are reluctant to commit, they should discuss their situation with their parents and the facilitators.

The facilitators of the SRL Programme should be able to provide advice and information to doubtful students in order to resolve these issues at the start of their study. If necessary, the parents or adults closest to these students should also be consulted.

The objective of this step: motivated students are convinced of their reasons for studying at a specific university in a course of study, and are cognisant of the learning environment.

6.3.2 The second strategy: obtaining knowledge of learning

The objective of the second strategy is to demystify the process of learning for the students and empower them with practical knowledge about their learning processes and preferred learning styles and strategies. Having acquired more knowledge about the process of learning should purposefully lead to metacognitive thinking about their own learning behaviour.

CONTACT SESSION 2

6.3.2.1 Obtaining knowledge of the process of knowledge acquisition

The diagram of Woolfolk (1998:244) should now be implemented to illustrate the process.

ACTION STEP 4

The facilitators have to refer the students to the illustration of Woolfolk's model

of information processing in the booklet (see Appendix 6) and discuss the process of knowledge acquisition with them. What is important here is that examples from the students' world of reference should be used to contextualise the new information.

The students have to take note that the brain's information acquisition process can be compared to the model of a computer.

The objective of this step: This will help the students understand the information processing system and the different memory stores.

The process can be compared to a computer process: information is fed to the computer and is processed; either for storing to be retrieved later, or for immediate retrieval. The process involves the following steps:

(1) gathering and representing of information (encoding);

(2) holding information (storage); and

(3) obtaining this information when needed (retrieval).

ACTION STEP 5

The facilitators have to give the students the following exercises:

1) Provide 10 concepts on a PowerPoint slide that the students should have **no** knowledge or previous experience of and give them 1 minute to try to remember it without writing it down. An example is "cephalopod" (instead of the commonly known name: octopus). Remove the list of concepts from their view and now ask them to write down as many concepts as they can without consulting each other. Stop them after 2 minutes. Enquire how many of these concepts the students wrote down. (If the concepts are completely unknown, very few students would have remembered all 10 of them). Discuss the short

term memory store again.

2) Now provide 10 concepts that are well-known to the students, that they should have prior knowledge of, or that they can relate to. An example is: “lighthouse”. Show the ten concepts for 1 minute only and ask them to remember all of them without writing it down, then remove the list of concepts. Now ask them to write down as many concepts as they can without consulting each other. Stop them after 2 minutes. Enquire how many of these concepts they wrote down. (If the concepts are well-known, most students would have remembered all 10 of them). Discuss the long term memory store again.

The students have to perform the two exercises and discuss the results with a class friend.

The facilitator should now briefly summarise the process of knowledge acquisition and indicate why the students (presumably) recalled the 2nd list of concepts more clearly. It is assumed that students should have knowledge of the better-known concepts in the 2nd exercise and be able to connect the concepts in the list to their prior knowledge of these concepts. The two exercises and the class discussion of reasons why the 2nd list is recalled more accurately should provide more information on the executive control processes.

The objective of this step is to illustrate the process of knowledge acquisition practically, leading to demystifying the concept of learning and making it less complex and easier to understand.

CONTACT SESSION 3

6.3.2.2 (a) Obtaining knowledge of learning styles and strategies

Learning styles are the different ways in which students take in information and process it (Felder & Brent, 2005:63). It is imperative that the students determine their

preferred learning style through the completion and analysis of the following questionnaire:

http:// www.engr.ncsu.edu/learningstyles/ilsInternet.phpi

or by studying the information provided in the booklet (see Appendix 6).

The *Index of Learning Styles Questionnaire* (ILS) was developed in 1993 by Richard Felder and Linda Silverman, and revised in 2002 by Felder. It includes the following styles of learning: Sensing; intuitive; visual; verbal; active; reflective; sequential; and global. Specific, appropriate study strategies are recommended for each one of these learning styles.

ACTION STEP 6

The facilitators should now explain that each individual uses specific learning strategies that correspond with his/her preferred learning style. He/she can invite students who are knowledgeable of their learning styles to describe them to the other students.

The students have to determine which learning style or combination of styles they prefer, by reading the description of styles provided in the booklet (see Appendix 6), and filling in the answer in the space provided underneath the description.

The students who **already** know their learning styles can compare their style with the description provided in the booklet, and read the book: *Guide to the ILS* (Felder & Solomon, 2003) as additional information available from the library.

The facilitator should now allow a student from each of the learning style groups to convey the learning strategies best suited to his/her group (see Appendix 6) and lead a discussion to give clarity to those students who have not yet determined their learning style at this stage.

The objective of this step: gaining knowledge of their learning style(s) and

strategies should aid the student in studying more effectively, as they can implement the strategies connected to their learning style(s). An additional, more covert advantage is that the students will gain metacognition by thinking about learning and discussing the concept that different students prefer different styles and strategies of learning.

Some of the learning styles overlap, and students may indicate a mixture of two or more learning styles.

ACTION STEP 7

The facilitators should inform the students that they can have a combination of learning styles. They also have to be informed at this stage that they can adapt or alter their learning style to meet the demands of a learning task or assessment. It is important to convey that more than one style may be followed for different learning tasks by a student who usually follows a predominantly single style and its strategies.

The students have to discuss at this stage for which learning tasks their preferred learning style has to be replaced temporarily with another learning style and its strategies.

The facilitator can provide the following answer after leading the discussion: When performing a hands-on assignment for example, an active approach is preferable to that of a verbal or a visual approach.

The objective of this step: teaching the students to apply their preferred learning styles in a flexible manner to different learning tasks. The covert objective in this step is gaining metacognition and the ability to differentiate between learning tasks.

6.3.2.2 (b) Obtaining knowledge of the physical setting preference

The students have to determine their preference in the following step:

- their preferred learning environment;
- their required physical contribution to effective studies;
- whether they prefer a structured milieu, such as a library where there is silence, or their room; or a room in the residence, where it is not always structured and quiet;
- whether they study for a specific time and how long before they take a break;
- what the kind of break is;
- whether sport, Pilates or other physical activities benefit their learning ability.

ACTION STEP 8

The facilitators instruct the students to discuss the subject of their preferred physical learning setting with a class friend.

The facilitators can use prompting questions to activate the discussion and supply multiple choices of learning settings.

The students have to discuss their learning setting preferences in their groups and write their answers in the space provided in their booklet (see Appendix 6).

The objective of this step: knowledge of their preferred physical learning setting and structuring it will optimise the students' study conditions and promote successful study. An additional, more covert objective is promoting the development of metacognition of learning.

CONTACT SESSION 4

6.3.2.4 Obtaining detailed knowledge of the academic infrastructure

Students have to be knowledgeable of the support structures that the university established and that are available to aid in their studies. The academic infrastructure should be well-known and accessible. They have to be informed of access to the library, academic resources and computers. They should know the contact details of the FYA advisers in their faculty and their lecturers' office hours. The students must know that they can contact the FYA adviser and their lecturers when they encounter problems in their studies, on emotional level or in any other field.

They have to form study groups to discuss academic tasks, as well as where and when they can air their problems. Active study groups within each module should be organised by the students themselves and meet regularly at appropriate times and venues.

ACTION STEP 9

The facilitators should inform the students of the support and guidance offered at the university by referring to the booklet (see Appendix 6). The facilitators should accompany their students to the various units where support is offered for first year students during this contact session.

Students should inform **the facilitators** if they do not possess laptops or any of the other electronic equipment that lecturers use increasingly for facilitating information. If they are not electronically skilful, additional training has to be organised and provided.

The faculty or school the students are enrolled in, should provide the students with the required equipment where necessary. The students who lack skills and knowledge in the use of electronic equipment should receive training.

The objective of this step: to provide the students with knowledge about the

support and guidance available. Co-regulation (see Par. 5.7.4.2) can be facilitated through this step, as well as by the establishment of a FYA.

6.3.3 The third strategy: planning, managing and monitoring

The goal of the previous two strategies included the activation of motivational and metacognitive participation of the students, leading to self-efficacy and confidence in studies at a university. The goal of the next strategies includes strengthening the behavioural self-regulation of their studies.

CONTACT SESSION 5

6.3.3.1 Planning, managing and monitoring *time*

It is imperative for the students to keep the calendar and diary they received with them always to organise their time and goals. They also have to plan and implement a study schedule as part of this strategy to monitor whether they adhere to their time and goal planning. The following strategy will be available in the booklet (see Appendix 6), but the facilitator should also instruct them as following:

- They should always have the **diary** with them, and use it to enter the dates for completion and handing in of assignments, tests, exams, their goals andobjectives, and all the dates that have to be adhered to. They should plan for both semesters of an academic year, and add noteworthy dates and future assignment dates as soon as they receive it. **The diary is implemented to plan and manage their time.**
- A **calendar** should be implemented to monitor their time planning and goal-setting, and should be posted on their wall with short or cryptic notes and dates, added according to the diary entries. The dates on the calendar should be crossed out when a specific date entry has been

reached or the academic task has been completed. **The calendar serves as a tick-off list.**

- Assignments, assessments and other academic tasks should be broken down in sectors according to the required input, and each sector should have a date and period of time awarded to it. Planning should be done for daily homework, as well as for future projects and dates.
- Time planning should be executed on a daily, weekly and monthly basis. All academic activities should be planned, managed and monitored by themselves as part of a study schedule. Monitoring their time should be performed routinely, and be maintained rigorously, as this will add to their motivation.

ACTION STEP 10

The facilitators now have to direct the students to their diaries and encourage them to enter the activities of their orientation week next to the dates in the diary. Students have to be encouraged to tick off these activities when they are completed on their calendars. The facilitators have to put this action into context by mentioning that when the classes start, the students have to enter assignments, tasks and other activities next to the dates in their diary.

The objective of this step: a practical demonstration and exercise in planning their time in the diaries and monitoring it on their calendars.

CONTACT SESSION 6

6.3.3.2 Setting, managing and monitoring *goals*

Learning content. The facilitators have to convey the following information before the following two action steps are performed:

- Effective and attainable learning goals contain certain specifications. They are: clear, specific, achievable, appropriate, moderately difficult, and realistic.
- Goal setting will depend on the students' long-term planning, and on more specific levels of their individual tasks and assignments.
- Short-term goals are attainable within a relatively short period of time and are most effective, especially when a large amount of work or difficult learning material has to be learned or performed.

ACTION STEP 11

The facilitators have to guide the students in the goal-planning strategy through the execution of the following procedure. They also have to inform the students at this stage of how a module mark is calculated - by referring to the academic rules of the HEI.

The students have to follow this procedure and fill in the spaces provided in the booklet (see Appendix 6):

(1) Do a task analysis and decide what they want to achieve academically;

(2) first set a global and distant goal such as: passing a specific module at the end of the semester, or obtaining a distinction for it;

(3) they can now divide the distant goal into proximal, realistic subgoals, such as: reaching a specific percentage for tests and assignments during the semester that serves as a participation mark;

(4) the next step is to be informed of the minimum percentage they need to pass the module in the exam, and calculate the module mark, by adding (3) to (4).

The facilitators now have to put this procedure into context by facilitating a discussion by the students to divide other distant goals into proximal goals.

The objective of this step: informing the students of a practical strategy to plan their goal-setting.

The students now have to be informed of methods to manage and monitor their goals. The facilitators have to discuss this procedure with them.

ACTION STEP 12

The facilitators have to inform the students that they have to:

(1) implement their preferred learning strategy, or another appropriate strategy to reach their objectives or goals;
(2) follow a schedule to reach it in due time through time management and strategic planning; and
(3) by using the diary and calendar, they can plan the objectives or goals in more detail in the diary, and monitor on the calendar when, and whether it has been reached; and
(4) they should prioritise when there are competing or conflicting goals.

The students have to follow this procedure and write the goals they have identified in Step 11 in their diaries.

The facilitator should now use examples from their living world to discuss which goals should be given priority above the others.

The objective of this step: informing the students of a practical strategy to manage and monitor goal-setting.

CONTACT SESSION 7

6.3.3.2 Setting and manageing an individualised *study schedule*

The following steps and advice are also provided in the booklet (see Appendix 6). The facilitators should stress the importance of having a study schedule with the

students. Students should be cautioned to follow their study schedule rigorously, and:

1. plan, manage and monitor their estimated time for studying and their goals by updating the diary and calendar every day;
2. file the notes, papers and additional study material for each module together. In this way the related study material is easily available and assembled when needed. The appropriate module codes and names should be pasted on each file;
3. a study routine should be followed daily and time should be allowed for this to be truly successful. At the end of the day all academic learning material and additional notes that were received in the order of the day should be filed;
4. homework should receive attention on a daily basis, whether at the end of the day or between daily activities; and
5. in modules that no homework was given, a 10-12 minute review has to be performed of the learning content that was facilitated.

ACTION STEP 13

The facilitators should guide the students in their class to design their own study schedule. During this contact session he/she should be available continuously for guidance and support.

The students should now implement their diaries and calendars to set their study schedule. For this action step no group work or collaboration should be allowed, and each student should perform this class assignment individually.

