



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

**THE CONSTRUCTION AND EVALUATION OF A
QUESTIONNAIRE MEASURING SELF-EFFICACY FOR
ACADEMIC SELF-REGULATION**

by

SHELDON VICTOR GAMA

20132043

**Submitted in partial fulfilment of the
requirements for the degree**

**BACCALAUREUS COMMERCII MASTERS
(HUMAN RESOURCES MANAGEMENT)**

in the

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

at the

UNIVERSITY OF PRETORIA

PRETORIA

OCTOBER 2006

© University of Pretoria

DECLARATION

I, Sheldon Victor Gama, declare that "The construction and evaluation of a questionnaire measuring self-efficacy for academic self-regulation" is my own work. All the resources I used for this study are cited and referred to in the reference list by means of a comprehensive referencing system.

I declare that the content of this thesis/article has never before been used for any qualification at any tertiary institute.

Sheldon Victor Gama

30 October 2006

NAME

DATE

Signature of student

ACKNOWLEDGEMENTS

In completion of this study, I would like to express my gratitude to the following individuals:

- Michiel Buys (University of Pretoria): For his continuous encouragement and guidance, as well as for introducing me to the dynamic field of self-efficacy.
- Ellen Usher (Emory University, USA): For taking the time to review this study and for her critically important advice, without which this study would not have been possible.
- My loving wife for her patience and unfaltering support; and for her motivation and inspiration every step of the way.

LIST OF FIGURES

Figure 3.1: Social Cognitive Theory.....18
Figure 3.2: Social Cognitive Theory and Self-Regulation.....20

LIST OF TABLES

Table 3.1: Effects of Self-Efficacy Beliefs.....36

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	9
1.1 THE RESEARCH PROBLEM	9
1.2 BACKGROUND.....	10
1.3 STATEMENT OF HYPOTHESIS.....	10
1.4 OPERATIONAL DEFINITIONS OF THE VARIABLES	11
1.5 SIGNIFICANCE OF THE STUDY	11
1.6 CHAPTER OUTLINE	12
CHAPTER 2: INTRODUCTION TO SELF-EFFICACY AND ACADEMIC SELF-REGULATION	14
2.1 DEFINING SELF-EFFICACY AND SELF-REGULATION	14
2.1.1 SELF-EFFICACY.....	14
2.1.2 SELF-REGULATED LEARNING.....	15
2.1.3 ACADEMIC SELF-EFFICACY	15
2.1.4 RELATED CONCEPTS	16
CHAPTER 3: DEVELOPING AN UNDERSTANDING OF SELF-EFFICACY	18
3.1 SOCIAL COGNITIVE THEORY	18
3.1.1 THE CONCEPT OF SOCIAL COGNITIVE THEORY.....	18
FIG. 3.1 SOCIAL COGNITIVE THEORY	19
3.1.2 SELF-REGULATED LEARNING AND SOCIAL COGNITIVE LEARNING.....	20
FIG. 3.2 SOCIAL COGNITIVE THEORY AND SELF-REGULATION.....	21
3.1.3 THE RELATIONSHIP BETWEEN SELF-EFFICACY AND SELF-REGULATION	22
3.2 SOURCES OF SELF-EFFICACY	23
3.2.1 MASTERY EXPERIENCE	23
3.2.2 VICARIOUS EXPERIENCE	24
3.2.3 SOCIAL PERSUASIONS	24
3.2.4 PHYSIOLOGICAL STATES	25
3.3 DETERMINANTS OF SELF-REGULATED LEARNING	26
3.4 THE DEVELOPMENT OF SELF-EFFICACY BELIEFS	27
3.4.1 THE ORIGIN OF A SENSE OF PERSONAL AGENCY	28
3.4.2 FAMILIAL SOURCES OF SELF-EFFICACY	28
3.4.3 BROADENING OF SELF-EFFICACY THROUGH PEER INFLUENCES	29
3.4.4 SCHOOL AS AN AGENCY FOR CULTIVATING COGNITIVE SELF-EFFICACY	29
3.4.5 GROWTH OF SELF-EFFICACY THROUGH TRANSITIONAL EXPERIENCES OF ADOLESCENCE	31
3.4.6 SELF-EFFICACY CONCERNS OF ADULTHOOD.....	31
3.5 THE EFFECTS OF SELF-EFFICACY AND DEVELOPMENT OF SELF-REGULATORY COMPETENCE	34
3.5.1 EFFECTS OF SELF-EFFICACY BELIEFS.....	34
3.5.2 THE DEVELOPMENT OF SELF-REGULATORY COMPETENCE.....	35
3.5.3 THE EFFECT OF SELF-EFFICACY BELIEFS ON THE BEHAVIOUR OF STUDENTS.....	36
TABLE 3.1 EFFECTS OF SELF-EFFICACY	37
3.6 EFFICACY-ACTIVATED PROCESSES	37
3.6.1 COGNITIVE PROCESSES	37



3.6.2	MOTIVATIONAL PROCESSES	38
3.6.3	AFFECTIVE PROCESSES	40
3.6.4	SELECTION PROCESSES	41
CHAPTER 4: MEASURING SELF-EFFICACY		43
4.1 THE CONSTRUCTION OF A MEASURING INSTRUMENT		43
4.1.1	QUESTIONNAIRE DESIGN	43
4.2 MEASURING SELF-EFFICACY		45
4.2.1	SELF-EFFICACY DIMENSIONS	45
4.2.2	GRADATIONS OF CHALLENGE	46
4.2.3	DOMAIN SPECIFICATION	48
4.2.4	PHRASING OF ITEMS	49
4.2.5	RESPONSE SCALE	49
4.2.6	MINIMISING RESPONSE BIAS	50
4.2.7	VALIDITY	51
4.2.8	DEVELOPMENT OF A COLLEGE ACADEMIC SELF-EFFICACY SCALE	51
4.3 SELF-EFFICACY IN AN ACADEMIC CONTEXT		52
4.3.1	SELF-EFFICACY AND ACADEMIC ACHIEVEMENT	52
4.3.2	SELF-EFFICACY AND EDUCATIONAL SELF-REGULATION	53
4.3.2.1	Goal setting	54
4.3.2.2	Self-evaluation	55
4.3.2.3	Self-monitoring	55
4.3.2.4	Time planning and management	55
4.3.3	SOCIAL COGNITIVE DEVELOPMENT OF EDUCATIONAL SELF-REGULATION	56
4.3.4	SELF-REGULATED LEARNING STRATEGIES	56
4.4 ACADEMIC PERFORMANCE		57
4.4.1	THE MEANING OF ACADEMIC PERFORMANCE	58
4.4.2	FACTORS INFLUENCING ACADEMIC PERFORMANCE	58
5. CONCLUSION		60
CHAPTER 5: RESEARCH METHODOLOGY		63
5.1 RESEARCH APPROACH		63
5.2 SAMPLING STRATEGY		63
5.2.1	TARGET POPULATION	63
5.2.2	SAMPLING STRATEGY	64
5.3 RESEARCH DESIGN		65
5.4 DATA COLLECTION PROCEDURES		65
5.5 DATA ANALYSIS		71
5.5.1	RELIABILITY	71
5.5.1.1	Internal Consistency	71
5.5.1.2	Item Analysis	71
5.5.2	VALIDITY	72
5.5.2.1	Content Validity	72
5.5.2.2	Face Validity	73
5.5.2.3	Construct Validity	74
5.5.2.4	Factor Analysis	74
5.5.2.5	Parallel Analysis	75
REFERENCES		77

CHAPTER 1: INTRODUCTION

1.1 THE RESEARCH PROBLEM

Self-efficacy refers to the belief in one's capabilities to produce the sources of action required to manage prospective situations successfully (Bandura, 1986:11). Self-efficacy as a research topic has enjoyed much attention on a worldwide level and has resulted in countless benefits to the fields of psychology, education, motivation etc (Schunk and Pajares, 2002). The identified research problem is that currently in South Africa, almost no research has been conducted in the area of self-efficacy, thereby preventing South Africa as a nation from developing and growing as a result of the positive benefits that self-efficacy research has to offer. In the academic realm, studies have shown that there exists a strong relationship between a student's level of self-efficacy and their academic achievement (Schunk and Pajares, n.d.). The results of these types of studies have fostered encouraging initiatives to improve the academic performance of students by putting strategies in place to strengthen their self-efficacy (Pajares, 2002a).

The education fraternity within South Africa has much to gain from these types of research findings. Students and teachers alike can discover new learning strategies that can foster greater academic success. Once the topic of self-efficacy has been established as a research field within the South African context, other areas can be investigated, such as principles of motivation and even recovery from drug addiction. Therefore this study does not propose to answer any specific research question, but rather it aims to address the stated problem by introducing a self-efficacy research topic in the South African context. In order to accomplish this objective it was decided to conduct a study in the academic realm by constructing a measuring instrument focusing on the concept of students' self-efficacy for academic self-regulation.

1.2 BACKGROUND

South Africa boasts one of the most diverse cultures in the world and has the potential for establishing new areas of self-efficacy research. Unfortunately though the benefits awarded from such research will not be forthcoming until the topic of self-efficacy has been well documented in the South African context. Bandura's social cognitive theory, upon which self-efficacy is based, hypothesises that human achievement depends on interactions between one's behaviours, personal factors and environmental conditions (Pajares, 1996). This theory can be universally applied to any area of human functioning. One specific area of self-efficacy that has been well established and researched is that of academic self-efficacy.

Due to the expansive literature and sound empirical evidence already produced in the field of academic self-efficacy, it was decided to embark on this type of research as the initial introduction within the South African context. As the research has already been well established it affords a sound foundation from which to begin. The first major challenge encountered was that there currently exists no measuring instrument for self-efficacy research in South Africa. This challenge prompted the decision to embark upon a study focusing on the construction of a measuring instrument regarding self-efficacy for academic self-regulation.

1.3 STATEMENT OF HYPOTHESIS

As previously explained, this research study does not propose any hypotheses, nor does it focus on answering any specific research question. Rather, it aims to identify the required process for constructing a valid and reliable measuring instrument for the topic of self-efficacy for academic self-regulation. Therefore the study is driven by a central objective and not by a hypothesis or research question.

1.4 OPERATIONAL DEFINITIONS OF THE VARIABLES

To develop a reliable and valid instrument, it is necessary to identify the dependent and independent variables in the study as well as their level of measurement. In this study, the dependent variable is defined as the concept of self-efficacy for academic self-regulation and essentially will take on the form of a total score reflecting the level of self-efficacy. The independent variables are the respondents' demographic characteristics i.e. gender, race, home language, age etc). The dependent variable will be measured using an ordinal scale. Measuring self-efficacy for academic self-regulation at the ordinal level means that the questionnaire will be able to indicate the difference between categories, i.e. "agree" and "disagree," and will also allow for the ordering of participants' responses (Neuman, 2003:188). The independent variables will be measured at the nominal level, meaning that a difference among categories is merely indicated. Therefore the identified variables will be measured at the ordinal and nominal level respectively.

1.5 SIGNIFICANCE OF THE STUDY

A valid and reliable academic self-efficacy questionnaire used within the country's education system could produce findings that can help improve academic performance on an individual as well as group level. By promoting students' appraisal of their self-efficacy and enhancing the key sources of that efficacy, students will be prepared not only to gain new knowledge and cultivate new skills, but to accept responsibility for their own education (Zimmerman, 1995:204). This form of research has the potential to effect positive changes in the country's education system as a whole.

The success of this study will lay the foundation for further research to be conducted in the area of self-efficacy within a South African context. Other

domains can be explored, such as ethnic differences and self-efficacy, or even the effects of self-efficacy on alcohol or drug rehabilitation. In the context of Industrial Psychology the areas of motivation and self-efficacy, as well as self-efficacy and career development are receiving greater attention and could serve as a valuable topic of research within the South African environment (Hackett, 1995:234). A young country like South Africa with a developing society can only gain from such research.

1.6 CHAPTER OUTLINE

This research study will be compiled into a research article, as opposed to a research dissertation, and the following chapter outline will be followed:

Chapter 1: Introduction

The introductory chapter will contain the following themes:

- Identification and statement of the research problem.
- Background to the research problem.
- Rationale of the study and statement of the hypothesis/hypotheses.
- Operational definitions of the research variables.
- Significance of the study.
- Chapter outline.

Chapter 2: The Literature Review

The purpose of the literature review will be to convey the knowledge and ideas that have already been established on the topic. A further aim will be to construct a scientifically sound argument for the topic, and to explore all of the relevant literature that will lead to the research objective being reached.

Chapter 3: Method of Investigation

The following themes will be discussed in this chapter:

- The research approach as well as the research design employed.
- A description of the sample and sampling strategy used.

- A description of the data collection techniques used as well as the procedures used to analyse the data.

This chapter will ensure that the study has empirical integrity and that credible statistical procedures are applied to the study.

Chapter 4: The Article

The final research article is likely to have the following framework:

- An abstract of the article.
- A theoretical discussion.
- A discussion on the methodology used.
- A discussion on the results of the study.
- Conclusion and recommendations.

This chapter will include a thorough analysis of the study's results as well as a proper discussion and interpretation of those results, to ascertain whether or not the original research objective has been obtained.

CHAPTER 2: INTRODUCTION TO SELF-EFFICACY AND ACADEMIC SELF-REGULATION

2.1 DEFINING SELF-EFFICACY AND SELF-REGULATION

2.1.1 Self-efficacy

“If there is any characteristic that is distinctively human, it is the capability for reflective self-consciousness,” Bandura (1986:10). From the moment that young children enter the educational realm it is impressed upon them that the success of their future livelihood will depend upon the success of their academic achievement. As they progress through the different levels of education, their unique individual experiences culminate in the establishment of a self-concept. This self-concept can be seen as a person’s general feelings of self worth, which governs their attitude towards the spectrum of components, which their lives consist of at the time. Academic achievement therefore plays a major role in any person’s life, because it is seen as a major determining factor during such an impressionable time of one’s life.

Another important guiding instrument that is attained is that of self-efficacy. Bandura (1986:11) defines self-efficacy as, “The belief in one’s capabilities to organise and execute the sources of action required to manage prospective situations.” A person’s perceived self-efficacy regards their personal belief in their own ability to successfully perform a specific action. For example, a person with a strong sense of running self-efficacy will regard competing in the Comrades marathon as a challenge instead of a threat. This will result in the person setting himself high personal standards and instilling a high sense of commitment to the task, and ultimately achieving success. In contrast, a person who possesses a weak sense of efficacy tends to view difficult tasks as a personal threat and focuses on his personal deficiencies, causing him to give-up easily. Such persons are more likely to suffer from stress and depression.

In an academic setting, students develop their own self-efficacy beliefs regarding the various spheres of academics. A student may hold the belief that his mathematical capability is excellent, but at the same time he might find it frustratingly difficult to compose a three page descriptive essay. From this, it is clear that the student has a high mathematical self-efficacy and a low writing self-efficacy.

2.1.2 Self-regulated Learning

A student's learning is qualified as being self-regulated when it involves the use of specific strategies to achieve academic goals, based on perceptions of self-efficacy (Zimmerman, 1989). According to Zimmerman (1989), this definition of self-regulated learning highlights three essential elements: students' self-regulated learning strategies; self-efficacy of performance skill; and commitment to academic goals. Self-regulated learning strategies refer to actions directed at acquiring information and skill, such as organising and transforming information or the use of memory aids and rehearsal (Zimmerman, 1989).

2.1.3 Academic self-efficacy

There are certain unique features of academic self-efficacy that Zimmerman postulates in Bandura (1995: 203). Zimmerman firstly points out that self-efficacy involves judgements of capabilities to perform certain activities, rather than personal qualities such as one's physical characteristics or psychological traits. Students therefore judge their capabilities to fulfil given task demands, not who they are as people or how they feel about themselves in general.

Another feature that Zimmerman in Bandura (1995:204) makes mention of is that self-efficacy beliefs are multidimensional rather than a single disposition. "Consequently, efficacy beliefs are linked to different domains of functioning. Thus, efficacy beliefs for mathematics may differ from efficacy beliefs for English composition or artistic production (Zimmerman in Bandura, 1995:204)." A third

feature is related to the strength dimension of self-efficacy measures. This is dependant on a mastery criterion of performance rather than normative or other criteria. This means that students can be asked to rate their certainty that they can solve mathematical problems of varying difficulty, not how well they expect to do in comparison of other students.

One final feature of academic self-efficacy is that it is measured before students perform the relevant activities. “This antecedent property provides the temporal ordering for evaluating the role of self-efficacy beliefs in causal structures,” Zimmerman in Bandura (1995: 204).

2.1.4 Related Concepts

As the purpose of this research study is the construction of a measurement scale, it is vital to ensure that the scale has a high degree of reliability. Neuman (2003: 180) states that one way of improving reliability is to clearly conceptualise all constructs. This can be achieved by developing unambiguous, clear theoretical definitions. In this case the concept of self-efficacy should be separated from related concepts. Some of these concepts, which are often misinterpreted as meaning the same as self-efficacy, are as follows:

- *Self-concept* – Sternberg (2001: 365) defines self-concept as “... an individuals view of her- or himself, which may or may not be realistic or even perceived similarly by other persons.” Self-concept is concerned with collective self-perceptions, whereas self-efficacy is concerned with specific judgments of capability. According to Pajares and Schunk (n.d.) self-efficacy concerns a judgement of competence, whereas self-concept is a description of one’s own perceived self accompanied by a judgement of self-worth.
- *Outcome expectations* – Schunk and Pajares (2002) differentiate between outcome expectations and self-efficacy by stating that outcome expectations are the consequences expected from one’s own actions. For example, an efficacious student may believe that he has the

capability to learn mathematics, but despite the perceived capability he may believe that he cannot achieve a high mark due to a disapproving teacher.

- *Effectance motivation* – Schunk and Pajares (2002) also differentiate between effectance motivation and self-efficacy, by stating that effectance motivation is the motivation to interact effectively with one's environment and control critical aspects. Unlike self-efficacy, effectance motivation is a global construct and lacks self-efficacy's specificity.

By separating self-efficacy from these related concepts it is ensured that a single construct is identified and eventually measured accurately when the final instrument is constructed.

CHAPTER 3: DEVELOPING AN UNDERSTANDING OF SELF-EFFICACY

3.1 SOCIAL COGNITIVE THEORY

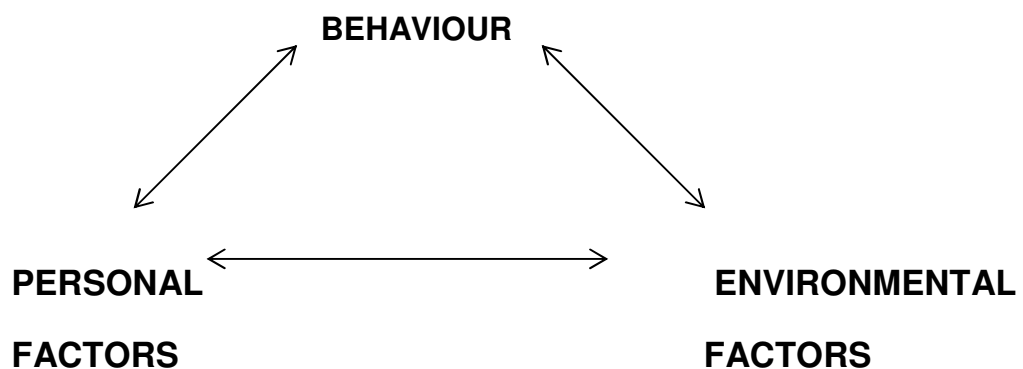
3.1.1 The Concept of Social Cognitive Theory

In order to achieve the aim of measuring the self-efficacy for academic self-regulation of tertiary students, it must first be understood where self-efficacy emanates from. In 1977, Albert Bandura focused much of his studies on Social Learning Theory. Bandura (1977: vii) stated that, “Social learning theory approaches the explanation of human behaviour in terms of a continuous reciprocal interaction between cognitive, behavioural, and environmental determinants.” Some years later in 1986 Bandura established a new theory in his publication “Social foundations of thought and action: A Social Cognitive Theory.” This theory was, of course, named a Social Cognitive Theory, and it is the foundation for Bandura’s concept of “*reciprocal determinism*.”

According to Bandura (1977: vii), “Within the process of reciprocal determinism lies the opportunity for people to influence their destiny as well as the limits of self-direction.” This conception of human functioning then neither casts people into the role of powerless objects controlled by environmental forces nor free agents who can become whatever they choose. Both people and their environments are reciprocal determinants of each other. This conception states that three specific forces create interactions that result in a triadic reciprocity. These three specific forces are behaviour, personal factors and environmental factors. The personal factors consist of cognition, affect as well as biological events that a person experiences. Pajares (1996) explains this process of reciprocal determinism as a “Self System”, which is incorporated by an individual to obtain reference mechanisms and a set of sub functions for perceiving, regulating, and evaluating their own behaviour.

Schunk and Pajares (n.d.) explain that Social Cognitive Theory is rooted in a view of human agency in which individuals are agents proactively engaged in their own development. The concept of human agency highlights the idea that individuals possess self-beliefs that enable them to exercise control over their thoughts, feelings and actions (Schunk and Pajares, n.d.). Therefore individuals are viewed as both producers and products of their own environments and social systems. Bandura also expanded his view of human agency to include collective agency, due to the fact that human lives are not lived in isolation. Pajares (2002a) states that, “people work together on shared beliefs about their capabilities and common aspirations to better their lives.” The diagram below illustrates the concept of reciprocal determinism, as explained by Bandura’s Social Cognitive Theory.

Fig. 3.1 Social Cognitive Theory



Schunk and Pajares (2002) explain that Bandura’s theory postulates that human achievement depends on interactions between one’s behaviours, personal factors and environmental conditions. Pajares (2002b) states that Bandura’s social cognitive theory provides a view of human behaviour and motivation in which the beliefs that people have about themselves are key elements in the exercise of control and personal agency. According to Pajares (2002a) people are viewed as “self-organising, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and shepherded by environmental forces or driven by concealed inner impulses.”

From this illustrious explanation it can be deduced that any human functioning is simply the product of the interaction of these three dynamic forces. Therefore, how people interpret the results of their own behaviour alters their environments and the personal factors they possess, which in turn alters their subsequent behaviour. This social cognitive theory can be applied to any sphere of self-efficacy from drug addiction to coping with major transitions in one's life. In the context of academic achievement, Pajares (2002a) states that teachers have the challenge of improving the academic learning and confidence of their students. By using social cognitive theory as a framework, teachers can work to improve their students' emotional states and to correct their faulty self-beliefs and habits of thinking (personal factors), to improve their academic skills and self-regulatory practices (behaviour), and to alter the school and classroom structures that may undermine the success of the students (environmental factors).