The objective of this step is to have an individualised study schedule designed by each student in the class. The covert objective is that each student takes personal responsibility for his/her own study planning.

6.3.4 The fourth strategy: Information seeking and re-organisation of different formats and sources of learning material

The goal of the fourth strategy is to facilitate the strategy of processing the new information. In order to process new information from the short term to the long term memory, the students have to summarise and re-organise the learning material in various ways (see Par. 2.3 and Fig. 2.1). These methods will depend on their learning style and the strategies that accompany each style (see Par. 6.3.2.2). Processing information from the different formats of learning material will be dealt with in two sessions.

CONTACT SESSION 8

6.3.4.1 Summarising printed learning material

The students have to bring a text book from a specific subject in their first semester to this contact session. They have to be taught to summarise a significant portion (8-10 pages) of the learning material in this contact session.

Any other appropriate information processing methods that have been proven successful can be applied. The students should implement and adapt the method that is most suitable for their individual learning styles.

ACTION STEP 14

The facilitator has to give guidelines on summarising large amounts of learning material, and include strategies on how to (1) paraphrase, (2) create analogies, (3) use applications, (4) create organisational schemes and outlining, (5) use analytic or inferential reasoning skills.

The student has to summarise by obeying the following guidelines:

- The **first line of a paragraph** is a good indication of the content.
- Underline the **main thought** in each sentence.
- **Review** a paragraph, and **summarise** the content in one or two sentences.
- Review the sentences and **condense** it further.
- During a class discussion the students can convey any appropriate information processing methods that have been proven successful for their studies. It is preferable that they demonstrate the methods and techniques in class.

The objective of this step is to aid students to cope with the large amounts of learning material that are received at HEI's.

Additional e-learning skills that have to be adopted to extract information from the Internet or Google are provided in the next contact session.

CONTACT SESSION 9

6.3.4.2 Seeking and summarising learning material from the Internet (Google and other search engines).

The researcher has indicated that e-enhanced learning is increasingly expected of students at HEI's (see Par 3.7 and 3.8). The next action step indicates how to seek and summarise information from the Internet (Google and other search engines). The facilitator should organise beforehand that each student has either his/her own PC or smart phone with Internet access in the class for a practical demonstration. The steps are also provided in the booklet (see Appendix 6). He/she should warn against using unreliable sources.

ACTION STEP 15

The facilitator should discuss the following steps and direct **the students** to:

1. **Reflect on the learning task**. Students should ask themselves what they already know, which information is required and what their learning goals or task requirements are.

2. **Plan the learning process.** They should establish which sources of information are relevant for the task requirement, where they can find these sources, whether they are available in the electronic platform, and how long it will take to obtain facts from these sources.

3. **Execute the search.** They have to browse and search for the relevant key word, scan the results, explore the most relevant information sources, and select the most appropriate source of information.

4. **Structure the obtained information**. Their structure should reflect what is asked, and documented according to their learning style.

The objective is to facilitate skills in obtaining information from the Internet.

CONTACT SESSION 10

Individualised feedback should be provided on the assignments, and a collective summary should be provided during this class. This feedback should be made available to the FYA, if such a structure exists at the HEI.

6.3.4.3 Using study aids to re-organise study material

Students will select study aids according to their learning styles. There are many types of study aids available, but they can also create their own study aids.

ACTION STEP 16

The facilitator should encourage the students to contemplate their use of study aids, and then give them the opportunity to suggest which study aids are best suited for their learning style.

The objective of this step: Using and creating study aids improves both the effectiveness and the efficiency of learning, especially in autonomous learning situations.

6.3.5 Strategy five: strengthen deliberate learning actions and behaviour through revising, studying and maintaining the learning process.

The goal of the fifth strategy is to facilitate and encourage deep learning (see Par. 2.3 and Fig. 2.1).

CONTACT SESSION 11

6.3.5.1 Effective revision and study

Reviewing the learning material should be performed on a daily basis, or students will lag behind. The facilitators should inform the students to retain newly acquired information and strengthen its retention by following the following steps that are also provided in the booklet (see Appendix 6).

- Read the material carefully, trying to connect the new material with previous knowledge.
- Form a holistic picture of the material by asking yourself: what have I just read?
- Return to the material, concentrating on separate paragraphs or chapters. Try to discern what the main thought is in each paragraph or chapter.
- Write the main thoughts down and review the study material again until you have formed a holistic view of the material.

ACTION STEP 17

The facilitators should give advice to the students on revising a volume of learning material provided in their booklet (see Appendix 6) according to the steps provided above.

The students now have to compile questions about the study material and try to answer them, or ask a class friend to do the questioning. The process should then be reversed with the other student doing the answering.

The objective of this step: when the students follow the learning strategy their deliberate learning actions should be strengthened.

The facilitators should then inform the students of the following study strategy, and the students should consider whether the following learning strategy that is also provided in the booklet (see Appendix 6), suits their individual style: the *SQ3R with five steps*:

- Survey the material to be revised/learned
- Develop questions about the material
- Read the material
- Recall the key ideas
- Review the learning material

CONTACT SESSION 12

6.3.5.2 Planning for assessment opportunities

Students should learn to differentiate between assessment opportunities and adapt their learning strategies to the requirements of assessment. Opportunity for self-reflection on differentiation is provided in this strategy. The students have already had an opportunity to self-reflect on differentiation in the assignment..

ACTION STEP 18

The facilitators should now inform the students that they should ask information regarding the format of exam questions and other assessment opportunities, and also why this is important. It is essential that students know the following before an assessment opportunity is conducted: (1) the length of the assessment, (2) the format of the questions (long, short or mixed questions, a multiple answer or an open book format), (3) which writing or computing materials are required, and (4) the time at which the assessment starts. The reasons for being informed about the format should be communicated to the students.

The students have to ask these questions from their lecturers before they attempt an assessment opportunity, and: (1) target their study activities, (2) set up study goals, (3) implement effective study plans, and (4) demonstrate their knowledge and skill acquisition so that it can be accurately assessed, according to the different requirements of the assessment opportunities.

The facilitators should now instruct the students to answer the following questions in the spaces provided in their booklet (see Appendix 6):

- "Do you learn differently for different formats of questions, such as for learning questions or for short questions?"
- "If you do, how do your learning methods differ?"

The facilitators should now help the students to realise the following through probing questions: (1) Students have to acquire a more global, or holistic knowledge of the study material if only *long questions* are asked; (2) if a *multiple answer* or *short question format* is set, knowledge must be studied more factually and in detail (3) for an *open book assessment* opportunity the layout of the book or study material has to be known, and also where to find the answers in the content.

The objective of this step: teaching the students to apply their learning methods according to the assessment opportunity, in a flexible manner. The covert objective in this step is gaining metacognition and the ability to differentiate between assessment opportunities and adapting their learning methods to suit each type of assessment opportunity.

CONTACT SESSION 13

6.3.5.3 Working out tests and exam papers

By performing scrutiny of the type of questions that are asked the students will attain knowledge of the format of the required questions and answers.

ACTION STEP 19

The facilitator should instruct the students to bring previous exam papers on one

or two of their own modules.

The students should now review previously set exam papers or tests from their study direction in the booklet (see Appendix 6). They should discuss these questions with a class friend and then in their subject groups, with regard to the difference from Grade 12 exam questions.

They should try to answer how and why these questions were asked in the space provided in the booklet (see Appendix 6).

The objective of this step: when the students acquire knowledge of the format of the required questions and answers, they can prepare for assessment opportunities with knowledge of what is required from them. A covert objective of this step is that the students should gain metacognition of assessment and learning.

CONTACT SESSION 14

6.3.5.4 Self Testing

Students have to ask themselves questions before, during and after studying learning material. This is done to ascertain that they are learning on a deep level (see Par. 2.3). They should test themselves by implementing the method that was provided in Action Step 15. The method is also appropriate when students use new information in novel ways, trying to apply a principle or method, or use a systematic approach to study.

ACTION STEP 20

The facilitators should direct the students to the study material in their booklet (see Appendix 6).

The students should be given the opportunity to review study material provided

in the booklet and ask themselves questions on it. They should then answer it and compare their answers with the study material.

The objective of this step is: to review their study material and to monitor their comprehension.

CONTACT SESSION 15

6.3.5.5 Monitoring their study outcomes by keeping assessment results and records

The students should be taught in this contact session to record their assessment results with the intent of comparing it with their goals.

The students should assess their academic success or failure in relation to their goals, by comparing their self-monitored information with their goals. In this phase they should adjust their self-efficacy and their future learning skills accordingly.

ACTION STEP 21

The facilitator should direct the students to the booklet where the rubric is provided.

The students should consult the rubric in the booklet (see Appendix 6) as an indication of how they can keep assessment results and compare it with their goals and objectives.

They should now fill in the rubric with their goals, subgoals or objectives, and degrees of performance.

The objective of this step: The effect of recording is that they can monitor the effectiveness of their study strategies continuously, by critically analysing the feedback and results they receive. If they are not satisfied with the results to

achieve their learning goals, they should adapt their study strategies or implement others. The feedback from the evaluation phase should then be applied to the start of the next learning cycle.

CONTACT SESSION 16

6.3.5.6 Asking advice

Students should be implored to ask for advice regarding their learning tasks and the requirements demanded from them. Depending on their social orientation, they should approach an individual such as a lecturer or peer, or discuss their need and queries in a group. Students who prefer a nonsocial source, such as Google or the Internet, should be enabled by having electronic applications available.

ACTION STEP 22

The facilitator should guide the students' attention to the section in the booklet where the numbers and details of advisers and facilitators are provided. They should be urged to contact one of these knowledgeable persons.

The students should now fill in the contact numbers of their facilitators and the advisers from the FYA that are allocated to their faculty.

The facilitators should now discuss the formation of study groups with the students, and facilitate the forming of study groups in this step.

The students should form study groups according to their subjects and determine the first meeting of their study group, and write their group's names and the date in in the space provided in the booklet (see Appendix 6).

The objective of this step: to ensure that students have study groups and contact with interested, knowledgeable persons who can help them when they need advice.

CONTACT SESSION 17

6.3.5.7 Self-consequating

The participants in the interviews all indicated some sort of reward when they achieved a goal or an objective. The facilitators have to enquire whether the students rewarded themselves, or if they were rewarded by others, and the form the rewards took while they were in Grade 12.

ACTION STEP 23

The facilitators have to direct the students to the space in the booklet (see Appendix 6) where they have to fill in how they were rewarded while they were in Grade 12.

The students should fill in the space, and also which rewards they expect when they are at university.

The objective of this step is: to help the students to visualise and imagine a reward for completing their studies, which should lead to motivation for completing their studies.

The last contact session should be devoted to self-reflection on the process of SRL, in addition to learning material on self-consequating.

6.3.6 The sixth strategy: differentiation

The sixth strategy is communicated and facilitated overtly and covertly in the previous 16 contact sessions. Differentiation between the requirements of the learning tasks, and in applying previous learning strategies was communicated. Having acquired and mastered this strategy, it should become a SRL skill. It is recommended that subject-specific examples for the demonstration and

implementation of the proposed strategies should be selected by the facilitators in the faculties.

The goal of this strategy is to facilitate the students' ability to apply their learning methods in a flexible way depending on what is required of them. The SRL skill acquired is to be able to differentiate not only through their learning styles and strategies (see Action Steps 2-6), but in their whole approach to obtaining information, revising and studying as well (see Action Steps 7 and 17).

ACTION STEP IMPLEMENTED CONTINUOUSLY DURING CONTACT SESSIONS 2-17

The facilitator should urge the students to differentiate between learning requirements, and provide reasons why this should take place.

The students should now study the different kinds of text material in the booklet (see Appendix 6) and decide how to apply their learning styles and strategies in a flexible manner. **NB** The text material is selected from the subject material of the qualification that the students have enrolled for.

The objective of this step is: to teach students to discern what is required, and having done this, to adapt their learning in a flexible manner to meet the demands required of them. The covert objective of this step is to strengthen the students' Declarative, Procedural and Conditional knowledge of their own learning process, leading to the acquisition of metacognition.

- Students need **Declarativ**e knowledge that all reading assignments are not alike. In the subject field of History, for example, they need to discern the following:

(1) a history textbook chapter with factual information, differs from (2) a primary historical document, which in its turn differs from (3) an article interpreting (or analysing) that document. They also need to know that there are different kinds of note-taking strategies useful for annotating the different types of texts.

- Students need **Procedural** knowledge to know how to actually write different kinds of notes.

- They need **Conditional** knowledge to know when to apply these kinds of knowledge when they study.

The following figure illustrates the cyclical, interconnected strategies in the proposed programme.