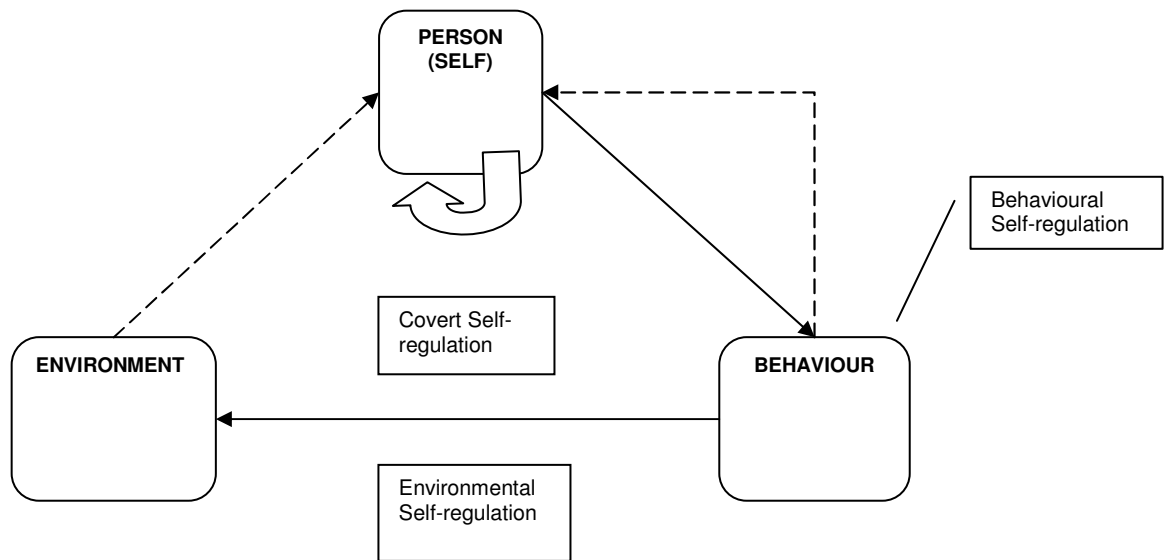
Social cognitive theory differs from theories of human functioning that overemphasise biological factors in human development and adaptation. Bandura (1986: 15) states, "A theory that denies that thoughts can regulate actions does not lend itself readily to the explanation of complex human behaviour." Behaviourist theories show little interest in self-processes because theorists firmly believe that human functioning is determined by external stimuli. According to Pajares (2002a) one reason for this is that inner processes are viewed as transmitting, rather than causing behaviour, and therefore inner processes are dismissed as a redundant factor in the cause and effect process of behaviour and are unworthy of further psychological enquiry.

3.1.2 Self-Regulated Learning and Social Cognitive Learning

According to Zimmerman (1989), student self-regulation assumes a reciprocal causation among the three elements of SCT, namely the self, environment and behaviour. Zimmerman (1989) explains that personal processes are influenced by environmental and behavioural events in a reciprocal fashion. In a practical

situation, a student's solution response to a simple math sum such as "5 + 5 = ?" is determined by perceptions of self-efficacy; as well as environmental stimuli, such as encouragement from a teacher or fellow student; and also by enactive outcomes, such as obtaining correct answers to previous problems.

Fig. 3.2 Social Cognitive Theory and Self-Regulation



As depicted in figure 3.2 self-regulated learning takes place to the extent that a student can make use of self-processes to strategically regulate behaviour and the learning environment. Behavioural self-regulation is evidenced in the manner in which a student proactively uses a self-evaluation strategy, such as checking homework, to source information about accuracy and whether checking must continue through enactive feedback (Zimmerman, 1989). In this way self-efficacy serves as a gauge that regulates strategic efforts to acquire knowledge and skill through a feedback loop. Zimmerman (1989) highlights environmental self-regulation by explaining that a student can make use of a proactive strategy to manipulate the learning environment that he/she works in, such as finding a quiet room to study. The continued use of such strategies to create a structured learning environment will depend on the perceived effectiveness thereof. Covert self-regulation is illustrated to show that a person's covert processes reciprocally

influence each other (Zimmerman, 1989). Therefore the covert strategies employed to produce success are similarly regulated through a covert feedback loop.

SCT proposes that the self-regulation process comprises three different sub processes (Schunk and Zimmerman, 1997):

1. *Self-observation* – Self-observation refers to deliberate attention to aspects of one's own behaviour. When self-observation results in perceptions of progress towards attaining a specific goal, it can motivate an individual.
2. *Self-judgement* – Self-judgement involves comparing performance to a certain standard, which can either be absolute in nature (fixed), or normative (based on the performances of others). The objective of self-judgement is to obtain information about progress.
3. *Self-reaction* – Self-reaction involves making evaluative responses to judgements of performance.

3.1.3 The Relationship between Self-Efficacy and Self-Regulation

According to Pajares and Valiante (n.d.) individuals can regulate their own functioning by monitoring and adjusting their environmental conditions, performance processes, and even their cognitive and affective states. Schunk and Zimmerman (1997) explain the link between self-efficacy and self-regulation, by postulating that the belief that one is making acceptable progress toward a goal enhances self-efficacy and motivation. Negative evaluations of progress made do not decrease motivation if individuals believe that they have the capability to improve. Pajares and Valiante (n.d.) further explain that students who believe they are capable of performing certain academic tasks i.e. possess a high level of self-efficacy, use more cognitive and metacognitive strategies and work harder, persist longer and persevere in the face of adversity.

Students with high self-efficacy engage in more productive self-regulatory strategies, such as monitoring effective use of academic time (Pajares and Valiante, n.d.). An increase in students' self-efficacy leads to an increase in the accuracy of the self-judgements they make about the outcomes of their self-observation (Pajares and Valiante, n.d.). In this way, the manner in which people behave can often be better predicted by their self-efficacy beliefs than by what they are actually capable of accomplishing, as these self-perceptions determine what individuals do with the skills and knowledge they possess (Pajares and Valiante, n.d.). A closer look at the sources of self-efficacy will help to explain how self-efficacy is developed and according to which methods it originates.

3.2 SOURCES OF SELF-EFFICACY

3.2.1 Mastery experience

Bandura (1977: 16) states, "Except for elementary reflexes, people are not equipped with inborn repertoires of behaviour. They must learn them." Pajares (2002b) defines mastery experience as, "The interpreted result of purposive performance." In practical terms, individuals gauge the effects of their own behaviour, and their interpretations of these effects help create their efficacy beliefs. Bandura (1994) states that mastery experience is the most effective way of creating a strong sense of efficacy. Individual successes build a strong belief in one's personal efficacy, whereas failures undermine it.

In an academic context, students that achieve high marks in Maths class are likely to develop a strong sense of confidence in their mathematical capabilities. This strong sense of efficacy ensures that students approach mathematics with resilience and that they increase their level of effort when faced with difficulty. On the other hand though, low-test scores in mathematics will weaken students' confidence in their math capabilities. Therefore students with low mathematics self-efficacy are more likely to approach the subject with apprehension and also give-up much easier when faced with difficulty. Pajares (2002b) concludes that

in order to increase student achievement in school, educational efforts should focus on raising students' feelings of self-worth and competence.

3.2.2 Vicarious experience

“Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human behaviour is learned observationally through modelling,” Bandura (1977: 22). According to Bandura (1994), observing people similar to oneself succeed by sustained effort raises the observer's beliefs that they too possess the capabilities in comparable activities to succeed. Of course by the same token, seeing other's fail (despite considerable effort) can lower an observer's own beliefs concerning their capability to succeed. The impact of this type of modelling on perceived self-efficacy is strongly influenced by the perceived similarity to the models. The greater the perceived similarity to the model, the more persuasive the observed successes and failures will be. If a person observes a model to be very different from themselves, the model's behaviour will not have any influence on the observer's efficacy beliefs.

There is another way that modelling influences can be used. People also tend to seek out certain models that possess the capabilities to which they aspire. Through their behaviour and expressed ideas, these competent models transmit knowledge and teach the observers effective skills and strategies for coping with environmental demands. Bandura (1994) explains that the acquisition of better means raises perceived self-efficacy. In the life of a young student, this is where peer groups and peer pressure can come into play. Vicarious experience is not as powerful a source as mastery experience.

3.2.3 Social persuasions

Self-efficacy beliefs are also created as a result of the social messages received from others. These social persuasions take the form of verbal judgements of others and they are weaker sources of efficacy information than vicarious or

mastery experience. According to Bandura (1994), people who are persuaded that they possess the capabilities needed to succeed at a given endeavour are likely to produce greater effort and sustain it. Persuasive boosts in perceived self-efficacy can promote the development of skills and a sense of personal efficacy, because they lead people to try harder to succeed. Of course receiving negative social persuasions like, “you are not university material” can lead to debilitating self-beliefs and even become a self-fulfilling prophecy.

It is quite difficult to instil high beliefs in personal efficacy by using social persuasions alone. According to Bandura (1994) unrealistic boosts in self-efficacy are quickly disconfirmed by disappointing results of one’s efforts. Therefore successful efficacy builders do more than just convey positive appraisals. They structure situations for people in ways that bring success and avoid placing those people in situations prematurely where they are likely to fail often.

3.2.4 Physiological states

This source of self-efficacy is the weakest of the four and it refers to states such as anxiety, stress, arousal, fatigue and mood states. Pajares (2002b) states, “... because individuals have the capability to alter their own thinking, self-efficacy beliefs, in turn, also powerfully influence the physiological states themselves.” Often individuals can gauge their confidence by the emotional state they experience as they contemplate a specific action. Negative physiological states can provide clues that something is amiss, even when one is unaware that such is the case. In practical terms, students who approach public speaking with a sense of dread and severe apprehension, likely lack confidence in their public speaking abilities. When people experience fears about their capabilities, those negative affective reactions can themselves trigger the stress and agitation that help ensure the inadequate performance they fear. Mood also affects people’s judgements of their personal efficacy. Bandura (1995: 4) states, “Positive mood enhances perceived self-efficacy; despondent mood diminishes it.”

Bandura (1995: 5) also stresses that any information that is relevant for judging personal efficacy gains its significance through cognitive processing. He explains therefore, that the information conveyed by the different sources should be distinguished from the cognitive processing by which that information is selected, weighted, and integrated into self-efficacy judgements. “A host of factors, including personal, social, and situational ones, affect how efficacy-relevant experiences are interpreted,” Bandura (1995: 5). Therefore, the extent to which performance attainments alter perceived efficacy will depend on people’s preconceptions of their capabilities; the perceived difficulty of the tasks; the amount of effort they expended; their physical and emotional state at the time; the amount of external aid they received; and the situational circumstances under which they performed.

3.3 DETERMINANTS OF SELF-REGULATED LEARNING

According to Zimmerman (1989) an individual can be said to be self-regulated when he or she has the ability to exercise strategic control over the following types of influence: self-observation, self-judgement and self-reaction. As previously explained, these courses of action comprise the three sub-processes of self-regulation according to social cognitive theory, and all three include actions that are observable, trainable and interactive. Zimmerman (1989) explains these determinants of self-regulation in the following way:

1. Self-Observation: Observing oneself provides important information about how well one is progressing towards certain goals. Self-observation is influenced by personal processes such as self-efficacy, goal-setting and metacognitive planning; as well as behavioural processes such as verbal or written reporting, and quantitative recording of one’s actions and reactions.

2. Self-Judgement: The process of self-evaluation depends to a large extent upon self-efficacy; as well as goal-setting; knowledge and standards; and self-observed responses. Students typically evaluate themselves by making use of checking procedures, such as the re-examination of answers; as well as the rating of answers in relation to those of another person or an answer sheet.
3. Self-Reaction: As was the case with the previous two determinants, self-efficacy perceptions also have a huge influence on the process of self-reaction. Self-reaction strategies can be distinguished according to behavioural self-reactions (by which learners seek to optimise their specific learning responses); personal self-reactions (in which students seek to enhance their personal processes during learning); and environmental self-reactions (by which they seek to improve the learning environment).

It is imperative to take note of the importance that self-efficacy plays as an influencing factor in each of these determinants of self-regulation. Students observe their own performances and then judge them against certain goal standards, and then react to those judgements. In this way their evaluations and reactions set the stage for additional observations (Zimmerman, 1997). The task of investigating self-regulation must focus to a large extent on investigating perceptions of self-efficacy, as it is the key determinant of self-regulation (Zimmerman, 1989).

3.4 THE DEVELOPMENT OF SELF-EFFICACY BELIEFS

With the emphasis of this study being on the academic self-efficacy of tertiary students, it is important to examine exactly how the perceived self-efficacy develops within a person by taking a look at some important life stages.

3.4.1 The origin of a sense of personal agency

A newborn child enters the world without any sense of self. Infants engage in exploratory experiences, in which they see themselves produce effects by their actions. This provides the initial basis for developing a personal sense of efficacy. Infants learn that certain actions (like crying or screaming) produce certain effects (like drawing the attention of adults). Bandura (1994) states, “Infants who experience success in controlling environmental events become more attentive to their own behaviour and more competent in learning new efficacious responses.”

The development of a personal sense of efficacy requires more than simply producing effects by actions. Those actions must be perceived as being part of oneself. For example, if feeding oneself brings a sense of comfort, whereas seeing others feed themselves does not bring such comfort, one’s own activity becomes distinct from all other persons. Bandura (1994) explains that based on growing personal and social experiences, infants eventually form a symbolic representation of themselves as a distinct self.

3.4.2 Familial sources of self-efficacy

Bandura (1994) asserts that young children must gain self-knowledge of their capabilities in various areas of functioning. They have to develop, appraise and test their physical capabilities, social competencies, linguistic skills and their cognitive skills for comprehending and managing the many situations they encounter daily.

Children spend much of their waking hours occupied with exploratory and play activities. These provide the children with opportunities to expand their range of basic skills and sense of efficacy. Parents are central to the early development of the social and cognitive competencies of their young children. Bandura (1994) postulates that parents who are responsive to their infant’s behaviour, and who create opportunities for efficacious actions by providing an enriched physical

environment and permitting freedom of movement for exploration, will have infants who are accelerated in their social and cognitive development.

3.4.3 Broadening of self-efficacy through peer influences

As children assume a more active and involved role in the community, the experiences they use to test their self-efficacy change substantially. Children broaden the self-knowledge of their capabilities through the peer relationships that they develop. “Those who are most experienced and competent provide models of efficacious styles of thinking and behaviour,” Bandura (1994). In addition, children of the same age provide highly informative comparisons for judging and verifying one’s self-efficacy. From this it is clear that children are sensitive to their relative standing among the peers in activities that determine prestige and popularity.

Due to the fact that peers serve as such a major influence in the development and validation of self-efficacy, any disrupted or impoverished peer relationships can adversely affect the growth of personal efficacy within an individual. Bandura (1994) states that a low sense of social efficacy can, in turn, create internal obstacles to favourable peer relationships. Therefore, children who regard themselves as socially inefficacious withdraw socially, perceive low acceptance by their peers and have a low sense of self-worth.

3.4.4 School as an agency for cultivating cognitive self-efficacy

According to Bandura (1994), school is the place where children develop the cognitive competencies and acquire the knowledge and problem solving skills essential for participating effectively in the larger society. At school, a child’s knowledge and thinking skills are continuously tested, evaluated and socially compared with his/her peers (Bandura, 1995).

There are many social factors, apart from the formal instruction that also affects children’s judgements of their intellectual efficacy. Bandura (1994) lists these

social factors as follows: peer modelling of cognitive skills; social comparison with the performances of other students; motivational enhancement through goals and positive incentives and teacher's interpretations of children's successes and failures in ways that reflect favourably or unfavourably on their ability.

The efficacy beliefs of teachers also play a major role in the academic achievement of students. The belief systems of staffs create school cultures that can have vitalising or demoralising effects on the performances of its students. Bandura (1994) states, "Schools in which the staff collectively judge themselves as powerless to get students to achieve academic success convey a group sense of academic futility that can pervade the entire life of the school." In the same way, schools in which staffs collectively judge themselves to be capable of promoting academic success instil their school with a positive atmosphere for development that promotes academic attainments.

"Students' beliefs in their capabilities to master academic activities affects their aspirations, their level of interest in academic activities, and their academic accomplishments," Bandura (1994). There are certain school practices that, for the less talented or ill prepared, result in debilitating self-efficacy beliefs, which further diminishes academic achievement. Bandura (1994) explains these activities as ability groupings, which further diminish the perceived self-efficacy of those cast in the lower ranks as well as competitive practices where many are doomed to fail for the success of a relative few. Another important factor that influences the development of intellectual self-efficacy is the structure of classrooms. They place emphasis on social comparison, instead of self-comparison appraisal. Bandura (1994) states, "Self-appraisals of less able students suffer most when the whole group studies the same material and teachers make frequent comparative evaluations." Self-comparison of improvement in a personal classroom structure raises perceived capability. Cooperative learning structures, in which students work together and help one

another also tend to promote more positive self-evaluations of ability and higher academic attainments, than do competitive ones. Therefore the Outcomes Based Education system that South African schools are instituting is more likely to give rise to vitalising academic self-efficacy beliefs, provided it is implemented effectively.

3.4.5 Growth of self-efficacy through transitional experiences of adolescence

Bandura (1994) asserts that as adolescents approach the demands of adulthood, they must learn to assume full responsibility for themselves in almost every dimension of life. This requires mastering many new skills and the ways of adult society. During this trying period a person is faced with many challenges such as pubertal changes, emotionally invested partnerships, as well as sexuality. These challenges require the individual to develop new competencies and self-beliefs of efficacy.

According to Bandura (1994), adolescents expand and strengthen their sense of efficacy by learning how to deal successfully with potentially troublesome matters in which they are unpractised. “Whether adolescents forsake risky activities or become chronically enmeshed in them is determined by the interplay of personal competencies, self-management efficacy and the prevailing influences in their lives,” Bandura (1994). The ease, with which the transition from childhood to the demands of adulthood is made, depends on the strength of personal efficacy built up through prior mastery experiences.

3.4.6 Self-efficacy concerns of adulthood

When people enter the early adulthood phase of their lives, they must learn to cope with many new demands that arise from lasting partnerships, marital relationships, parenthood and occupational careers. A firm sense of self-efficacy is an important contributor to the attainment of further competencies and

success. Those who enter adulthood poorly equipped with skills and plagued by self-doubts find many aspects of their adult life stressful and depressing.

One of the major challenges facing a young adult is beginning a vocational career. Greenhaus, Callanan & Godshalk (2000: 119) suggest that this phase of early adulthood is comprised of occupational choice and organisational entry. They further explain how these two sub-phases consist of major tasks that need to be completed by the individual. Some of these tasks include developing an occupational self-image; assessing alternative occupations; making an initial occupational choice and then pursuing the necessary education. Once these tasks have been completed, the individual must obtain job offers from desired organisations and select an appropriate job based on accurate information.

Self-efficacy beliefs contribute, in a substantial way, to this early phase of career development and to the success of vocational pursuits. Bandura (1994) remarks that, "In preparatory phases, people's perceived self-efficacy partly determines how well they develop the basic cognitive, self-management and interpersonal skills on which occupational careers are founded." The vocational life paths that are chosen are also determined by one's beliefs of one's capabilities.

Career success involves doing well and advancing in it. Bandura (1994) explains that psychosocial skills contribute more heavily to career success than do occupational technical skills. The development of coping capabilities and skills in managing one's motivation, emotional states and thought processes increases perceived self-regulatory efficacy. "The higher the sense of self-regulatory efficacy, the better the occupational functioning," Bandura (1994). This confirms once again the infallible relationship between self-efficacy and self-regulation.

As if these major career challenges are not enough, an individual who has entered adulthood also has to deal with familial challenges such as parenthood and spousal relationships. According to Bandura (1994) these individuals not

only have to deal with the ever-changing challenges of raising children, but also have to manage interdependent relationships within a family system and social links to many extra-familial social systems including educational, recreational, medical and care giving facilities. Parents, who are secure in their parenting efficacy, shepherd their children adequately through the various phases of development without serious problems or severe strain on the marital relationship. For those who lack the appropriate efficacy to deal with their familial demands, this can be a very trying time and they will be highly vulnerable to stress and depression.

Bandura (1994) claims, “By the middle years, people settle into established routines that stabilise their sense of personal efficacy in the major areas of functioning.” However, this period of middle age does not remain static. According to Levinson (in Greenhaus et al 2000: 113), middle adulthood is greeted by the midlife transition, where the very life structure that was pursued so intensely during the prior period, is reappraised. The individual is confronted by questions like, “What have I done with my life?” As well as, “What is it I truly want for myself and others?” This major re-evaluation can be quite a painful one, that can be brought upon by a modest decline in bodily functioning that may be interpreted as a loss of youthful vigour and may stimulate an awareness of one’s mortality. In terms of career progression Greenhaus et al (2000: 119) state that major tasks that need to be completed in the midcareer include reappraising the early career and early adulthood; reaffirming or modifying a dream and remaining productive in work. According to Bandura (1994) the midcareer provides the individual with situations in which people must compete for promotions, status and even work itself, for constant self-appraisals of capabilities by means of social comparison with younger competitors.

3.5 THE EFFECTS OF SELF-EFFICACY AND DEVELOPMENT OF SELF-REGULATORY COMPETENCE

3.5.1 Effects of self-efficacy beliefs

Self-efficacy beliefs affect behaviour in several important ways. Pajares (2002b) describes them as follows:

- *Choices* – They influence the choices people make and the courses of action they pursue. People engage in tasks in which they feel competent and confident, and avoid those in which they do not.
- *Effort* – Efficacy beliefs also help determine how much effort individuals will expend on an activity, how long they will *persevere* when confronting obstacles, and how *resilient* they will be in the face of adverse situations. So the higher the sense of efficacy, the greater the effort, persistence and resilience the individual will be capable of expending.
- *Stress and anxiety* – Self-efficacy beliefs also influence the amount of stress and anxiety individuals experience as they engage in a task, and ultimately, the level of accomplishment they realise.

Schunk and Pajares (2004) explain that through these effects, a strong sense of efficacy can enhance human accomplishment and personal well-being. People with a high sense of personal competence approach difficult tasks as challenges to be mastered, rather than as threats to be avoided (Schunk and Pajares, 2004). They also have greater intrinsic interest and deep engrossment in activities, and they set themselves challenging goals and maintain strong commitment to them. “As a result of these influences, self-efficacy beliefs are strong determinants and predictors of the level of accomplishment that individuals finally attain,” Pajares (2002b).

3.5.2 The Development of Self-Regulatory Competence

Zimmerman (1997) explains that academic self-regulatory competence develops initially from social sources and subsequently shifts to self sources in a series of levels. The first of these levels is known as the *observational* level. At this level, in order to improve on his/her behavioural accuracy of a certain skill, an observer requires a model to adopt a teaching role and provide the observer with guidance, feedback and social reinforcement during practice (Zimmerman, 1997). In this way the observer will emulate a successful model's methods, and avoid those that are unsuccessful. Vicarious reinforcement is the primary source of motivation during this phase (Zimmerman, 1997). The next level of development, according to Zimmerman (1997) is known as the *imitative* level. At this level the observer refrains from copying the exact actions of the model, but instead begins to emulate the model's general pattern or style of functioning (Zimmerman, 1997). The source of learning of self-regulatory skill at the first two levels is mainly social, according to Zimmerman (1997).