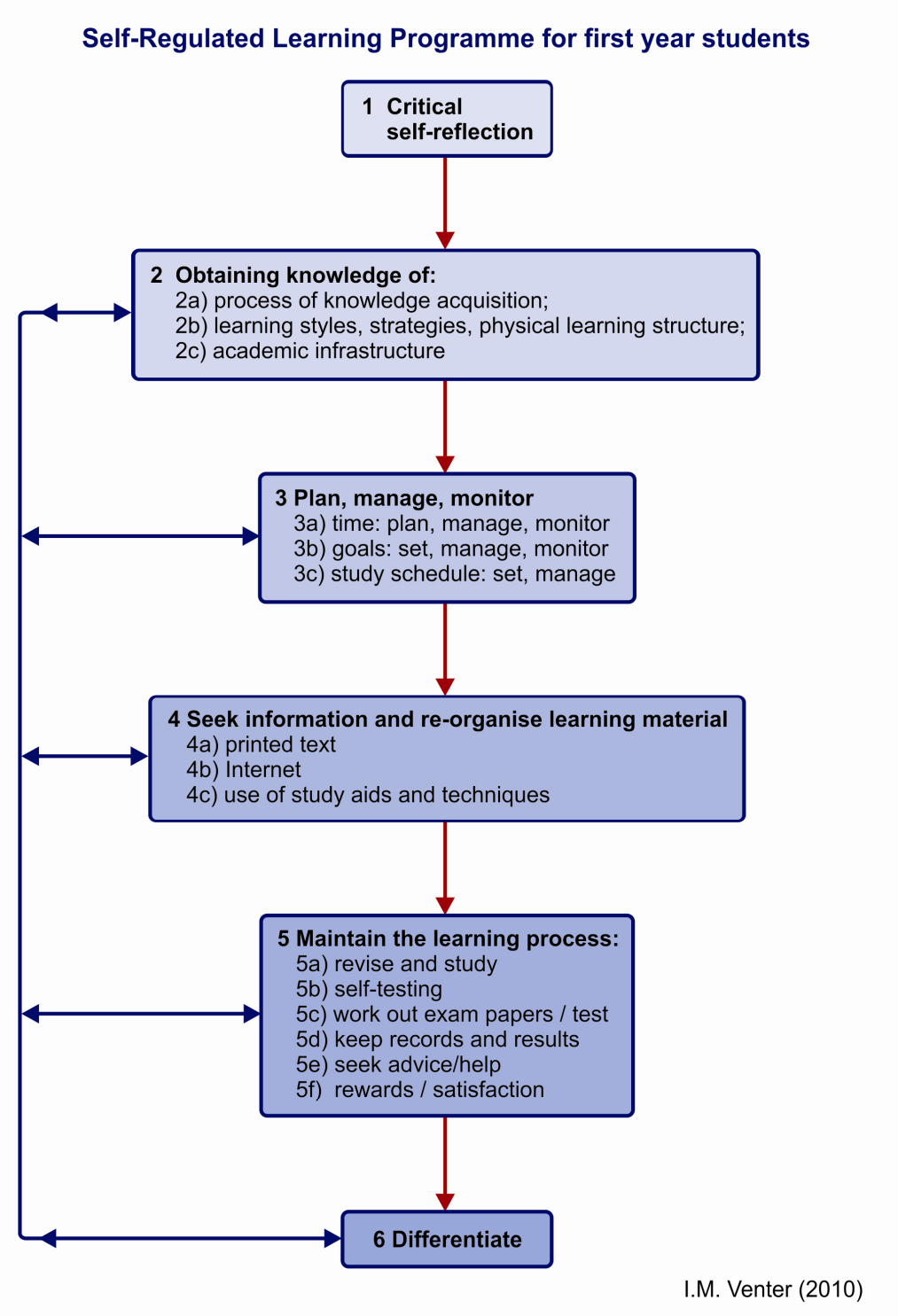

Figure 6.1 A Self-regulated Learning programme for first year students

The arrows in Figure 6.1 indicate the strategies that are linked to each other. The strategies may be adapted, according to the degree of motivational, metacognitive and behavioural skills an individual student possesses.

6.4 ASSIGNMENTS FOR THE SRL PROGRAMME

According to SAQA guidelines (2010) a variety of assignments have to be completed. For this 8 credit programme at least two assignments should be completed to obtain a participatory mark for admittance to the summative assessment opportunity. The following example of an assignment is provided and it is recommended that students complete it after the first nine contact sessions.

EXAMPLE OF A SELF-REFLECTIVE, INDIVIDUAL ASSIGNMENT

For this assignment the students will have to apply the skills they learnt previously through the strategies facilitated in contact sessions 1-9 in order to complete their assignment. To complete the self-reflective assignment they have to: (1) note the assignment in their diary immediately; (2) hand in the assignment after completing Action step 15; and (3) hand in a short self-reflective description of the following learning steps:

- an estimated time calculation for completion;
- whether they used their short term or long term memory store to complete the assignment;
- the learning style and its accompanying strategies they implemented to complete the assignment;
- the decisions they took on whether they had to make use of the infrastructure of the university;
- a short description of their use of the Internet, which search engines they used and which web links they accessed for obtaining information (if applicable); and a description of their physical learning setting and how they structured it for optimal study conditions.

ASSIGNMENT

The facilitators have to give the assignments and inform them that they have to hand it in on a pre-determined date with their names and student numbers on the front page. They have to be informed that it is not a group assignment and that it has to be completed individually.

The students should read 1) a lengthy volume of learning material from their specific study direction which should be obtained in the library or in a study guide, ***as well as*** 2) a volume of learning material that is subject-specific on the Internet or on Google. With the aid of the instructions in the booklet (see Appendix 6) and from information obtained in contact sessions 8 and 9, they have to summarise both kinds of learning material.

After completion they should compare the processes they followed for their summaries with the processes that was followed by a class friend, and give verbal feedback to each other.

Together with the summaries they should hand in their notes on the learning process they followed.

The objective of this step: the students will develop the skill of seeking for learning material from different sources and summarising it, and self-reflect afterwards on the processes they followed. Students have to adapt their learning strategies to benefit from electronic platforms such as the Internet, Google and other electronic learning environments. The strategy will empower them to attain e-learning skills in their search for relevant information on the Internet with its mega-availability of sources and information.

During the following contact session the assignments should be handed out and discussed before the next SRL strategy is facilitated.

6.5 CONCLUDING REMARKS

In this chapter the findings emanating from the empirical study were synthesised to propose strategies to develop the SRL skills of first year students in a *SRL Programme*. The strategies address the need for motivational, metacognitive and behavioural active participation in learning by students who simultaneously have to adapt to an unfamiliar learning setting in their first year of study.

In the next chapter the study will be summarised. Against the background of the findings, recommendations will be made for the implementation of the proposed SRL Programme.

CHAPTER 7
SUMMARY, FINDINGS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter provides a concluding synopsis of the study. A summary of the main aspects of each chapter is presented for purposes of the synopsis. With regard to the research objectives the findings that arose from the literature review and the empirical study were analysed, evaluated and synthesised to propose strategies for the development of SRL skills of first year university students. The findings from the empirical study were obtained from a homogeneous cohort of first year students at the Potchefstroom Campus of the North-West University. Thus, recommendations for the implementation of the programme will be proposed and limited to first year students of the Potchefstroom Campus of the NWU. The chapter will conclude with recommendations for further research and some final thoughts.

7.2 SUMMARY

In *Chapter 1* the reader was orientated towards the study. Against the backdrop of the escalating number of first year student students at Higher Education Institutions (HEI's) and the alarming dropout rates, the research problem, aim and objectives were stated. The research design and methodology which were implemented to address the research problem and to achieve the aims and the objectives of the research, were briefly discussed and information was given about the ethical considerations that guided the research. The potential contribution of the study was mentioned and a brief exposition of the different chapters in the thesis was provided.

In *Chapter 2* a description of the nature of knowledge and definitions of knowledge were provided. The three kinds of knowledge that are mostly referred to by

educationists were described, namely: *Declarative, Procedural* and *Conditional* knowledge. The process of knowledge acquisition was elucidated, followed by a theoretical overview of the origin and development of SRL. The overview contained information regarding a paradigm shift in the perspective of learning that took place and that led to the Constructivist perspective of learning. A discussion of various concepts that relate to SRL followed; such as its definition, the difference between SRL and *Self-Directed Learning,* and theoretical views regarding some issues in SRL. A description of the Social-cognitive view of SRL and its origins followed which included the feedback loop and relevant constructs, such as self-efficacy, motivation and goal-setting. The categories of SRL skills deemed to be important for academic achievement, as well as the latest findings on SRL, concluded the chapter.

Chapter 3 addressed the relationship between SRL and the academic achievement of students at HEI's. A description of the characteristics that self-regulating and non-self-regulating students demonstrate was provided, and a discussion followed whether SRL should be viewed as a trait or as an event, with some resultant implications for the evaluation and instruction of SRL skills. The impact and demands on students' SRL skills in learning environments that become increasingly more electronically enhanced were briefly addressed. Various quantitative and qualitative measures for assessing students' SRL skills were discussed and the chapter concluded with strategies for developing the SRL skills of students at HEI's.

In *Chapter 4* the research design and methodology were discussed. The research aim and objectives were stated again and the choice of research design was motivated. The quantitative and qualitative methodologies were described and the chapter concluded with the ethical considerations that guided the research.

In the first part of *Chapter 5* the quantitative results were presented. Biographical information regarding the study population was provided and the construct validity of the LASSI was proven by means of various factor analyses. Cronbach's Alpha coefficients were calculated to determine the reliability of the inventory. Various regression analyses were done to identify the best predictors of academic achievement of the first year students. A summary of the results emanating from the

quantitative part of the research was provided, followed by a discussion of the results. In the second part of *Chapter 5* the qualitative findings were presented and discussed. The chapter ended with conclusions drawn from the quantitative and qualitative findings.

In *Chapter 6* the focus fell on the proposal of strategies for the development of SRL skills that were derived from both the literature review and the findings of the empirical investigation.

7.3 FINDINGS

7.3.1 Findings with regard to the primary research question:

In Paragraph 1.3 the primary research question was formulated as following:

What strategies can be proposed for the development of self-regulated learning (SRL) skills of first year students at a South African university?

On the basis of the findings emanating from the literature review and the empirical investigation, it became clear that the following strategies should be proposed for the development of SRL skills of first year students at the Potchefstroom Campus of the NWU:

- Strategies to enhance first year students' critical self-reflection about their studies at the university;
- Strategies to demystify the process of learning for the first year students and to empower them with practical knowledge about their learning processes and preferred learning styles, strategies and preferred learning structure;
- Strategies to assist first year students with the planning, managing and monitoring of their studies;

- Strategies to facilitate first year students' skills of searching and accessing information and re-organising different formats and sources of learning material by means of summarising, the use of study aids and study techniques;
- Strategies that will help first year students to maintain the learning process, and
- Strategies that will enable first year students to differentiate between the requirements of the different learning tasks, and to apply previously acquired learning strategies.

7.3.2 Findings regarding the research objectives:

The findings that follow were made on the basis of the results of the empirical investigation.

7.3.2.1 Findings regarding the first research objective: an analysis of the results of the LASSI

With regard to the first research objective the following findings were made:

- Female students obtained significantly higher scores in the subscale *Use of study aids* than their male counterparts and they also demonstrated more SRL skills than male students.

- Scores on the subscales *Motivation* and *Attitude* were the least differentiated in all the faculties. The results further indicated that participants from the Faculty of Engineering achieved higher scores than any other faculty in six of the LASSI subscales*: Attitude, Motivation, Concentration, Information processing, Selecting main ideas, and Self-testing,* followed by the Faculty of Theology. The participants from the Faculty of Education Sciences achieved lower scores than any other faculty in six of the LASSI subscales: *Attitude, Anxiety, Concentration, Information processing, Selecting main ideas* and *Test strategies.*

- The age of the participants did not have an effect on their LASSI results.
- Participants' Grade 12 marks correlated with the LASSI subscales: *Motivation, Test strategies, Information processing, Concentration* and *Self-testing.*

7.3.2.2 Findings regarding the second research objective: did the SRL skills of the cohort of first year students, as assessed by the LASSI, significantly predict their academic success?

Regarding the second research objective the following finding was made:

- The analysis of the LASSI results indicated that *Motivation, Time management a*nd *Information processing* were the best LASSI predictors of academic success

7.3.2.3 Findings regarding the third research objective: The different variables that relate to the SRL skills and academic achievement of these first year students

Regarding the third research objective, namely the identification of different variables that relate to the SRL skills and the academic achievement of the first year students, the following findings were made:

- The independent biographical variables *Grade 12 marks, age* and *gender* correlated better with academic achievement than the LASSI subscales did.
- When the LASSI subscales together with the biographical variables were considered as predictors of academic achievement, Grade 12 marks, age and gender were identified as biographical predictors, and to a lesser degree *Time management* and *Information processing* as LASSI predictors of first year students' academic achievement.

7.3.2.4 Findings regarding the fourth and fifth research objectives:

With regard to the fourth and fifth research objectives; namely (1) an exploration of how participants have experienced their studies in their first year and subsequent years of study and (2) a determination of the self-regulated traits or skills which have influenced the academic achievement of a selected group of participants in their fourth year of study, in addition to the skills assessed by the LASSI, the following findings were made:

- Successful students could differentiate between the different types of study material and could adapt their study methods accordingly. They could also adapt their study methods when the volume of the study material differed.
- Successful students applied a repertoire of learning strategies in a flexible manner.
- Successful students conveyed knowledge of themselves as students, as well as of the different requirements that study at a university implicates.
- Most of the successful students received information from parents, lecturers or principals about different learning methods and could describe their learning styles and preferences clearly.
- Some of the successful students could accurately infer which questions could be expected in the exam papers, and knew how and why these questions were asked.
- Successful students set realistic academic goals for themselves.
- Unsuccessful students did not consider their own study preferences or the academic requirements of the university.
- Unsuccessful students did not manage their time well and were not motivated.