The third level of development of self-regulatory competence is the *self-controlled* level of academic self-regulatory skill. At this level a learner has the ability to make use of strategy independently when performing a certain task (Zimmerman, 1997). The fourth, *self-regulated* level of self-regulatory skill allows learners to systematically adapt their learning strategies. At this level a learner can initiate the use of strategies, incorporate adjustments based on contextual features of the situation, and maintain motivation through the use of self-efficacy perceptions of enactive success (Zimmerman, 1997).

3.5.3 The Effect of Self-Efficacy Beliefs on the Behaviour of Students

Pajares and Schunk (n.d.) explain that self-efficacy beliefs influence the choices that students make, i.e. students will engage in tasks about which they feel confident, and avoid those in which they do not. At a tertiary level students have a great amount of control over course and activity selection decisions. These decisions, for example, are directly influenced by students' self-efficacy beliefs. Another area that is influenced by self-efficacy beliefs is the amount of energy and effort students will expend on an activity and how long they will persevere (Pajares and Schunk, n.d.). The greater a student's sense of self-efficacy, the greater the effort expenditure and persistence.

According to Pajares and Schunk (n.d.) self-efficacy beliefs also have an influence on students' emotional reactions. Low self-efficacy can cause students to believe that a situation is tougher than it really is, fostering anxiety, stress and a narrow vision of how best to solve a problem (Pajares and Schunk, n.d.). High self-efficacy can foster feelings of serenity in approaching difficult tasks; can increase optimism and resilience; and also lowers anxiety whilst raising self-esteem at the same time (Pajares and Schunk, n.d.).

Usher and Pajares (2005) further found that students with high self-efficacy are better at monitoring their time, work harder and evaluate their progress more frequently than students with low academic self-efficacy. According to their results, students with high self-efficacy also engage in more self-regulatory strategies that promote academic success (Usher and Pajares, 2005). The influence of self-efficacy on student behaviour, according to Pajares and Schunk (n.d.), can be summarised in the following way:

Table 3.1 Effects of Self-Efficacy

Students With High Self-Efficacy	Students With Low Self-Efficacy
Approach difficult task as challenge to be mastered.	Hold beliefs that foster stress and depression.
Great intrinsic interest in activities.	Attribute failure to low ability, which is perceived as inborn and permanent.
Set challenging goals and maintain commitment to them.	Failure is simply a reminder of their incapability.
Heighten and sustain their efforts in the face of failure.	Normally envision low grades even before an examination begins.
Recover confidence quickly after failures or setbacks.	

3.6 EFFICACY-ACTIVATED PROCESSES

A comprehensive understanding of the mechanics of self-efficacy would not be complete without exploring exactly how these beliefs regulate human functioning. Bandura (1995:5) explains that self-efficacy beliefs regulate human functioning through four major processes. These will now be discussed.

3.6.1 Cognitive processes

Human behaviour, which is primarily purposive, is regulated by forethought embodying valued goals; and personal goal setting is influenced by self-appraisal of capabilities (Bandura, 1995:5). The stronger the perceived self-efficacy, the higher the goal challenges people set for themselves and the firmer their commitment is to these goals are.

Bandura (1995:6) claims that most courses of action are initially organised in thought. Those who have a high sense of efficacy visualise success scenarios that provide positive guides and supports for performance. On the other hand, those who doubt their efficacy visualise failure scenarios and dwell on the many things that can go wrong. A major function of thought, as stipulated by Bandura

(1995:6), is to enable people to predict events and to develop ways to control those that affect their lives. In learning predictive and regulative rules people must draw on their knowledge to construct options; to weigh and integrate predictive factors; and to test and revise their judgements against the immediate results of their actions. Another essential part of the process is to remember which factors they have tested and how well they have worked (Bandura, 1995:7).

Therefore, those who maintain a resilient sense of efficacy set themselves challenging goals and use good analytic thinking, which pays off in performance accomplishments.

3.6.2 Motivational processes

As mentioned before by Bandura (1995: 7), people motivate themselves and guide their actions anticipatorily by the exercise of forethought. They form beliefs about what they can do and anticipate likely outcomes of prospective actions. They set goals for themselves and plan courses of action designed to realise valued futures. They mobilise the resources at their command and the level of effort needed to succeed.

According to Bandura (1995:7), there are three different forms of cognitive motivators around which different theories have been developed. They are as follows:

- *Causal attributions* – The corresponding theory linked to causal attributions is the attribution theory. Bandura (1995:7) postulates that efficacy beliefs influence causal attributions. He explains that people who regard themselves as highly efficacious attribute their failures to insufficient effort or adverse situational conditions, whereas those who regard themselves as inefficacious tend to attribute their failures to low ability. “Causal attributions affect motivation, performance and affective reactions mainly through beliefs of personal efficacy,” Bandura (1995:8).

- *Outcome expectancies* – The next cognitive motivator is that of outcome expectancies, and its corresponding motivational theory is the expectancy-value theory. Bandura (1995:8) argues that in this theory motivation is regulated by the expectation that a given course of behaviour will produce certain outcomes and the value placed on those outcomes. It is important to keep in mind though, that people act on their beliefs about what they can do as well as on their beliefs about the likely outcomes of performance. “The motivating influence of outcome expectancies is thus partly governed by efficacy beliefs,” Bandura (1995:8). Therefore the influence of self-efficacy substantially enhances the predictiveness of expectancy-value theory.
- *Cognised goals* – The corresponding theory to this cognitive motivator is goal theory. According to Bandura (1995:8) the capacity to exercise self-influence by goal challenges and evaluative reaction to one’s own performances provides a major cognitive mechanism of motivation. Motivation based on goal setting involves a process of cognitive comparison of perceived performance to an adopted personal standard. Bandura (1995:8) explains further that by making self-satisfaction conditional on matching the standard, people give direction to their behaviour and create incentives to persist in their efforts until they fulfil their goals. They intensify their efforts by being discontent with substandard performances.

Bandura (1995:8) declares that efficacy beliefs contribute to motivation in several ways. They determine the goals people set for themselves, how much effort they expend, how long they persevere in the face of difficulties, and their resilience to failures. When faced with obstacles and failures, people who distrust their capabilities slacken their efforts or give up quickly. Those who have a strong belief in their capabilities exert greater effort when they fail to master the challenge.

3.6.3 Affective processes

According to Bandura (1995: 8) people's beliefs in their coping capabilities affect how much stress and depression they experience in threatening or difficult situations, as well as their level of motivation. He also explains that perceived self-efficacy to exercise control over stressors plays a central role in anxiety arousal. It does so in several ways, according to Bandura (1995:9). Efficacy beliefs affect vigilance toward potential threats and how they are perceived and cognitively processed. People who believe that potential threats are unmanageable view many aspects of their environment as fraught with danger. They dwell on their coping deficiencies and magnify the severity of possible threats, and worry about things that rarely happen (Bandura, 1995:9). In contrast however, people who believe they can exercise control over potential threats do not exert any energy on being ever watchful for threats, and they also do not conjure up disturbing thoughts about them.

The exercise of control over ruminative disturbing thoughts is another way in which efficacy beliefs regulate anxiety arousal and depression, according to Bandura (1995:9). It is not the sheer frequency of disturbing thoughts, but the perceived inability to turn them off that is the major source of distress. Hence, Bandura (1995:9) concludes that the frequency of aversive thoughts is unrelated to anxiety when the effects of perceived thought control efficacy are removed.

Another way in which efficacy beliefs reduce or eliminate anxiety, according to Bandura (1995: 9), is by supporting effective modes of behaviour that change threatening environments into safe ones. The stronger the sense of efficacy, the bolder people are in taking on problematic situations that generate stress, and the greater their success in shaping them more to their liking. So therefore, efficacy beliefs can regulate stress and anxiety through their impact on coping behaviour (Bandura, 1995:9).

Bandura (1995:9) postulates that there are three routes to depression. The first route is through unfulfilled aspiration. People, who impose on themselves standards of self-worth they judge they cannot attain, drive themselves to bouts of depression. A second route to depression is through a low sense of social efficacy to develop social relationships that bring satisfaction to one's life and cushion the adverse effects of chronic stressors. "Social support reduces vulnerability to stress, depression, and physical illness," Bandura (1995: 10). So therefore, a low sense of efficacy to develop satisfying and supportive relationships contributes to depression both directly and by curtailing development of social supports. Bandura (1995:10) explains that supportive relationships can enhance personal efficacy to reduce vulnerability to depression.

The third route to depression is via thought control efficacy. According to Bandura (1995:10), dejecting ruminative thought cognitively generates much of human depression, and a low sense of efficacy to control ruminative thought contributes to the occurrence, duration and recurrence of depressive episodes.

3.6.4 Selection processes

"People are partly the product of their environment. Therefore, beliefs of personal efficacy can shape the courses people's lives take by influencing the types of activities and environments they chose to get into," Bandura (1995: 11). In this process, destinies are shaped by selection of environments known to cultivate certain potentialities and life-styles (Bandura, 1995:10). People avoid activities and environments they believe exceed their coping capabilities. On the other hand though, people readily undertake challenging activities and select environments that they judge themselves capable of managing. According to Bandura (1995:11), people cultivate different competencies, interests and social networks that determine their life courses, by the choices they make. Any factor that influences choice behaviour can profoundly affect the direction of personal development. "This is because the social influences operating in selected environments continue to promote certain competencies, values and interests

long after the efficacy decisional determinant has rendered its inaugurating effect,” Bandura (1995:11).

Bandura (1995; 11) provides a short summary regarding the diverse effects of perceived personal efficacy. He explains that people who have a low sense of efficacy in given domains shy away from difficult tasks, which they view as personal threats. They have low aspirations and weak commitment to the goals they choose to pursue. When faced with difficult tasks, these people dwell on their personal deficiencies, the obstacles they will encounter, and all kinds of adverse outcomes rather than concentrate on how to perform successfully. They slacken their efforts and give up quickly in the face of difficulties. People with a low sense of efficacy also view insufficient performances as deficient aptitude, and therefore it does not require much failure for them to lose faith in their capabilities. They fall easy victim to stress and depression.

Bandura (1995: 11) also expresses a word of caution concerning the benefits of a resilient sense of personal efficacy. He states that saying something should not be confused with believing it to be so. Simply saying that one is capable is not necessarily self-convincing. “Self-efficacy beliefs are the product of a complex process of self-persuasion that relies on cognitive processing of diverse sources of efficacy information conveyed enactively, vicariously, socially, and physiologically,” Bandura (1995:12).

CHAPTER 4: MEASURING SELF-EFFICACY

4.1 THE CONSTRUCTION OF A MEASURING INSTRUMENT

4.1.1 Questionnaire Design

The objective of this study is to create a valid and reliable measuring instrument. In order to construct a measuring instrument it is imperative to follow the guidelines of a theoretical model. The following theoretical model, as proposed by DeVellis (1991), will be used for the basic construction of the measuring instrument:

Step 1: Determine clearly what it is you want to measure

DeVellis (1991: 52-53) explains that the construct being measured should be clearly defined and distinguished from related concepts. It is also important that the purpose for the scale development is clear and well understood (DeVellis, 1991: 52-53).

Step 2: Generate an item pool

In the next step DeVellis (1991: 54) explains that it is necessary to generate a large pool of items that are candidates for eventual inclusion in the final scale. The description of exactly what the scale is intended to measure should guide the process of item generation (DeVellis, 1991: 54). As many items as possible should be generated for final inclusion, as this will improve the internal consistency of the overall questionnaire (DeVellis, 1991: 57). Items should be clear and unambiguous, and must also not be too lengthy (DeVellis, 1991: 57). A decision must also be taken about whether or not to use positively or negatively worded items. The objective is to avoid agreement bias, which can be caused by using only positive items, whilst at the same time avoiding confusion which can be caused by using negative items DeVellis (1991: 60).