7.3.2.5 Findings regarding the sixth research objective: a combination of the findings of the literature and the empirical study in order to

identify the SRL skills and other prerequisites that are necessary for academic success.

Regarding the sixth research aim the following findings were made:

- Successful students do not necessarily demonstrate all the SRL skills;
- The SRL skills of *Motivation, Time management* and *Information processing (*or *re-organising)* are imperative for successful studying;
- Successful students have to realise at the beginning of their first year of study that they have to adapt to the academic environment and requirements of the university milieu;
- Students have to obtain knowledge of, and be cognisant about their own learning styles, the appropriate learning strategies, the academic infrastructure, and their physical learning structure preferences;
- They have to set realistic academic goals and use effective time management strategies, and monitor both;
- They have to differentiate between the requirements of their learning tasks and adapt their learning strategies accordingly;
- They must know how, when, where and why to apply a variety of strategies to learn in a flexible manner.

7.4 RECOMMENDATIONS

On the basis of the findings emanating from the research, the following recommendations are made:

7.4.1 Recommendations for lecturers of first year students at the Potchefstroom Campus of the NWU

It is recommended that these lecturers should:

- corraborate closely with the FYA (if such a structure exists) advisers to monitor the students' progress – they should help to compile a profile of each of their students. The first year students should be aware that their profile is drawn with their best interest at heart. If they are warned when their marks are slipping, and advised by their adviser on how to address their problems this should inhibit high drop-out numbers;
- structure the learning tasks in the first year extensively;
- promote strongly interactive student-student learning through the establishment of learning communities among first year students, such as study groups;
- implement effective immediate feedback and other assessments that give prompt and constructive feedback on the students' learning (through informal and formal formative assessments);
- implement subsequent instructional modifications, especially where the first year students are not adapting to the learning requirements demanded by the university;
- teach the first year students how to read pertinent materials to their study programme /course, and evaluate arguments and evidence (thus helping to build a more critical approach than the students exhibited in Grade 12);
- set assignments that require more careful analysis, synthesis and critical thinking in each chapter of a study guide;
- facilitate the development of clearer learning outcomes;
- give substantial support to first year students in achieving these outcomes;
- formulate the outcomes that they wish the students have to achieve, then choose the appropriate teaching and assessment strategies, and finally the content that seems most likely to achieve these outcomes; and

- follow intentional approaches to help the first year students adapt to the different requirements of the university.

Motivation

The faculty members' responsibilities are sometimes underestimated. Students may sometimes fail or drop out because the pedagogy that was employed was inappropriate. The best courses are those that most successfully achieve the outcomes lecturers see as most important.

To be academically successful in a first year course, students need strong self-efficacy beliefs, employ a variety of learning strategies and be convinced of the value/relevance of the programme they are following. Lecturers therefore need to: 1) investigate ways of increasing students' self-beliefs about the subjects they are studying, 2) teach students a variety of learning strategies that they can use when studying and 3) convince students of the value/relevance of the courses they are studying through contextualising the information.

7.4.2 Recommendations for further research

Recommendation

Research has to be intensified on the skills that are needed for studying in an e-enhanced or an e-based learning environment. Research on strategies to improve the students' ability of implementing SRL skills in the electronic milieu is crucial, but also on the effect that the mega-provision of information has on their learning processes.

Motivation

The ability to obtain an infinite wealth of information from electronic resources is made possible through the push of a button. The impact of this mega-availability has not been researched sufficiently, and with each additional electronic gadget the speed of acquiring masses of unfiltered information, accelerates. Changes in

learning have been documented but not addressed completely. Research on learning electronically is not yet sufficiently performed and documented.

Recommendation

Further research is necessary on the SRL skills of students who study through open and distant courses where blended modes of instruction and e-learning plays an important role.

Motivation

Learners who leave Grade 12 may prefer to study through a distance mode of instruction, sometimes while they are working from eight o'clock to five o'clock. Specific SRL skills are needed to study successfully when advisers or lecturers who can encourage and advise these students are not immediately approachable.

7.5 CONCLUDING THOUGHTS

The basis of all forms of progress is education, especially with the aim of facilitating knowledge acquisition and the development of skills that are essential to create job opportunities. As more students gain access to Higher Education, academic support initiatives play increasingly important roles to ensure that students complete their studies. First year students need to transform their perspectives of learning and receive intensive training to improve their learning abilities. Students who experience difficulty in adapting to the learning requirements that universities or FET's demand, need to receive advice and constant support throughout their first year of study from the HEI. Higher Education is vitally important for the future of all countries, and South Africa cannot afford to lose valuable human potential at Higher Education Institutions.

These concluding thoughts are substantiated by the following quotation:

Today, more than ever before in human history, the wealth – or the poverty - of nations depends on the quality of Higher Education. Those with a larger repertoire of skills and a greater capacity for learning can look forward to lifetimes of unprecedented economic fulfilment. But in the coming decades the poorly educated face little better than the dreary prospects of lives of quiet desperation.

(Gillis, 2000)

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APPENDIX 1:

Informed consent form

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Informed consent form

Participants of a qualitative survey for the research project:

Strategies for the development of Self-Regulated Learning skills of first year students

You are kindly requested to participate voluntarily in an interview for qualitative research with the aim to determine if you apply Self-Regulated learning skills to study. The project is also part of my Ph D study.

The method used in this research, is the use of a recorder to capture the answers and discussions of you and the other students in the group, for analysis after the interviews.

You are assured that the following ethical aspects in this regard, will be honoured:

You may withdraw from the project at any time

The project will be completed within a specific time

The information gained from you will be treated confidentially

No name or student number of participating students will be made public

The results will be made known to you, whether orally or written.

Thank you for participating voluntarily in this very important project to develop Self-Regulated learning skills for first year students !

Ms Inge M Venter

(Telephone number: 018 299 4083)

I give consent with this form that the answers or discussion that I shall take part in during the interview that Ms Venter will conduct with me as individual or in a group, may be applied for the research on Self-Regulated learning skills

Name: ..... Student number: .....

Date:

Original details: Inge M Venter(10824987) C:\Documents and Settings\Administrator\My Documents\PhD Informed consent form.doc
22 April 2010
File reference: 2

APPENDIX 2:
Ingeligte toestemming

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

Ingeligte toestemmingsvorm

Deelnemers aan 'n kwalitatiewe ondersoek vir die navorsingsprojek:

Strategies for the development of Self-Regulated learning skills of first year students

U word vriendelik versoek om vrywillig deel te neem aan 'n onderhoud vir 'n navorsingsprojek met die oog daarop om vas te stel of u Self-Regulerende leervaardighede aanwend om te studeer. Die projek word ook aangepak om my Ph D te voltooi.

Die metode wat gebruik sal word om die navorsing te doen, is om 'n bandopnemer te gebruik om die antwoorde van u en die ander studente in u groep, vas te lê vir ontleding na die onderhoude.

U word hiermee verseker dat die volgende etiese aspekte in die verband, nagekom sal word:

1. U kan te enige tyd onttrek van die projek
2. Die projek word binne 'n bepaalde tyd afgehandel
3. Die inligting wat bekom word, sal konfidensieel behandel word
4. Geen naam of studentenommer van deelnemende studente sal bekend gemaak word nie
5. Die resultate sal aan u bekend gemaak word, hetsy mondeling of skriftelik

Baie dankie dat u vrywillig deelneem aan hierdie uiters belangrike projek om Self-Regulerende Leervaardighede vir eerstejaarstudente te ontwikkel !
Me Inge M Venter
(Telefoonnommer: 018 299 4083).

Ek gee hiermee toestemming dat die antwoorde of gesprek waaraan ek deelneem tydens die onderhoud wat Me Venter met my as individu of in 'n groep voer, aangewend mag word vir die navorsing oor Self-Regulerende Leervaardighede.

Naam: ..... Studentenommer: .....

Datum:

Oorspronklike gegewens: Inge M Venter(10824987) C:\Documents and Settings\Administrator\My Documents\PhD Ingeligte toestemmingsvorm.doc 21 April 2010

Verwysingsnommer: 1

APPENDIX 3:
The level descriptor for NQF level 8
(the fourth year of study)

Level Descriptors for the South African National Qualifications Framework

November 2010

Purpose of level descriptors

1. The purpose of level descriptors for Levels One to Ten of the NQF shall be to ensure coherence across learning in the allocation of qualifications and part qualifications to particular levels, and to facilitate the assessment of the international comparability of qualifications and part qualifications.

Definitions and context

2. In these level descriptors any word or expression to which a meaning has been assigned in the National Qualifications Framework Act (Act 67 of 2008) shall have such meaning and, unless the context indicates otherwise.

   a. "applied competence" means the ability to put into practice in the relevant context the learning outcomes acquired in obtaining a qualification

   b. "autonomy of learning" means the capacity of a learner for lifelong learning and includes the extent to which a learner can undertake action for learning independently, the extent to which a learner takes responsibility for his or her own learning and the extent to which a learner is self-reflexive about and can evaluate the quality of his or her learning and eventually that of others

   c. "field" means a particular area of learning used as an organising mechanism for the NQF

   d. "level" means one of the series of levels of learning achievement arranged in ascending order from one to ten according to which the NQF is organised

   e. "level descriptor" means that statement describing learning achievement at a particular level of the NQF that provides a broad indication of learning achievements or outcomes that are appropriate to a qualification at that level

f. "National Qualifications Framework " is a comprehensive system approved by the Minister for the classification, registration, publication and articulation of quality-assured national qualifications

g. "operational literacy" means an ability to use basic procedures and operations to complete complex tasks

h. "sub-framework" means one of three coordinated qualifications sub-frameworks which make up the NQF as a single integrated system: The Higher Education Qualifications Sub-Framework, the General and Further Education and Training Sub-Framework and the Occupational Qualifications Framework

3. Each level of the NQF is described by a statement of learning achievement, known as a level descriptor.

4. There is one set of level descriptors for the NQF.

5. The nomenclature for qualifications is dealt with in the sub-frameworks of the NQF.

6. Contextual interpretation of the level descriptors within each of the three sub-frameworks is encouraged.

7. In order to advance the objectives of the NQF, the South African Qualifications Authority is responsible for the development of the content of the level descriptors for each level of the NQF in consultation with the three Quality Councils: The Council on Higher Education, Umalusi and the Council for Trades and Occupations

Level descriptors

8. A qualification or part qualification registered at a specific level of the NQF shall comply with the following categories of level descriptors.

16. NQF Level Eight

a. *Scope of knowledge*, in respect of which a learner is able to demonstrate: knowledge of and engagement in an area at the forefront of a field, discipline or practice; an understanding of the theories, research methodologies, methods and techniques relevant to the field, discipline or practice; and an understanding of how to apply such knowledge in a particular context

b. *Knowledge literacy*, in respect of which a learner is able to demonstrate an ability to interrogate multiple sources of knowledge in an area of specialisation and to evaluate knowledge and processes of knowledge production

c. *Method and procedure*, in respect of which a learner is able to demonstrate an understanding of the complexities and uncertainties of selecting, applying or transferring appropriate standard procedures, processes or techniques to unfamiliar problems in a specialised field, discipline or practice

d. *Problem solving*, in respect of which a learner is able to demonstrate an ability to use a range of specialised skills to identify, analyse and address complex or abstract problems drawing systematically on the body of knowledge and methods appropriate to a field, discipline or practice

e. *Ethics and professional practice*, in respect of which a learner is able to demonstrate an ability to identify and address ethical issues based on critical reflection on the suitability of different ethical value systems to specific contexts;

f. *Accessing, processing and managing information*, in respect of which a learner is able to demonstrate an ability to critically review information gathering, evaluation and management processes in specialised contexts in order to develop creative responses to problems and issues

g. *Producing and communicating information*, in respect of which a learner is able to demonstrate an ability to present and communicate academic, professional or occupational ideas and texts effectively to a range of audiences, offering creative insights, rigorous interpretations and solutions to problems and issues appropriate to the context

h. *Context and systems*, in respect of which a learner is able to demonstrate an ability to operate effectively within a system, or manage a system based on an understanding of the roles and relationships between elements within the system

i. *Management of learning*, in respect of which a learner is able to demonstrate an ability to apply, in a self-critical manner, learning strategies which effectively address his or her professional and ongoing learning needs and the professional and ongoing learning needs of others

j. *Accountability*, in respect of which a learner is able to demonstrate an ability to take full responsibility for his or her work, decision-making and use of resources, and full accountability for the decisions and actions of others where appropriate

APPENDIX 4:

Consent from the registrar.

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
INSTITUTIONAL OFFICE

Confidentiality Clause for the granting of access to information in terms of the Promotion of Access to Information Act, 2 of 2000

I, IM Venter, for purposes of my PhD studies in "Strategies for the development of self-regulating learning skills of first-year university students" undertake and agree to:

(a) only use, copy or otherwise replicate the sample of student numbers, surnames and names, campus, faculty, delivery mode academic year and cell number as extracted from the student administrative system of the NWU (herinafter referred to as "the Confidential Information") for the purposes as mentioned above (herinafter referred to as "the PhD studies") and not to use the same for any other purpose whatsoever;

(b) ensure that only those officers and employees who are directly concerned with the carrying out of this PhD studies have access to the Confidential Information on a strictly applied "need to know" basis and are informed of the confidential nature of it;

(c) keep the Confidential Information secret and confidential and shall not directly or indirectly disclose, publish, transfer, disseminate, copy or permit to be disclosed the same to any third party for any reason other than the PhD studies without the prior written consent of the NWU's Institutional Registrar involved.

The obligations of confidence referred to above shall not extend to any Confidential Information which:

(a) is or becomes generally available to the public otherwise than by reason of breach by myself of the provisions of this Clause;

(b) is known to myself and is at its free disposal (having been generated independently by the myself or a third party) in circumstances where it has not been derived directly or indirectly from the NWU's Confidential Information;

(c) is subsequently disclosed to myself without obligations of confidence by a third party owing no such obligations to the NWU in respect of that Confidential Information;

(d) is required by law to be disclosed (including as part of any regulatory submission or approval process) and then only when prompt written notice of this requirement has been given to the NWU's Institutional Registar so that it may, if so advised, seek appropriate relief to prevent such disclosure provided always that in such circumstances such disclosure shall be only to the extent so required and where practicable shall be subject to prior consultation with the NWU's Institutional Registrar with a view to agreeing timing and content of such disclosure.

My obligations under this Clause shall survive the expiration or termination of the PhD studies for whatever reason.

Signed on this 15th day of September 2009 at Potchefstroom

IM Venter

Ms IM Venter (Staff nr 10824987)
Researcher

Prof NT Mosia
NWU Institutional Registar Acting.

F.J. du Preez

Original details: AMANDA.VANDERMERWE@NWU.AC.ZA c:\documents and settings\administrator\desktop\confidentiality clause.doc
2009-09-01

APPENDIX 5:
Translated verbatim transcriptions of participants' responses

Question 1 (5.5.3.1) Study methods used with success

Part.	Answers
1	• Previously I was not motivated but am now. • I make use of study aids when the amount of learning is huge. • I summarise and use brain charts for huge amounts. • I use highlighters in different colours to indicate different areas of work.
2	• I read through study material. • I am more motivated than for my 1st qualification, because it is a more challenging study than my 1st. • Mathematical theorems are written down and memorised, but for theory I read and re-formulate it to understand. • I never use brain charts or study aids for studying.
3	• I read through study material until I comprehend - then I make summaries or use highlights. I make brain charts of the material. • I can't learn work I don't understand. I test myself by asking questions or ask a class friend to ask me. • I was not motivated but am now, because of positive feedback.
4	• For Maths and Accounting I calculate sums and practice the calculations • I make summaries and say it out loud: the see-hear-say method which involves three senses. • I make use of notes and the text book for explanation, info is added in writing and notes to form a holistic picture. • I explain to myself and friends. • Some work is easier to write down - and group work and discussions are not preferred. • I like studying in the library for the structure and silence. • I think outside the box and love my studies • One has to know the underlying theories and how and why to apply it.
5	• I like the theory and problem-solving ways of my study. • I work through problems and memorise. • I am now out of residence: plan and manage my time better. • I work through the text book and make sure I understand by note-making and condensing. • I memorise mathematical theorems and one subject. • I read, concentrate on headings, and summarise the others.

	• One should have knowledge of lecturers: their time spent on an aspect indicates importance of the aspect, also their comments. • I do extensive revision of the study material if my comprehension is less than 100%, in order to pass and keep my bursary .
6	• I study better alone. • I repeat for some subjects, make rhymes or summarise, but I put it in a sequence and compare notes for short learning divisions. • For longer learning divisions I make a rhyme and use highlights. • I cut out and paste to form a holistic picture, but no brain charts - I use different methods for different subjects
7	• For comprehensive amounts I read and rehearse. • I highlight main points.
8	• I learn say 7 pages and then write it down but it doesn't always work. • I re-organise my learning environment. • I only memorised and didn't understand. • My motivation is when I do well.
9	• I learn like a parrot and memorise mostly - I learn for 45-60 min and then take a break. • What I do for difficult work is to break it into segments and learn smaller segments. I learn all the work and never 'spot'. • I took a course in "how to learn" in Grade 9.
10	• Maths is practical and we do a lot of repetition and exercising of sums. • Sums are worked out to make sure you understand and remember. • For English I do a lot of reading and use study methods. • For lots of work I make summaries, no brain charts… • I use highlighters for main facts and mainly red for headings • I am a visual and auditive learner. • I use brain charts for planning of my study and not for learning. • I really like my studies and my lecturers in the 4th year

Question 2 (5.5.3.2) Study methods adapted from the first year of study.

Part.	Answers
1	• I never used study aids in Matric and at the beginning of my 1st year. • At university the amount of work became more considerable and I started using highlighters and brain charts for main points. • I do more summarising and self-testing now.
2	• My study methods haven't changed and I use the same study methods but I still try to understand what I learn.
3	• My study methods had to change because the work is so comprehensive, not more difficult. • I summarise much more because of the huge amount.of work, and I adapted my study methods to the requirements set by the University. • I now use highlighters and coloured pens.

4	• My study methods stayed the same
5	• I adapted unconsciously because of the amount of learning material. • I don't take notes if I have my study guide and I only note additional information. • I make a pointer of main facts or indicate the importance that adds to the subject matter
6	• I spend more time on studying because of the amount of work at university. • Students study more individually than at school where we worked in groups.
7	• I study longer than at school because the work is more.
8	• I don't do well because I haven't changed my study methods, but I wish I had. • I didn't understand what I was learning
9	• I only learnt how to learn this year and I sum up much more and use highlighters. • For difficult work I look at slides and work through the text book to get an overview. • In my first year I studied for distinctions but not anymore.
10.	• The amount of work overwhelmed me in my first year and so I had to change my study methods - in my first year my time management wasn't good but that has improved. • LEER 111 helped with my study methods but not with organising the huge amount of work. • In my first year I stressed but now I prepare beforehand and plan ahead for studies and exams, by planning and grouping the learning material when I receive my exam schedule. • I adapted because of the interactive CD's, for which one has to prepare. I look at it and then make summaries. • My aim is a Honours degree in English • My marks are better because of my better time management and learning strategies. • I have to make time to summarise before I start studying, to have more time to study.

Question 3 (5.5.3.3) Self-evaluation while studying

Part.	Abbreviated answers
1	• I ask myself questions while I am studying and at the end of each study section. • I look at the outcomes and self-evaluate if I have reached it and if not, I go through the work again.
2	• I usually self-evaluate.
3	• I ask myself questions and ask others to test me.
4	• I do.
5	• I make sure I understand the work through reflecting.
6	• I evaluate myself and repeat a lot, but I don't set questions for myself.
7	• I ask myself questions and try to understand.
8	• Not really.
9	• I do through practicing. • Pharmaceutica is a highly cognitive subject
10	• I ask myself what I remember.

	• For typical study subjects like Education I make rhymes and use highlights. For subjects that have to be understood, I study questions from the exams and evaluate myself. I anticipate questions and give attention to class questions.

Question 4 (5.5.3.4) Re-organisation of the study material

Part.	Answers
1	• I first try to understand, and then I summarise the work.
2	• I re-formulate difficult concepts and try to understand before I learn it. • Mathematical theorems are written down and then memorised. • I re-organise the study material.
3	• I summarise or rewrite difficult pieces in my own words.
4	• I organise and rearrange the material and file relevant material together. I don't listen to music and walk up and down when learning. • I organise my study: more time was spent on my 3rd year module than on the 1st year module as it was more difficult.
5	• I add pointers or additional notes.
6	• I make rhymes with the core words and use highlights for it.
7	• If there is a lot of work I make summaries. The parts I understand are not re-organised.
8	• I write the material in my own words. I learn better with synonyms.
9	• I learn for oral exams and not for class tests. I can adjust my learning to the degree of difficulty. • I spend more time on difficult subjects - some parts have to be learnt but I don't always know why…
10	• I make summaries of say, the interactive CD's.

Question 5 (5.5.3.5) Setting of goals and planning of study activities

Part.	Abbreviated answers
1	• I set goals such as setting a certain percentage or a distinction. If I have a distinction the University doesn't demand the class money and my father said I could then have that money for myself.
2	• I set goals and try to keep them.
3	• I work for distinctions.
4	• When I set myself a goal for e.g. a distinction, I work harder.
5	• I enjoy the exams as I then have time for executing my goals. If there are 6 chapters and 3 are comprehensive, I divide the most comprehensive one in two and plan my time accordingly. • I always leave the easiest and shortest for last, so that when my time runs out, I can skimread it. • During Aardklop I stayed in Potch for catching up of my studies as my main goal was high marks. I learn for 90% and when I get 60% I know that it is because of my difficult study. If I want to attain 75% for a specific subject I know I have to study for 5 or more hours.

6	• I set goals and when I reach it, it motivates me to study further
7	• I do to pass. If I have a 40% participation mark I know I have to obtain 60% in the exam.
8	• I am purposeful and complete my assignments on time.
9	• I have a 4 year long-term goal and no short-term goals. I give my best and study to get my degree.
10	• I aim for 75% or 80% in English.

Question 6 (5.5.3.6) Information-seeking

Part.	Abbreviated answers
1	• I go to the library or the Internet.
2	• I prefer the Internet or the library. I would rather ask my friends than the lecturers.
3	• I go to the library or the Internet.
4	• I go to the library or Internet or consult the text book.
5	• I ask a friend or consult the study guide or the text book.
6	• I consult my friends who study in the same direction and we consult the text book. I also ask the lecturers but only as a last resort the Internet.
7	• I consult the Internet, library and friends.
8	• I prefer the Internet, study guides and text books before I go to lecturers.
9	• I consult the lecturer or my friends and not the internet or library - I like interaction between myself and people.
10	• I consult the text books, then the library. I consulted a programme *RJS* that demonstrates how to search information. I also search for information on the Campus Internetsite. I get information from group work and can also ask my lecturers, who are very motivating.

Question 7 (5.5.3.7) Keeping of records

Part.	Answers
1	• I keep records for the purpose of getting distinctions. If I have 70% as a participation mark I know I have to get 80% in the exam for a distinction. If I have 72% for class tests I have to perform better in assignments and vice-versa.
2	• I don't keep records.
3	• I keep records for all my modules. I keep my modules and participation mark in files. If I read more about the subject I add it to the file.
4	• I keep records: for my short-term goal the participation mark indicates what I should obtain for admittance to a Honours degree. • For my long-term goal, well the challenges in Accountancy are difficult and thus I have to work harder.
5	• I monitor my percentages as I have a SASOL bursary so I try to obtain 75%.
6	• I do.
7	• I do to compare marks. If I have a 40% participation mark I need 60% in the exam to

	pass. I never attend all the classes and don't write the class tests. I spin a story if I need the necessary mark to be allowed for the exam and I would then learn very hard for the exam. • I don't like classes. I feel I can learn quicker on my own than having to attend classes. The lecturers have so many kinds of trying to keep the students learning, such as group work and games, which don't work for me.
8	• I keep my participation mark and then deduct what the exam mark should be to pass.
9	• I keep track of my participation mark so that I know what I need in my exam to pass.
10	• I keep records of my participation marks so that I know what to get in the exam for obtaining distinctions.

Question 8 (5.5.3.8) Re-structuring of learning environment

Part.	Answers
1	• I like monotonous sounds and music to study by. • My surroundings must be neat and structured.
2	• I organise my room and like having sounds, I even leave my door open to hear other students and sounds.
3	• I prefer a neat place with everything in order. My study material is filed and the light must be just right.
4	• I like a structured environment and I organise my study material before I study.
5	• I sort my desk out before I study. I arrange the learning material with tests, notes, and study material for each module. • I like to have sound because my twin sister and I used to talk to each other when studying in the same room. • Monotonous sounds or earphones with music helps, but I don't like sudden sounds as they startle me. • I think I am an auditive learner.
6	• I like neat and orderly studying and structured surroundings. I like music and even silence. • I have a study book and study material.
7	• I try to keep my surroundings as quiet as possible. I study in a comfortable way, such as lying down or sitting comfortably. • I like having something to eat and drink when I study.
8	• I like organised surroundings. • I print my notes and put them in files and when I finish learning a section I put it in a parcel in the file.
9	• I like my surroundings neat and my environment structured – I am a creature of habit. • I play baroque music and like my study material together and neat.
10	• I like studying in a group for the same subject. I organise my learning surroundings and keep only necessary material on my desk. When I study Maths, I play music

	because it helps me to concentrate, but if I only memorise I like silence. • I can't study in the library as it is too structured. I can study anywhere - even in my PJ's.