Step 3: Determine that format for measurement

DeVellis (1991: 61-74) discusses the use of different formats, such as Thurstone scaling, Guttman scaling, Likert scaling etc; as well as the conditions under which each of them should preferably be used. DeVellis (1991: 74) advises that the item formats, including response options and instructions, should reflect the nature of the construct being measured.

Step 4: Have initial item pool reviewed by experts

The chosen panel of experts should be provided with a working definition of the construct being measured, and then be asked to rate each item with respect to its relevance to the construct. The panel of experts should also rate each item's clarity and conciseness; as well as point out any awkward or confusing items (DeVellis, 1991: 76). The decision to accept or reject an item remains the responsibility of the scale developer (DeVellis, 1991: 76).

Step 5: Consider inclusion of validation items

A useful method of aiding in determining the validity of the final scale is to determine social desirability – the attempt to present oneself in a way that society regards as positive (DeVellis, 1991: 77).

Step 6: Administer items to a development sample

DeVellis (1991: 78) recommends that the developed scale be administered to a representative sample to conduct preliminary statistics and thus improve the final scale before it is administered on the target population.

Step 7: Evaluate the items

DeVellis (1991: 80-86) explains that the scale should be scrutinized vigorously by using different means, in order to determine the scale's reliability and validity.

Step 8: Optimise scale length

It is important to take cognisance of the fact that the size of the scale as well as the size of the target population have a significant impact on the statistical results generated (DeVellis, 1991: 86-90). As the number of items in the scale increase, so too should the number of respondents in the target population DeVellis (1991: 90).

4.2 MEASURING SELF-EFFICACY

4.2.1 Self-efficacy dimensions

Bandura (2001) provides a guide for constructing self-efficacy scales. The guidelines that Bandura recommended for the construction of self-efficacy measuring instruments will be strictly adhered to in order to ensure that the measuring instrument is customised for the realm of self-efficacy. Since the purpose of this research study is the development of such a questionnaire, it is vitally important to pay careful attention to Bandura's helpful guide.

Before constructing a self-efficacy scale or questionnaire, Bandura (2001) states that it is essential to first understand the different dimensions of self-efficacy. There are three different dimensions of self-efficacy. They are as follows:

- *Generality* – Bandura (2001) explains that people may judge themselves efficacious across a wide range of activity domains or only in certain domains of functioning. Generality can vary across types of activities; the modalities in which capabilities are expressed (behavioural, cognitive, affective); situational variations; and the type of individuals toward whom the behaviour is directed (Bandura, 2001). Assessments linked to activity domains, situational contexts, and social aspects reveal the patterning and degree of generality of people's belief in their efficacy. Bandura (2001) also tells us that, within the context of generality, the

most fundamental self-beliefs are those around which people structure their lives.

- *Strength* – In addition to generality, efficacy beliefs also differ in strength. According to Bandura (2001), weak efficacy beliefs are easily negated by disconfirming experiences, whereas people who have a tenacious belief in their capabilities will persevere in their efforts despite facing many difficulties and obstacles. Individuals who possess such tenacious self-beliefs are not easily dissuaded by adversity. Bandura (2001) states, “The stronger the sense of personal efficacy, the greater the perseverance and the higher the likelihood that the chosen activity will be performed successfully.”
- *Level* – The third way of designating self-efficacy beliefs is by level, which, according to Bandura (2001), is the number of activities individuals judge themselves capable of performing above a selected cut-off value of efficacy strength. It is imperative, Bandura (2001) says, to note that converting a continuous measure of efficacy strength into a dichotomous measure on the basis of a minimal cut-off strength value loses predictive information. If a low cut-off value is selected, a relatively low sense of efficacy is treated the same as self-assurance. If the cut-off criterion is set at a high level, a moderately strong sense of capability gets defined as lack of self-efficacy. Therefore either too low or too high cut-offs can produce artificial discrepancies between perceived self-efficacy and performance. The minimum threshold of self-assurance needed to attempt an activity has to be determined empirically because the threshold varies across different domains of functioning (Bandura, 2001).

4.2.2 Gradations of challenge

Bandura (2001) recommends that perceived self-efficacy should be measured against levels of task demands that represent gradations of challenge. Self-efficacy appraisals reflect the level of difficulty individuals believe they can

surmount. If there are no obstacles to overcome, the activity is easily performable and everyone has uniformly high self-efficacy for it.

Bandura (2001) indicates that the events over which personal influence is exercised may entail regulating one's own motivation, thought processes, performance level, emotional states, or changing environmental conditions. The content domain should correspond to the area of functioning one seeks to manage. Bandura (2001) also explains that the nature of the challenges against which personal efficacy is judged will vary depending on the sphere of activity. The different challenges that are set in the measurement scale may be graded in terms of level of ingenuity, exertion, accuracy, productivity, threat, or self-regulation required. These are only a few dimensions of performance demands though.

According to Bandura (2001) many areas of functioning are primarily concerned with self-regulatory efficacy to guide and motivate oneself to get things done that one knows how to do. In such instances, self-regulation is the capability of interest. Bandura (2001) states, "The issue is not whether one can do the activities occasionally, but whether one has the efficacy to get oneself to do them regularly in the face of different types of dissuading conditions." Bandura (2001) illustrates this point with an example. In the measurement of perceived self-efficacy to stick to a health promoting exercise routine, individuals judge how well they can get themselves to exercise regularly under various impediments, such as when they are under pressure from work; are tired or depressed; in foul weather; or when they have other commitments or more interesting things to do.

Bandura (2001) cautions that when constructing scales to assess self-regulatory efficacy, a great amount of preliminary work is required in order to identify the different forms the challenges and impediments take. Bandura (2001) recommends conducting open-ended interviews and making use of pilot questionnaires, with the group of people in question, in order to describe the

things that make it hard for them to perform the required activities regularly. The identified challenges or impediments are then built into the efficacy items, which appear in the questionnaire. In the formal scale participants then judge their ability to meet the challenges or to surmount the various impediments. Bandura (2001) states further that, “Sufficient gradations of difficulties should be built into the efficacy items to avoid ceiling effects.” To ensure that the items contain sufficient gradations of difficulty, pre-tests should be conducted.

4.2.3 Domain Specification

“The construction of sound efficacy scales relies on an informative conceptual analysis of the factors governing the selected domain of functioning,” Bandura (2001). A comprehensive knowledge of the determinants governing the activity domain specifies which aspects of personal efficacy should be measured. Bandura (2001) makes use of the self-management of weight as an example. He states that weight is determined by what people eat, by their level of exercise, which burns calories and can raise the body’s metabolism, and genetic factors that regulate metabolic processes. A comprehensive efficacy assessment would be linked to the contributing behavioural factors over which people can exercise some control. This would include perceived capability to regulate the foods that are purchased, to exercise control over eating habits, and to adopt and to stick to an increased level of physical activity. “In the present example, perceived self-efficacy will account for more of the variation in weight management if the assessment includes perceived capability to regulate food purchases, eating habits and exercise, than if it is confined solely to eating habits,” Bandura (2001). From this Bandura (2001) concludes that multifaceted efficacy scales not only have predictive utility, but also provide insights into the dynamics of self-management of behaviour.

According to Bandura (2001), if self-efficacy scales are targeted to factors that have little or no impact on the domain of functioning, such research cannot yield a predictive relationship. Therefore self-efficacy scales must be tailored to

activity domains and assess the multifaceted ways in which efficacy beliefs operate within the selected activity domain. Pajares (1996) echoes Bandura's reasoning by stating that if the purpose of a study is to achieve explanatory and predictive power, self-efficacy judgements should be consistent with and tailored to the domain of functioning or task under investigation.

4.2.4 Phrasing of items

According to Bandura (2001), it is essential that the items in the scale be written at the reading level of the participants. He also explains that the following problems should be avoided:

- Ambiguous or poorly worded items
- Technical jargon that is not part of everyday vocabulary
- Multi-barrelled items that include different types of attainments within the same item, for which respondents may have different levels of perceived efficacy. For example, if individuals are asked to rate their efficacy to perform a given exercise routine regularly, and to reduce their caloric intake by a certain amount, it is unclear what the response to this double-barrelled item presents.

Another recommendation that Bandura (2001) puts forward is to keep the items short and explicit, and pre-test them for readability and clarity. Pajares (1996) states that it is vital that the skills required to accomplish the performance attainments that form the outcome assessment, should be clear to the participant. "When students do not know with any degree of accuracy what it is they are expected to do, the judgements on which they will base their capability to do it will be nebulous at best," Pajares (1996).

4.2.5 Response scale

Bandura (2001) explains that in the standard methodology for measuring efficacy beliefs, individuals are presented with items portraying different levels of task

demands, and rate the strength of their belief in their ability to execute the requisite activities.

Bandura (2001) recommends that a 100-point scale be used that ranges in 10-unit intervals, from 0 (“Cannot do”); through intermediate degrees of assurance, 50 (“Moderately certain can do”); to complete assurance, 100 (“Certain can do”). He also states that scales that only use a few response points should be avoided, as they are less sensitive and reliable. Another important factor that must be addressed concerns the preliminary instructions. Bandura (2001) states that people must be asked to judge their operative capabilities *as of now*, not their potential capabilities or their expected future capabilities. “It is easy for people to imagine themselves to be fully efficacious in some hypothetical future (Bandura, 2001).” However, in the case of perceived self-regulatory efficacy to maintain a given level of functioning over time, people judge their assurance that they can perform the activity regularly over designated periods of time.

4.2.6 Minimising response bias

Bandura (2001) provides a few recommendations regarding avoiding response bias:

- The self-efficacy judgements should be recorded privately, rather than given publicly.
- The questionnaire should be identified by code number rather than by name.
- Respondents should be informed that their responses will remain confidential and be used only with number codes by the research staff.
- If the scale is labelled, a nondescript title like “Appraisal Inventory” should be used, instead of “Self-efficacy.”
- To encourage frank answers, respondents must be informed about the importance of their contribution to the research. They can be told that the knowledge the research provides will increase understanding and guide

the development of programmes designed to help people to manage the life situations with which they have to cope.

4.2.7 Validity

“Self-efficacy scales should have face validity. They should measure what they purport to measure, i.e. perceived capability to produce given attainments,” Bandura (2001). The construct of self-efficacy is embedded in social cognitive theory, and Bandura (2001) explains that people who score high on perceived self-efficacy should differ in distinct ways from those who score low in ways specified by the theory. Verifications of predicted effects increase evidence for the construct’s validity.

4.2.8 Development of a college academic self-efficacy scale

Owen and Froman conducted a study in 1988 concerning the development and estimation of measurement properties of the College Academic Self-efficacy Scale. Three university faculties developed a pool of routine, frequent behaviours of college students. A 33-item assortment resulted, with a five-point Likert-type scale attached. The scale was administered to two different groups of students over an eight-week period.

“Nearly all studies have focused on the content of self-efficacy rather than its measurement. Sometimes the measurements are so casual or confounded that one wonders what is actually being assessed,” Owen and Froman (1988). The authors’ study resulted in the development of the College Academic Self-Efficacy Scale, which showed high alpha interval consistency estimates for the two occasions of .90 and .92. The concurrent, incremental and factorial validity of the scale proved to be quite high. In the end the study resulted in a measurement scale of academic self-efficacy that is rapid (five minutes) and simple, and proved to be much more useful and efficient than most of the other self-efficacy measures of its time.