Question 9 (5.5.3.9) Rewards for studying

Part.	Answers
1	• My father says I can keep the money when I attain distinctions. • I buy myself electronic gadgets like an iPod. .. this is a reward I promised myself while studying.
2	• I don't promise myself rewards as being successful academically is rewarding enough
3	• Not really – I like to spend time with friends after a test.
4	• I give myself incentives like a chocolate or a break or watching TV when I complete a study section. • I motivate myself through the satisfaction of finished study.
5	• My motivation is internal - but I have a SASOL bursary for studying.
6	• I reward myself with recreation or drink coffee when I reach my study goals. • Reaching my goals is my reward
7	• I think about celebrating and after studying I celebrate with friends.
8	• I keep records and results and when I learnt hard enough I don't have to learn the day before.
9	• My reward is the satisfaction that I have progressed with my studies. • My motivation is internal and my family are also pharmacists.
10	• One studies for yourself. After studying a section I eat out with my boyfriend or socialise. • I am organised and when I know that I am in accordance with my study plan I feel internally motivated. • I like to tick off what I have done and I feel panicky when I don't know where I am.

Question 10 (5.5.3.10) Rehearsal or memorisation of study material

Part.	Answers
1	• There is a lot of rehearsing and memorising in Law.
2	• I only memorise mathematical theorems. • If I think there will be a long question, I rehearse some of the study material.
3	• I have to sometimes.
4	• I don't memorise if I don't understand. • I read the material more than once if it is a difficult subject.
5	• It depends on the subject. Most subjects require problem-solving, but this year we had Biochemistry and I had to adapt because we had to memorise the content. I don't like memorising.
6	• Yes I do.
7	• I have to – say for formulas. Otherwise I read only.

8	• Yes: I believe in the three senses-learning: see, say and write.
9	• Yes I have to. If I don't remember I go back and learn again. • I try to understand more in this fourth year because the new work builds on the previous work.
10	• I complete chapter by chapter and rehearse a lot. • I use brain charts for planning of my study and not for learning.

Question 11 (5.5.3.11) Assistance-seeking when encountering difficulties

Part.	Answers
1	• I ask my friends or the lecturers
2	• I ask my study group or other friends, not the lecturers. • My father started a group to discuss study methods and that motivated me.
3	• I ask my class friends or the lecturers
4	• In my undergraduate years I asked my class mates – as I felt that the lecturers wouldn't have time for me in such a big group. • In my postgraduate year now I ask my lecturers because we are less and they know us and we are more involved.
5	• I ask my friends or the lecturers. I have good relationships with the lecturers
6	• I first study on my own and only then do I go to friends to study together
7	• I ask students who have previously studied the subject, or class friends. • I don't ask the lecturers
8	• I prefer the Internet
9	• I seek assistance from my lecturer or my class friends
10	• I ask my class friends and the lecturers. The lecturers are very sympathetic towards us.

Question 12 (5.5.3.12) Working out tests and exam papers

Part.	Abbreviated answers
1	• I do. It helps to know how the lecturer asks questions – long or short questions. • Exam papers can be repetitive in the way they ask questions.
2	• Yes. It's easy to work out papers and the same questions are repeated. • I always work out old memo's and try to find out why and when specific formulas are applied.
3	• Only after I have completed learning for a subject.
4	• I revise old exam papers and tests and I also look at how the lecturer asked them.
5	• Only after I understand the study material. Then I review the questions and memos.
6	• I first try to understand my work and then I work through exam papers and tests. • I believe in studying all my work
7	• I do. The lecturers ask the same questions but not in a pattern.

8	• I revise old exam papers and try to answer. Then I look at the memos to see if I was correct. • I learn hard and am hard working.
9	• I do at the end of my learning for a section. Only then do I test myself against an exam paper.
10	• I work through old exam questions and papers to see if the lecturer asks only facts or demand motivations too. • One can read the lecturers and their questions like a book. Some are lazy and ask the same questions over and over.

Question 13 (5.5.3.13) Advice and hints for learning for first-year students

Part.	Answers
1	• Immediately adapt and summarise your study material, as it is more than at school. • Work on your own and find your learning style and strategy that works for you - my friends have different learning strategies that work for them but not for me. • The same study method that worked in Matric is perhaps not adequate for the university level, because the work becomes more and one has to keep up right from the beginning.
2	• Study in accordance with your psychometric tests: I didn't and started my studies because the lecturer was so enthusiastic, but I realised that I prefer Maths to Accountancy in my first year. I am very motivated now. Matrics should know what their intended study entails. • First-years should know why they use specific theory and when - examples help with this. One should understand the reasons for doing things and study what you are interested in. • I recommend listening to music while you study and getting enough sleep. • One should have a balanced approach and also take part in sport.
3	• Manage your time spent on studies. One should decide which subject is most important and spend time on that. • One studies better when you understand the learning material. • I use highlighters and coloured pens and music as background • First years must adapt their study methods from Matric to that demanded by the university. The work is much more and one has to work on one's own. • Some work is also more difficult than others, while in Matric they have the same difficultness.
4	• My school principal had interviews with the Matrics about their future studies. Figures were suggested for me, and I chose a business direction. • I would say that I am a self-regulated student – I know when and how to study and have self-discipline.

	• First-year students should sleep well and start early with studying. If you start early and revise, the content is in your long-term memory and you will not stress in the exam. • I like to organise the study material and see that my goals have been reached. • Adapt the tempo and input to the volume and degree of difficulty. • When studying a comprehensive amount of work such as that encountered at university, break it into smaller pieces. • Students in their first year don't always know what to study and what to leave.
5	• Time management is important. In Matric there is a lot of repetition necessary to achieve well and the exam papers have to be completed in detail. Try to keep the same standard but learn more as the work becomes more at university. • In Matric one learns very hard and purposefully – and the ethics of this should be continued. One was safe and sheltered and there was more routine than at university. • Sleep enough. Also take part in sport – I was not an academic wreck and did well enough.
6	• Be alone when you study and then reflect with friends to get a broader perspective. First make the learning material your own. • Plan and manage your time for study. • Read more about the subject and try to understand. • If a subject requires higher order thinking, one should pay more attention. If one is interested in the subject – read more about it. • No-one needs to tell me to study as I know what works for me - that is why I study the way I do. • Set up a study plan and keep it up, otherwise one becomes nervous. You have to have confidence in your study method. • Write dates of the exam papers and plan your study accordingly. Allow more time for difficult subjects and less for easy subjects. • Manage your social life and prioritise your tasks. • Self-confidence in studying depends on yourself as individual. If you experience your studies as problematic you should talk to an adviser and rise above it. Motivate yourself and don't be afraid. • My dad was a lecturer and he asked us: how do you learn? • Oh, and use a red pen for highlighting.
7	• Make complete notes. If you summarise the study material you will know it better. • You must study hard.

	• There is only one subject I enjoyed learning for. Most of the others … the lecturers take such a long time in really getting to the point. I could have learned much quicker if I hadn't attended classes and studied on my own.
8	• I only memorised and don't always understand – that is wrong. • Students should understand what they are learning.
9	• Be balanced. Don't only learn but take part in other things as well. • Don't learn until 4 am. You should be rested. • You should manage your time properly. Don't learn only old notes.
10	• Plan ahead and keep to the schedule, because you won't have extra time for studying. • Take your diary for planning and what you have to do. Make lists and tick off what you have completed. • You should know your individual learning style and strategies. • You should get to know your lecturers better and then you can deduct which type of questions they will ask in the exam and tests. Attend all your classes. • Keep files and the results of your subjects together. • Plan your studies – one cannot study for 4 hours without a break. You must sleep enough and study long before you write. • One can't study without some stress, but don't drink Red Bull all the time.

APPENDIX 6:
Example of a booklet to accompany the SRL programme for first year students

CONTACT SESSION 1

WELCOME !

1. Please fill in the following spaces

1. Universities where a FYA is established.

We welcome you as a very important student at the …….. (name of university). The name of the facilitator is ……. (name of facilitator) and his/her contact number is …….. To support you in the process of adapting to a very different learning milieu than the one you have attended for the past 12 years, the …….. (name of university) has established a First Year Academy or FYA with advisers and personnel who will be available for all your requests. The manager/director of the FYA is …….. (name) and he/she will extend a personal welcome sometime during the next two days.

OR

2. Universities where a FYA is not established but other structures and persons, such as first year advisers and SI leaders, are in place to support the first year students.

We welcome you as a very important student at the …….. (name of university). The name of the facilitator is ……. (name of facilitator) and his/her contact number is …….. To support you in the process of adapting to a very different learning milieu than the one you have attended for the past 12 years, the university has first year advisers and Supplementary Instruction (SI) leaders who will be available for all your requests.

All universities:

The …….. (name of university) has established a Self-Regulated Learning Programme or SRLP to prevent you from becoming one of the numbers in the high dropout and failure statistics that are recorded for universities. A survey in 2005 has established that 36% of first year students at Higher Education Institutions (HEI's) in South Africa drop out in their first year. There is concern worldwide about the poor adaption of first year students from Secondary Education Institutions to the challenging learning milieu of universities.

ASSIGNMENTS To put the strategies that you will learn into practice please do the assignment individually. These are not group assignments and have to be completed and handed in with your name and student number on each assignment.

TAKE NOTICE OF THE FOLLOWING

Your learning ability and intelligence is not rigid and can be improved even further. When you believe you can become smarter this already makes you smarter! No effort that you put into your studies is superfluous. You will be empowered with the knowledge and skills that you gain in the next two days to be a successful first year student.

"Thinking about intelligence and learning ability as changeable rather than stable and fixed, results in greater academic achievement…"

Aronson, Fried and Good (2001).

If you are interested in reading more about this exciting viewpoint, you can read the following articles:

- P.L. Ackerman, M.E. Beier and M.O. Boyle (2005). Working memory and intelligence: the same or different constructs? *Psychological Bulletin* Vol.131:30-60.
- M. J. Kane, D. Z. Hambrick and A. R. A. Conway (2005). Working memory capacity and fluid intelligence are strongly related constructs. *Psychological Bulletin,* Vol 131: 66-71.
- H. M. Suss, K Oberauer, W. W. Wittmann, O. Wilhelm and R. Schulze (2002). Working memory capacity explains reasoning ability and a little bit more. *Intelligence,* Vol 30: 261-288.

2. The estimated number of hours for your 1st and 2nd semester.

The reason for estimating your study hours is to draw your attention to the fact that you will have to plan and manage your time very carefully and constructively at university.

2 Fill in the number of hours in the spaces that are provided for:

1) Notional study hours*:* ……..…
2) Activities such as sport, cultural: …..…….
3) Socialising and group activities: ..…..……

4) Estimated number of hours: Total …….

(Holidays are not included)

Take note that you will have to develop a **time table** this afternoon that will allow adequate time for your academic and non-academic activities.

3. Have you given careful thought about studying at this specific university in the specific direction you have enrolled for?

To be committed you should be completely convinced of your reasons for studying at the .... in ..... (course of study).

3 You have to commit yourself to the university by signing in the space provided. If you are reluctant to commit you should discuss your situation with your parents and/or the facilitator of the SRLP or an adviser from the university.

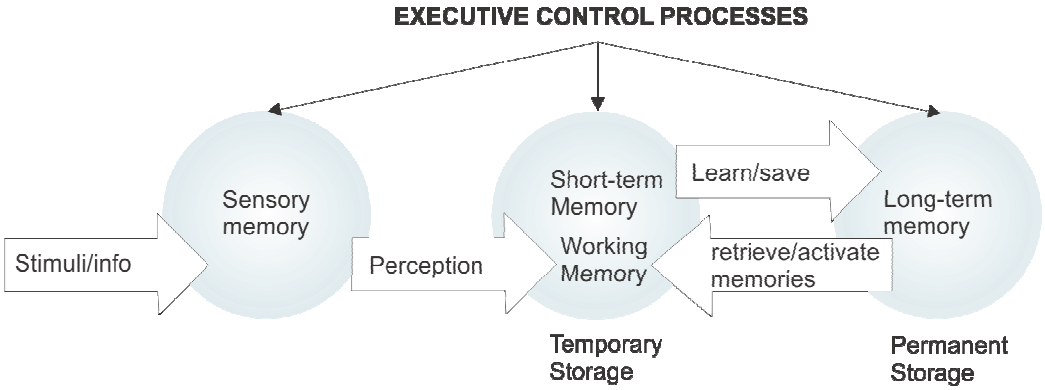
..... (signature)

..... (student no.)

4. Have you ever wondered about how you acquire knowledge and remember? The process of knowledge acquisition was illustrated schematically in the following figure of Anita Woolfolk in 1998, and is used to demonstrate how you can process information.

It can be compared to a computer system! Information is received, either processed and stored for later retrieval, or processed and fed back immediately. Listen carefully to your facilitator when he/she explains the system.

The circles indicate the memory stores and the arrows indicate the actions that are performed.



The information processing system of Woolfolk (1998)

- The *sensory memory* holds all the *stimuli or information* from the environment for a very brief time, and has a large capacity, but the duration of holding is very short.
- *Perception* is the meaning we attach to the stimuli/information received. This meaning is constructed and based on objective reality as well as existing knowledge.
- The *short-term or working memory* has a smaller capacity than the sensory memory, and holds new information for a brief time. It is also called the *working memory* because its content is information that is activated. This may be some new information that has just been encountered, or knowledge from the long-term memory that has been activated.
- The information has to be *saved through rehearsal*: either through repetition, called maintenance rehearsal, or through elaborative rehearsal, that involves the association of the new information with something in the long-term memory store. If the information is not rehearsed, it is lost from the short-term memory, as a result of interference or decay. **Deep learning** implies the critical analysis of new information and linking it to prior knowledge. This process should lead to understanding and the long-term retention of concepts.
- The *long-term memory* holds the information that is well learned and durable. The capacity of long-term memory is unlimited and if information is stored securely, the duration is permanent. Obtaining access to long-time information is more time - and effort consuming than obtaining access to short-time memory. Information from the long-term memory store is not lost, but is stored and becomes available if the right cues are given.

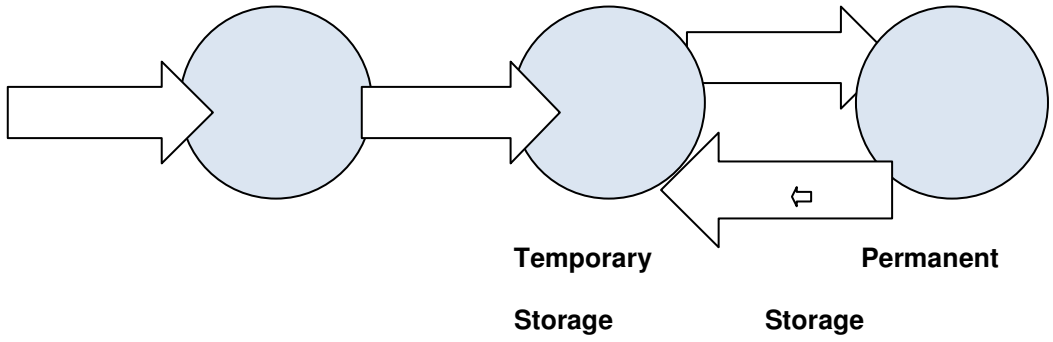
  The contents of your long-term memory consist of three categories of memory:

  - ❖ semantic (the meaning of words and sentences);
  - ❖ episodic (consisting of many and different events); and
  - ❖ procedural memory (the procedure of doing things).

- *Retrieving information* can partly be effected through spreading of activation from one bit of knowledge to related ideas, or through reconstruction. *Storing information* in the long-term memory can be integrated through the use of **learning strategies**, such as elaboration, summaries, organisation, contextualising, the use of study aids etc. You will shortly learn more of the learning strategies that you can use for successful studies at the university.

4 Can you quickly fill in the names of the 3 memory stores and of the arrows without looking at the figure?

Woolfolk's process of knowledge acquisition



Remember that the information acquiring process involves the following steps:

(1) gathering and representing of information (encoding);

(2) holding information (storing); and

(3) getting the information when needed (retrieving).

5 Memory exercise:

1)10concepts: ……

……

……

……

……

……

2) 10 concepts:

……

……

……

……

6. Read the following description of learning styles and determine your learning style. If you are not sure of your style, discuss how you learn with a class friend. Remember that you may have more than one learning style, or a combination of learning styles. Contemplate the learning strategies that accompany each learning style, as well as the alternative strategies (indicated by a star or *) that are provided in the descriptions below, and decide how you can implement it.

If you are interested in reading more about learning styles, you can search for the Internet link provided underneath:

http://www.engr.ncsu.edu/learningstyles/ilsInternet.phpi

- **A sensing learning style** (vs an intuitive learning style)

These students focus on external input, observe details of their environment, prefer concrete facts and thoughts with hands-on work. You learn through repetition, have time consuming thoughts, write in detail, and search for the connection between the learning material and the real world. You look for the facts in your learning material and are good at memorising learning material.

Appropriate learning strategies

When reviewing or learning the study material, you should try to concentrate on the facts and underline or highlight them. You should learn theoretical information by bringing in facts to support the theories. Ask for, or search for specific examples of concepts and procedures, and find out how the concepts apply in practice.

* You should concentrate on more innovative thinking and understanding.

- **An intuitive learning style** (vs a sensing learning style)

These students focus on internal input, are imaginative, and look for meanings - thus sometimes missing details. You prefer abstract thinking, are quickly bored with repetition and prefer variety in learning. You like to work with concepts, and tend to make careless mistakes. You look for meaning in your learning material and prefer discovering possibilities and relationships.

Appropriate learning strategies

You have to form a global picture of the learning material, and then break it down into smaller parts, that contain more facts and detail. You should ask for, or look for interpretations or theories that link the facts. You should practice your innovation skills, but when reviewing study material, you should try to concentrate on the facts as well as the meaning.

* As lecturers present and assess both insight and facts, you should also memorise facts and data, to help you defend or criticise theories or procedures.

- **A visual learning style** (vs a verbal learning style)

These students prefer to study with pictures, use diagrams and make sketches of study material. You prefer to use schematics, draw flow charts and implement plots. You look for visual representations of information.

Appropriate learning strategies

You learn most effectively through the use of flow charts, diagrams and brain charts to help visualise the information that has to be reviewed or learnt – this helps, especially for learning quicker. You should ask for, or search for videotapes or CD-Rom displays of the course material. When you revise study material, you should group information according to concepts in blocks, and use arrows linking the blocks, to create visual links. Highlighters can be used effectively for the retention of facts, such as using one colour per topic.

* Because of the preferred mode of verbal and written delivery of information by most university lecturers, you should also adapt to these modes of delivery. You can do this by working in groups or by writing summaries in your own words.

- **A verbal learning style** (vs a visual learning style)

These students prefer the spoken word, request explanations and use written words. You prefer to use symbols which are seen, but are translated by the brain into their oral equivalents. You look for explanations with words and are adept at verbal reasoning.

Appropriate learning strategies

You learn most effectively through the use of rhyme, mnemonics, and word formation. You should practice note-taking and seek out opportunities to explain information verbally to others, such as in study groups. You can rewrite the study material outline in your own words.

* You should also develop skills in implementing flow charts and diagram, to summarise and learn the material quicker.

- **An active learning style** (vs a reflective learning style)

These students process information actively (doing something with the study material, and then reflecting on it), think out loud, and try something out before planning. You prefer to attempt new knowledge acquisition somewhat prematurely. You like working in groups to figure out problems.

Appropriate learning strategies

These students should involve themselves in decision making in groups, and try to apply the learning information in as practical a manner as possible at university. As you sometimes make hasty decisions, you should learn to reflect before acting. You learn most effectively when you reflect in a group situation, or with another student in the same study direction. In the group the members should take turns explaining difficult topics to each other. Try to predict what the questions will be in the next assessment opportunity, and what the answers should be.

* You should learn to digest the main drift of the new information first, before your group discussion.

- **A reflective learning style** (vs an active learning style)

These students process information reflectively (you think beforehand about the presented material and then do something with it), and work introspectively. You prefer to think things through, to evaluate options, and learn by analysis. You tend to delay starting to learn and prefer figuring out a problem on your own, or through working with one or more class friends.

Appropriate learning strategies

You need to allow yourself enough time to concentrate on summarising learning situations or problems. You have to digest new information first, before discussing it with others. How you digest new information depends on whether you are a visual or a verbal learner. You should write short summaries of class notes in your own words to retain the material effectively.

* You have to force yourself to make decisions on time for the learning requirements at a university, which sometimes demand quick action or decision-making. You should also adapt to group discussions, which is a widely-used method of teaching at most universities.

- **A sequential learning style** (vs a global learning style)

These students build understanding in logical sequential steps and can learn even with partial understanding of the information. You progress steadily, explain easily and think analytically. You

prefer to have information presented linearly and orderly. You put together the details in order to understand the big picture.

Appropriate learning strategies

You can explain how a procedure or problem has to be solved to your fellow students. You learn most effectively by breaking down the learning material into smaller components, thus solving problems easily. You have to use numbering or the alphabet to organise your learning material in consecutive order. You should ask, or try yourself to fill in any steps that were skipped in class or the material. You should outline the learning material in logical order.

* You have to strengthen your global learning skills by relating each new topic to known things or facts.

- **A global learning style** (vs a sequential learning style)

These students absorb information randomly, and acquire information through interrelations and connections. You prefer a holistic approach and may make leaps in understanding with little progress between them. You can't explain easily and you think holistically. You see the big picture first and then fill in the details. You can detect why you should learn a specific part of the material, and then put it into the perspective of the total picture/concept.

Appropriate learning strategies

You learn most effectively through first forming a global picture of the learning material. You should break the material down into smaller components to effect problem-solving quicker. You should ask or search yourself for connections between learning material.

* You should take time to search for and find connections and explanations before you conclude your learning of specific learning material.

6 My preferred learning style(s):

…….

Strategies that accompany my style of learning:

……..

……..

……..

7. In which learning surrounding/environment do you learn at your best?

- Do you study better at your desk or table or while lying on your bed?
- Do you prefer a structured environment, such as a library where there is silence, or your room, or a room in the residence where it is not always structured and quiet?
- Will you change your learning environment at university?
- Do you study for a specific time and for how long before you take a break?
- What is the kind of break you take?
- Does sport, Pilates or other physical activities benefit your learning ability?

Remember that knowing your preference and taking action to arrange your learning environment to suit your preference will improve your ability to study successfully.

7 Discuss how you would structure your learning environment for optimal learning with a class friend, and write your answer in the space provided below:

.....

.....

8. The academic infrastructure

You have to form study groups to discuss academic tasks, as well as where and when you can air your problems. Study groups within each module should be organised, be active and meet regularly at appropriate times and venues. You can also contact your facilitator and adviser, as well as your lecturers when you experience problems in class or while studying.

If you do not possess a laptop or any of the other electronic equipment that lecturers use increasingly for facilitating information you should be provided with the required equipment. If you are not electronically skilful, the module ..... (name of computer module for first year students at university) will help you to become more proficient.

8 Test your knowledge of the academic infrastructure. Make sure you know the following:

Where the FYA is situated (look at the map in front of your booklet) / or the names and contact numbers of advisers and SI leaders if there is no FYA at your university;

where the library is situated (look at the map);

where your classrooms are;

where the store is for hard copy study guides and/or the link for electronic study guides;

the number of your facilitator for the SRLP;

the names of your study group members and their contact numbers; and

the electronic equipment that will be implemented in your classes. Do you have it in your possession or will you contact the facilitator to help you obtain it?

9. Planning, managing and monitoring your time

Always keep your calendar and diary with you to organise your **time** and **goals**. You will also learn how to set and monitor a **study schedule** in the following steps.

- The diary is implemented to plan and manage your time and your goals.
- A calendar is implemented to monitor your time planning and goal-setting, and should be posted on your wall with short or cryptic notes and dates. The dates on the calendar should be crossed out when a specific date entry has been reached, the academic task has been completed or your goal has been reached.
- Assignments, assessments and other academic tasks should be broken down in sectors according to the required input, and each sector should have a date and period of time awarded to it. Planning should be done for daily homework, as well as for future projects and dates.
- Time planning should be executed on a daily, weekly and monthly basis. All academic activities should be planned, managed and monitored by yourself as part of your study schedule.
- **NB** Monitoring your time should be performed routinely and be maintained rigorously.

9 You now have to enter the time and date for each of your activities in this orientation week in your diary.

When you complete the activities you have to tick it off on your calendar.

10. Setting, managing and monitoring your goals

NB Remember that short-term goals are attainable within a relatively short period of time and are most effective, especially when a large amount of work or difficult learning material has to be learned or performed.

10 Write down your answers in the following spaces:

(1) Which long term goals do you want to achieve in your first year?

.....

(2) Divide your long term goals into short term, realistic sub-goals:

.....

11. Methods to manage and monitor your goals.

11 The following procedure should be followed:

- Plan your objectives or short term goals in more detail in your diary.
- Remember to monitor on the calendar when, and whether it has been achieved.
- You have to prioritise when there are competing or conflicting goals.

12 Set your own study schedule

- Plan, manage and monitor your time for study and your goals by updating the diary and calendar every day.
- File your notes, papers and additional study material for each module together. In this way the related study material is easily available and assembled when needed. The appropriate module codes and names can be pasted on each file.
- A study routine should be followed daily and time should be allowed for this to be truly successful. At the end of the day all academic learning material and additional notes that were received in the order of the day should be filed.
- Homework should receive attention on a daily basis, whether at the end of the day or between daily activities.
- In modules that no homework was given, a 10-12 minute review has to be performed of the learning content that was facilitated.

12 Give a short description of how you would maintain your study schedule.

.....

.....

.....

13. Information seeking and re-organisation of different formats and sources of learning material.

13a Read a lengthy volume of learning material from your specific study direction

in (1) the library or your study guide; and

(2) on the Internet or Google.