4.3 SELF-EFFICACY IN AN ACADEMIC CONTEXT

Bandura (1995: 17) proclaims that a major goal of formal education should be to equip students with the intellectual tools, efficacy beliefs, and intrinsic interests to educate themselves throughout their lifetime. Bandura (1995:18) also explains that there are three principal ways in which efficacy beliefs operate as an important contributor to academic development. These three principal ways include students' beliefs in their efficacy to regulate their own learning and to master different academic subjects; teachers' beliefs in their personal efficacy to motivate and promote learning in their students; and faculties' collective sense of efficacy that their schools can accomplish significant academic progress.

4.3.1 Self-efficacy and academic achievement

Zimmerman (in Bandura 1995: 203) defines perceived academic self-efficacy as personal judgements of one's capabilities to organise and execute courses of action to attain designated types of educational performances. Zimmerman (in Bandura 1995: 208) discusses a research programme conducted by Schunk and his associates in 1991. The research programme included children with major academic deficiencies. The respondents were required to engage in self-directed learning of mathematical and language skills. The subject matter was structured for them in easily mastered steps in which they learned the basic principles and practiced applying the knowledge. Instructional influences were then added that could alter children's perceptions of cognitive efficacy. These instructional influences included modelling of cognitive strategies, self-verbalisation of cognitive operations and strategies, goal setting, self-monitoring, social comparison and attributional feedback. The results of the research programme showed that the instructional programmes and supplementary social experiences enhanced the children's self-appraisal of their intellectual capabilities. Zimmerman (in Bandura 1995:209) concludes therefore that social and evaluative feedback accompanying formal instruction influences self-efficacy beliefs, which in turn enhance development of academic competencies.

Zimmerman in Bandura (1995:210) gives further testimony to other investigations conducted by Schunk and his colleagues, where three indices of academic achievement were studied in relation to students' efficacy beliefs. The three indices included basic cognitive skills, performance in academic course work, and standardised achievement tests. Their results indicated that efficacy beliefs affect all three forms of academic performance.

Multon, Brown and Lent (1991) conducted a meta-analysis, which examined the effects of efficacy beliefs on student's academic achievement. They identified 38 published and unpublished articles that measured academic performance. To be included in the meta-analyses, a study had to provide the following: a) a measure of self-efficacy, b) a measure of academic performance or persistence, and c) sufficient information to calculate appropriate effect size estimates. The analyses yielded a positive effect size of .38, indicating that self-efficacy accounted for approximately 14% of the variance in students' academic performance across a variety of student samples, experimental designs, and criterion measures. The findings suggested that self-efficacy beliefs are generally related to academic behaviours in ways that support Bandura's theory and its extension to educational –vocational behaviour.

4.3.2 Self-efficacy and educational self-regulation

Bandura (1995:18) posits that in social cognitive theory, people must develop skills in regulating the motivational, affective and social determinants of their intellectual functioning as well as the cognitive aspects. Bandura (1995:18) also states, "Zimmerman has been the leading exponent of an expanded model of academic self-regulation. He and his colleagues have shown that good self-regulators do much better academically than do poor self-regulators." According to Bandura (1995:18) self-regulatory skills will not contribute much if students cannot get themselves those skills persistently in the face of difficulties, stressors, or competing attractions. He also states that firm beliefs in one's self-regulatory skills provides the needed staying power, and that the higher the

students' beliefs in their efficacy to regulate their motivation and learning activities, the more assured they are in their efficacy to master academic subjects.

In explaining the impact of cognitive self-efficacy on developmental trajectories, Bandura (1995:19) states that children's intellectual development cannot be isolated from the social relations within which it is embedded or from its social consequences. It must be analysed from a sociocultural perspective. Bandura (1995:19) affirms that children who have a high sense of efficacy to regulate their own learning and to master academic skills behave more pro-socially, are more popular, and experience less rejection by their peers than do children who believe they lack these forms of academic efficacy. "Moreover, a low sense of cognitive efficacy is associated with physical and verbal aggression and ready disengagement of moral self-sanctions from harmful conduct," Bandura (1995:20). He goes on to declare that students of low social and intellectual efficacy are likely to gravitate to peers who do not subscribe to academic values and life-styles. Zimmerman in Bandura (1995: 219) describes the causal role of self-efficacy beliefs in the operation of the various sub-functions of self-regulation listed below.

4.3.2.1 Goal setting

Zimmerman in Bandura (1995: 219) declares that beliefs of personal capabilities affect the goals people select and their commitment to them. The more capable that people judge themselves to be, the more challenging goals they set for themselves. He states further that perceived efficacy for self-regulated learning enhances the perceived efficacy for academic attainment. Perceived academic self-efficacy in turn raises the academic goals that students set for themselves, and their final academic achievement.

4.3.2.2 Self-evaluation

Zimmerman in Bandura (1995: 221) declares, “Self-efficacy beliefs not only influence the goals students set for themselves but also their evaluative reactions toward their own performances.”

4.3.2.3 Self-monitoring

Zimmerman in Bandura (1995: 222) explains that self-monitoring is a selective process in which self-beliefs influence which aspects of one’s performance are given most attention, how they are perceived, and how the performance information is organised. Zimmerman in Bandura (1995:222) cites a study conducted by Bouffard-Bouchard, Parent, and Larivee in 1991. They studied the effects of efficacy beliefs on self-monitoring during concept learning with junior high and high school students at two levels of cognitive ability. Efficacy beliefs were shown to exert a significant effect on concept learning. Students of high-perceived efficacy were better at monitoring their working time, were more persistent, were less likely to reject correct hypotheses prematurely, and were better at solving conceptual problems than students of equal ability but of low perceived efficacy.

4.3.2.4 Time planning and management

Zimmerman in Bandura (1995: 224) claims, “As a component of forethought, efficacy beliefs can motivate people to predict events and to control those events that affect them.” Zimmerman in Bandura (1995) cites a longitudinal study by Britton and Tesser to support his claim. The study, conducted in 1991, concerned college students’ management of their academic study time. Britton and Tesser identified a distinct self-efficacy factor in their scale, which concerned feelings of being in charge of one’s time. Not only did efficacy beliefs predict academic achievement four years later, but also it accounted for three times more variance than did a standardised scholastic aptitude test. The study

concluded that effective management of one's study time contributes to academic self-development.

4.3.3 Social cognitive development of educational self-regulation

Zimmerman in Bandura (1995: 225) posits that Bandura's social cognitive theory provides a multifaceted approach to children's motivation and self-regulatory development. He remarks that within the conceptual framework of social cognitive theory, children's efficacy beliefs play a major role in regulating cognitive, affective and motivational factors that operate in unison in the development of children's capabilities to manage their own learning and intellectual attainments.

According to Zimmerman in Bandura (1995:225), guided mastery is the main vehicle for the cultivation of intellectual competencies, and self-directed mastery experiences can be provided to strengthen and generalise children's growing sense of self-efficacy. Zimmerman in Bandura (1995:225) states that the perceived efficacy and self-regulation of students cannot be improved upon unless there is greater flexibility in the curriculum. He recommends that time constraints for completion of academic assignments and test preparation should be individualised. This will allow study time to be self-managed more effectively. He describes the benefits of such changes as an increase in students' perceptions of their self-efficacy as well as their motivation and academic success. Zimmerman in Bandura (1995:226) explains that similar benefits can be obtained if other dimensions of academic learning could be altered to allow for greater self-regulation, such as students' method of learning, type of motivation, and use of behavioural, environmental and social supports.

4.3.4 Self-Regulated Learning Strategies

Zimmerman (1989) extracted ten different self-regulated learning strategies that were scientifically proven to correlate highly with specific academic achievement indices. These self-regulated learning strategies discriminated significantly

between students with good academic results and those with poor results (Zimmerman, 1989). The identified learning strategies can be used as an example of which self-regulation aspects to test for in the measuring instrument. The strategies to focus on, according to Zimmerman (1989), are as follows:

- *Self-evaluating strategy*: Refers to student initiated evaluations of the quality or progress of their work.
- *Organising and transforming*: Refers to student-initiated rearrangements of instructional materials to improve learning.
- *Goal setting and planning*: Refers to students setting educational goals and planning for the completion of activities related to achieving those goals.
- *Seeking information*: Refers to student-initiated efforts to secure further task information from non social sources when undertaking an assignment.
- *Keeping records and monitoring*: Student-initiated efforts to record events or results.
- *Environmental structuring*: Student-initiated efforts to select or arrange the physical setting to make learning easier.
- *Self consequating*: Student-initiated organising of reward or punishment for success or failure.
- *Rehearsing and memorizing*: Student-initiated efforts to memorise material by means of over or covert practice.
- *Seeking social assistance*: Student initiated efforts to elicit help or assistance from peers, teachers and adults.
- *Reviewing records*: Student-initiated efforts to reread notes, tests or textbooks in preparation for class or further testing.

4.4 ACADEMIC PERFORMANCE

With the purpose of this study focusing on constructing an academic self-efficacy scale, it is vital to study the construct of academic performance. It is also

important to take a look at any factors that are likely to have an influence on academic performance.

4.4.1 The meaning of academic performance

Lavin (1968) refers to academic performance as some method of expressing a student's scholastic standing. He also describes academic performance as being a grade for a course, an average for a group of courses in a subject area, or an average for all courses expressed on a 0-to-100 or other quantitative scale.

4.4.2 Factors influencing academic performance

After surveying many different research studies and their findings, Lavin (1968) concluded that the following factor plays an important role in influencing academic performance:

- *Study habits and attitudes towards study* – Measures of study habits can predict academic performance even where ability is controlled. In addition, the studies show that positive attitudes toward school, such as beliefs in the value of intellectual pursuit and of education in general, are positively related to academic performance.

Trockel, Barnes and Egget conducted a study in 2000 regarding health-related variables and academic performance among first year college students. The goal of the study was to determine which of several health-related variables might affect college students' academic performance. The set of variables used in the study included exercise, eating and sleep habits; mood states; perceived stress; time management; social support; spiritual or religious habits; number of hours worked per week; gender and age. The participants consisted of 184 undergraduate students that were selected randomly. A questionnaire was constructed based on information on health-behaviour variables that are potential predictors of academic performance. The participants were then required to complete the questionnaire either on campus, through the mail, or by telephone.

The findings of the study showed that all the variables did have an effect on academic performance. Although the effects were variable, of all the variables considered, sleep habits, particularly wake-up times, accounted for the largest amount of variance in the grade point averages of the participants. Later wake-up times were associated with lower grade averages. Trockel et al (2000) concluded that encouraging them to improve their sleep habits could enhance students' academic performance. They also suggested that students use a planner for time management, eat breakfast and change other behaviours.

In 1997 Vrugt, Langereis and Hoogstraten conducted a study in which they predicted that self-efficacy appraisals, together with beliefs concerning the malleability of ability, would influence exam performance and the attribution of students' failure to a lack of talent. The authors referred to the variable of malleability beliefs as – “the extent to which the participants thought they could develop their ability by acquiring knowledge, practice, and strategy.” The participants in the study consisted of 438 white, first year, undergraduate, psychology students. The participants were given the academic self-efficacy questionnaire of Wood and Locke, which classified self-efficacy beliefs into seven task domains: Understanding, discriminatory concepts, explaining concepts, memorisation, class concentration, note taking and exam concentration. For each of these task domains four items (with equal intervals) were included. The participants were asked to indicate whether they could achieve the described level of performance, and if so, to indicate the degree of confidence in their ability at the level described on a scale ranging from 0-10.