NB Summarise it by referring to the hints given in 13a and 13b.

And then:

13b On a separate piece of paper with your name and student number the following information should be provided for the facilitator, after you have self-reflected on the requirements that are asked.

Now answer these questions on the learning process you followed:

- The time you took for completion of the hard copy summary: ……
- The time you took for completion of the Internet summary: …….
- Which memory stores did you use?
- Did you use any knowledge acquisition processes and what were they?: ……

  ……..…….
- The learning style(s) you used: ..…:……..
- Use of the infrastructure and/or other persons: ……..
- How you structured your learning environment: ……

HINTS FOR BOTH FORMATS

1. **Reflect on the learning task**. Ask yourself what you already know, which information is required and what your learning goals are.
2. **Plan the learning process.** You should establish which sources of information are relevant for your goals, where you can find these sources, whether they are available in the academic infrastructure, and how long it will take to obtain facts from these sources.

13 a) Hints and advice for summarising printed learning material

- The **first line of a paragraph** is a good indication of the content.
- Underline the **main thought** in each sentence.
- **Review a paragraph**, and summarise the content in one or two sentences.
- **Review** the sentences and **condense** it further.

You can also: (1) paraphrase, (2) create analogies, (3) use applications, (4) create organisational schemes and outlining, (5) use analytic or inferential reasoning skills.

13 b) Hints and advice for seeking and summarising learning material from the Internet.

- **Execute the search.** You have to browse and search for the relevant key word, scan the results, explore the most relevant information sources, and select the most appropriate source of information.
- **Structure the obtained information**. Your structure should reflect what is asked, and the information documented according to your learning style.

14. Using study aids to re-organise study material

You will select study aids according to your learning style. It was found that female students make more use of study aids than male students. Using and creating study aids improves both the effectiveness and the efficiency of learning, especially in autonomous learning situations.

14 Describe here which study aids you use ……

……..

Would you use different study aids for different learning tasks? ……..

How and where would you use them?

……

……

15. How to strengthen deliberate learning actions and behaviour through revising, studying and maintaining your learning process.

Hints and advice for effective revision and study

You have to review the learning material on a daily basis, or you will lag behind. You have to follow the following steps to process any newly acquired information that is in your short term memory store to your long term memory store. Do you remember the figure of Woolfolk in step 4?

- Read the material carefully, trying to connect the new material with previous knowledge.
- Form a holistic picture of the material by asking yourself: what have I just read?
- Return to the material, concentrating on separate paragraphs or chapters. Try to discern what the main thought is in each paragraph or chapter.
- Write the main thoughts down and review the study material again until you have formed a holistic view of the material.
- Ask yourself questions about the study material and try to answer them, or ask a friend to do the questioning.

15 Revise the next volume of learning material in your booklet according to the hints and steps provided above.

You can also implement the following strategy: *SQ3R with five steps*:

- Survey the material to be revised/learned
- Develop questions about the material
- Read the material
- Recall the key ideas
- Review the learning material

(At least three pages from the students' learning material should be provided here. For the purpose of keeping the thesis brief an example is not provided here by the researcher.)

16. Plan your learning time and goals for assessment opportunities

The format of tests and exam questions should be known – not the content of course! You need to prepare differently for different assessment formats – this is also called *differentiation*.

You should ask the lecturer or examiner for the following information before an assessment opportunity is conducted: (1) the length of the assessment; (2) the format of the questions (long, short or mixed questions, a multiple answer or an open book format); (3) which writing or computing materials are required; and (4) the time at which the assessment starts.

16 Answer the following questions in the spaces provided:

How do you learn for an essay question format? …….

…….....

How do you learn for a multiple choice format? ……....

…….....

If and why do you think one learns differently for different formats? …….....

…….....

(1) You have to acquire a more global, or holistic knowledge of the study material if only *essay type questions* are asked; (2) if a *multiple answer* or *short question format* is set, knowledge must be studied more factually and in detail; and (3) for an *open book assessment* opportunity the layout of the book or study material has to be known, and also where to find the answers in the content.

17. Working out tests and exam papers

You can now scrutinise the type of questions that are asked and ask yourself why and when these questions are asked. The reason for doing this is that your knowledge of the format of the required answers will be improved.

17 Review previously set exam papers or tests from your study direction that you receive from your facilitator.

Answer the following questions in the spaces provided:

(1) Do these questions differ from those asked in Grade 12 exam papers and how do they

differ? ……

……

(2) Can you detect how and why these questions are asked?

……

……

18. Self Testing

You have to ask yourself questions before, during and after reading or studying learning material. A specific method to review study material and how to monitor their comprehension was provided in Step 15.

18 Refer to the study material provided in the booklet at Step 15 and ask yourself questions on it. You may also ask class friends to set questions on it. Answer it and obtain feedback from the study group.

19. Monitor your study outcomes by keeping assessment results and records

The intent is to compare it with the goals and sub-goals (short term goals) you set for yourself. You can monitor the effectiveness of your study strategies continuously, by critically analysing the feedback and results you receive. If you are not satisfied with the results, you should adapt your study strategies or implement others. The feedback from this phase should then be applied to the start of your next learning cycle.

19 Consult the rubric that follows as an indication of how to keep assessment results and compare it with your sub-goals and objectives.

Module:	**Marks for tests**	**Marks for assignments**	**Participation mark**	**Exam mark**	**Module mark**	**Date achieved**
Subgoal/ objective						
Subgoal/ objective						
Subgoal/ objective						

20. Asking advice

You should always ask for advice regarding your learning tasks and its requirements. You should approach an individual such as a lecturer or your facilitator and discuss your needs and queries in a group. If you have to look for information on a nonsocial source such as Google or the Internet, you should have the necessary electronic equipment available. In some classes the lecturer will ask the students to use their smart phones (that presumably have access to the Internet) to look for information or perform other learning duties.

20 Make sure you have the numbers and details of your advisers and facilitators and your study group members.

Make sure you have access to the Internet and Google. Otherwise you should ask your facilitator about the steps you should take to obtain access.

21. Reward(s) for goals reached.

You learnt to break down your long term goals into short term sub-goals in Step 11. You have to reward yourself after reaching a goal or a sub-goal. How do you reward yourself?

21 Answer the following questions and fill in the spaces provided

(1) I reward myself with a film, other enjoyable activities or ……..

(2) I reward myself with chocolates, something to eat or drink……

(3) I am rewarded by my parents with ……

(4) My school/the Department of Education rewarded me with …….

(5) The satisfaction of good marks is my reward, or ……..

(6) It depends: ……

(7) For me the most satisfying reward at university would be the following: ……..... ……

Would you say that your reward(s) are external or internal? …….

22 Can you differentiate between the requirements of various learning tasks?

You already know from Step 15 that when you have to study for a specific assessment opportunity the format impacts on the learning process that has to precede it.

However you should also be able to evaluate and analyse different formats of text material and be able to apply your learning style(s) and strategies flexibly to what is being asked. You have to differentiate between your learning tasks. The same learning skill cannot always be implemented with the same success for all the learning tasks you receive. You have to discern what is required, and having done this, should adapt your learning to the demands required.

22 Provide reasons to a class friend why and how you as students should differentiate.

The different kinds of text material and strategies in your booklet now have to be studied and identified, and also how each format should be approached by you as a student.

(An example of a traditional, factual textbook chapter, an article, an analysis of a written document and a speculative, philosophical postulation should be provided in the booklet. However for the sake of brevity these examples are not provided in the appendix).

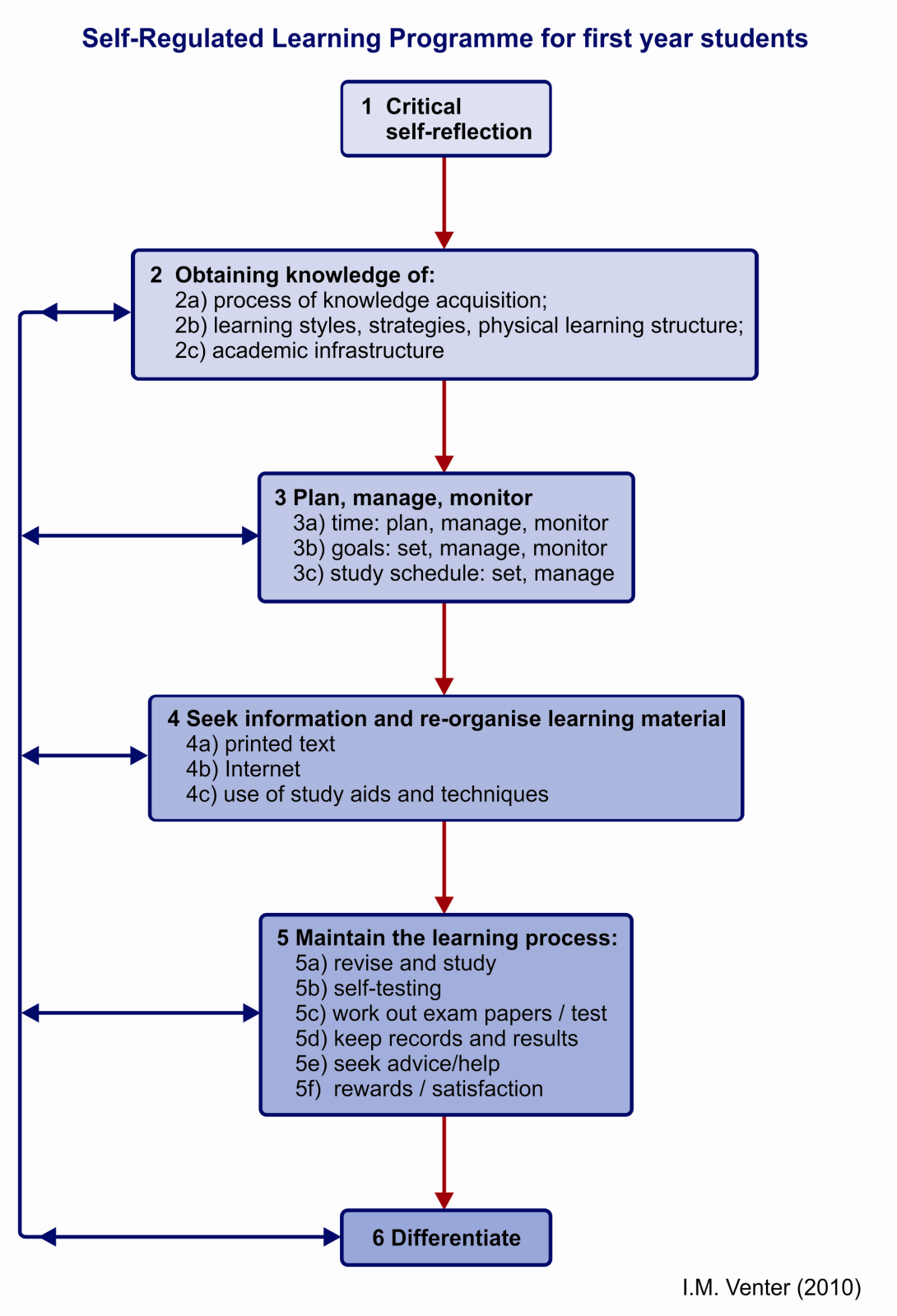
- You need to ask a *what?* question to know that that all reading assignments are not alike: (1) a history textbook chapter with factual information, differs from (2) a primary historical document, which in its turn differs from (3) an article interpreting (or analysing) that document.

You also need to know that there are different kinds of note-taking strategies useful for annotating the different types of texts.

- You need to ask a *how?* and *when?* question to know how to write different kinds of notes; and
- You need to ask a *why?* question to know why you apply these different kinds of knowledge when you study.

Your final self-reflective exercise:

Contemplate the following figure which illustrates the interconnected and cyclical strategies that were taught to you in the SRLP. The arrows in the figure indicate the strategies that are linked to each other. Try to see how the strategies fit together and form a cycle of self-regulated learning skills.



You have now reached the end of the SRL Programme. May you have many happy and successful study experiences at this university!

APPENDIX 7:
APS Scores

ADMITTANCE REQUIREMENTS (APS)

Admittance requirements could have an impact on the results from the LASSI when a comparison regarding LASSI results is drawn between faculties. The Grade 12 results obtained in four designated subjects and two National School Certificate (NSC) subjects are used in the computation of the APS score. The subject *Life Orientation* is excluded**.**

The admittance requirements also differ between faculties but were not implemented as a variable, and were thus not provided here. The admittance requirements also differ from school to school in some faculties, e.g. in the Faculty of Health Sciences. The following APS scores for some of the qualifications in Health Sciences are provided to illustrate this point:

Diploma in Sport Science: 16*; BA in Health Sciences:* 22*; BA in Psychology and Labour Relations:* 20*; BA in Sport, Health and Leisure Science:* 22*; BSc in Biological Sciences:* 24*; BSc in Psychology and Nutrition:* 22*; BSc in Social Work:* 24*; BCur:* 25*; B Pharm:* 26*; BSc Dietetics:* 26. (NWU Admission requirements: 2011).

APPENDIX 8:

Ethics form, declarations