The participants were also asked four questions about the malleability of their own abilities in studying psychology, as well as five other questions about lack of talent as an explanation of failure. The findings concerning the academic self-efficacy of the students revealed that academic self-efficacy did contribute to exam performance directly as well as indirectly through pursued goals. As far as the malleability of the students is concerned, the results showed that participants

with high self-efficacy appraisals and strong malleability beliefs ascribed failure less to lack of talent than those with low self-efficacy appraisals and weak malleability beliefs did.

Lane and Lane conducted a study in 2001, of which the purpose was to “identify measures of self-efficacy that tap into the perceived capability of the full range of behaviours and interest. The second purpose was to investigate whether self-efficacy measures can predict academic performance some months after the measures of self-efficacy have been obtained,” Lane and Lane (2001).

Lecturers were consulted to provide the competences they believed would be needed to achieve success in the given module. The input of students was also sought by asking a group of students to consider what they thought would be the most critical aspects and competences needed to succeed as a student. This information resulted in the construction of an academic self-efficacy scale that asked participants to rate their confidence in their present abilities to successfully perform the identified activities on a scale from 1-10. There was a 13-week period between the time students completed the self-efficacy questionnaire and the performance measure (results of the module).

The results of the study showed that stable self-efficacy measures were associated with 11.5% of performance variance. Regression results showed that self-efficacy toward intellectual ability predicted subsequent academic performance. This relationship was found even though the time gap between self-efficacy and performance was long.

5. CONCLUSION

Previous research focusing on academic achievement has always been complicated by the issue of causality between academic self-beliefs and academic achievement (Pajares and Schunk, 2001). Although the debate between whether positive self-beliefs bring about academic achievement, or

whether academic achievement causes positive self-beliefs continues; it does not pose concerns in the area of self-efficacy research. Bandura (1986:16) promulgated the concept of reciprocal determinism (taken from social cognitive theory), which postulates that human behaviour is determined by the reciprocal interaction of personal, behavioural and environmental conditions. Therefore the chicken-and-egg question of causality is rendered superfluous, as Bandura contends that human motivation and behaviour influence one another reciprocally (Pajares and Schunk, 2001).

This led to the formulation of self-efficacy, the principal determinant of self-regulatory competence (Zimmerman, 1989); which has been shown to have a direct impact on academic achievement (Multon, Brown & Lent, 1991). The construct investigated in this study is self-efficacy for academic self-regulation; referring to a student's personal belief in his/her ability to perform the required activities that will yield academic success. Self-efficacy is central to the investigation as it determines to a large degree whether or not a student can self-regulate their own behaviour. Zimmerman (1989) identifies certain self-regulatory learning strategies that comprise the types of behaviour required for academic achievement, such as self-evaluation, organising and transforming etc.

In order to measure such an intricate construct it is essential to follow the principle of social cognitive theory, as well as the manner in which it manifests in self-regulation in the form of the sub-processes described by Zimmerman (1989), being self-observation, self-judgement and self-reaction. It is also important to heed Bandura's (2001) guidelines in constructing self-efficacy measuring instruments by ensuring that the generated items contain aspects of generality, strength and level. In order to construct a valid and reliable questionnaire it is necessary to follow a sound theory for constructing measuring instruments that propose a step-by-step guide, as provided by DeVellis (1991).

This form of research can yield tremendously beneficial results for the entire academic fraternity within South Africa. According to Pajares and Schunk (2001) the challenge for teachers and lecturers is to pay as much attention to students' perceptions of competence as to actual competence, for it is the perceptions that are more likely to predict students' motivation and academic choices. Low self-efficacy perceptions, as opposed to lack of capability or skill, are more responsible for maladaptive academic behaviours and diminishing school interest and achievements (Hackett, 1995:236).

“Success and failure are largely self-defined in terms of personal standards. The higher the self-standards, the more likely will given attainments be viewed as failures, regardless of what others might think,” Bandura (1986: 358). This literature study shows that much research has been conducted on self-efficacy and how it impacts on academic achievement. Leading researchers in the field of academic self-efficacy, such as Schunk, Pajares and Zimmerman, have demonstrated the importance of self-regulation in achieving academic success. Studies have shown that when students believe they possess the capabilities to achieve success in a given subject, they demonstrate greater persistence and expend more effort in the face of challenges or difficulties than those students who lack the same sense of self-efficacy.

CHAPTER 5: RESEARCH METHODOLOGY

5.1 RESEARCH APPROACH

The quantitative approach to research design is described by Fouché and Delport (cited in De Vos, 2002:79) as an approach that aims to measure the social world objectively; test hypotheses; predict and control human behaviour; and is measured with numbers. The focus of the quantitative approach is more specific and controlled than that of the qualitative approach, and is much more amenable to various statistical analyses (Fouché and Delport, cited in De Vos, 2002:80). For the purposes of this study, where a large sample was drawn to include all culture groups, a quantitative approach was adopted in order to best serve the interests of the study. Determining the validity and reliability of the final scale required detailed statistical analyses, which are far better supported by a quantitative approach (Fouché and Delport, cited in De Vos, 2002:80). A qualitative research design is flexible, without any fixed steps to be followed. The main reason for not employing a qualitative design for this study is that the design cannot be exactly replicated (Fouché and Delport, cited in De Vos, 2002:80). This is problematic because the construction of a questionnaire must follow a fixed procedure (DeVellis, 1965:51).

5.2 SAMPLING STRATEGY

5.2.1 Target Population

The target population refers to the entire collection of people that need to be studied. It is important to define the target population in terms of all the properties displayed by the population, as this will ensure that the sample drawn from the population portrays all the characteristics needed for the study. For the purposes of this study the target population included the student population at the University of Pretoria. The target population therefore includes full-time as

well as part-time students; living on and off campus that are registered with the university. The population is representative of all the national race groups, i.e. African, White, Indian, Coloured and Asian, and is not confined to any specific age group, but most likely falls between the ages of 18 and 26. The population is representative of a wide array of study fields, although the study area chosen by the students will not form any specific focus in the study.

5.2.2 Sampling Strategy

The sampling strategy to be followed can either be a form of probability or non-probability sampling. The premise of probability sampling, which is based on randomisation, is that each person in the population has the same known probability of being selected (Strydom and Venter, cited in de Vos, 2002:201). Non-probability sampling produces a type of sample in which the sampling elements are selected by making use of a method other than a mathematically random process (Neuman, 2003:540). Convenience sampling (a form of non-probability sampling) was used to draw the sample for this study. It involves deriving a sample in any way that is convenient (Neuman, 2003:211). The questionnaire was administered to consenting students on campus during class time, by first obtaining permission from lecturers. To ensure data that are statistically relevant, a sample of at least 200 students was set as the target.

Although non-probability sampling produces the risk of drawing a sample that is not entirely representative of the target population, it can still be effective in this instance, as the population parameters of the target population are fairly broad. The sample must include registered students at the University of Pretoria. The proposed strategy of convenience sampling will meet this requirement, as the instrument will be administered to students attending class at the University of Pretoria's campus. Convenience or accidental sampling can be effective by including those cases that form part of the target sample until the required

sample is drawn (Strydom and Venter, cited in de Vos, 2002:207). This procedure was followed to draw the sample for this study.

5.3 RESEARCH DESIGN

The nature of this proposed research study is exploratory, as the main aim of the study is to explore the development of a measuring instrument in the field of self-efficacy for academic self-regulation. The end product, being the actual questionnaire, was used to gather the information needed to achieve the purpose of the study, and the questionnaire itself is descriptive in nature. Essentially this study is a form of survey research. Survey research is normally used to describe a population at a certain point in time or over a period of time (Fouche & De Vos, 2002:143).

The survey or questionnaire to be applied in this study was conducted at one point in time as opposed to over a period of time, and therefore it is a cross-sectional design. Neuman (2003:30) points out that with cross-sectional research, a snapshot approach is taken, wherein the researcher makes an observation at one point in time. The study followed a cross-sectional design, as the self-efficacy for academic self-regulation of tertiary students was measured only once, as opposed to being measured on a number of occasions over a long period of time. Therefore it was not possible to observe change over time, although the research question will still be addressed in full by making use of a cross-sectional design. This type of design is most consistent with the descriptive approach to research, which is partly being used in this study (Neuman, 2003:31).

5.4 DATA COLLECTION PROCEDURES

The data collection strategy employed in this research study took the form of the questionnaire, as the questionnaire ultimately generated the data required to

statistically address the research question of whether or not a valid and reliable measuring instrument was developed. It is important to keep in mind though that the objective of the study is the construction of a questionnaire, which means that the data collection firstly consisted of a literature study, which provided the insight and understanding required to develop the questionnaire. The next part of the data collection phase involved the application of the questionnaire, which provided statistically amenable data, providing an indication of the reliability and validity of the instrument.

The following theoretical model, as proposed by DeVellis (1965), was used for the basic construction of the measuring instrument in the following manner:

Step 1: Determine clearly what it is you want to measure

As previously discussed, the purpose of the study was to construct a valid and reliable measuring instrument to determine the self-efficacy for academic self-regulation of tertiary students. Therefore the topic being measured is self-efficacy for academic self-regulation; and this is achieved through the construction of a scientific measuring instrument. The topic being measured is clearly defined in the literature study and is also distinguished from related concepts.

Step 2: Generate an item pool

In order to generate an item pool the literature surrounding self-efficacy and academic self-regulation was studied to determine specific indicators. The self-regulated learning strategies discussed in the literature were closely scrutinised, as they provide a clear distinction between those sets of behaviour that are indicative of academic success and those that are indicative of academic failure. Therefore items were generated around aspects such as self-evaluation strategies, goal setting, organising skills etc. The concept of reciprocal determinism, as described by Bandura (1986:16) was employed as the guiding principle in generating items. This means that every item should succinctly

depict the rationale of Social Cognitive Theory, and the relationship between the personal, environmental and behavioural spheres should be clearly evident in the objective of each item.

The guidelines, as set out by Bandura (2001), for constructing self-efficacy scales was also followed closely. Every item was strictly examined according to the most important of these guidelines, that every item should contain the three dimensions of self-efficacy:

1. Generality – Each item should contain a specific context, providing enough clarity for the respondent to make an informed judgement.
2. Strength – Each item should evidently seek to determine the strength of the respondent's belief in his/her ability. The item should neither be too challenging nor too easy to provide a true reflection of perceived ability.
3. Level – Each item should also have the ability to distinguish between high levels and low levels of self-efficacy.

Step 3: Determine the format for measurement

Scaling is a measurement technique commonly used in survey research and assists a researcher in producing quantitative measures of how an individual feels or thinks about something (Neuman, 2003:195). There are many different types of scales that can be used in the operationalisation of a research question. The scaling method selected for this study is the Likert scale. DeVellis (1965: 68) explains that in a Likert scale the item is presented as a declarative statement or sentence, which is followed by certain response options that indicate varying degrees of endorsement of the statement. Likert scaling is mostly used in instruments that measure opinions, beliefs and attitudes (DeVellis, 1965: 69)

The fundamental concern addressed by the measuring instrument created in this study is to determine what students believe their level of self-efficacy to be. Therefore the measuring instrument essentially deals with the measurement of

beliefs, and this is a purpose fulfilled by a Likert scale (DeVellis, 1965: 68). The pool of items generated in the previous step was produced in the form of statements, allowing itself to easily be fashioned in the form of a Likert scale.

Another matter of concern in deciding on the format of a measuring instrument is the level of measurement. The levels of measurement categorise the degree of precision of the measurement and ultimately limit the statistical evaluations that can be performed on the data generated (Neuman, 2003:188). The dependent variable in the study is self-efficacy for academic self-regulation, and the Likert scale that was developed to measure this dependent variable was developed at the ordinal level. Scales constructed at the ordinal level, as it mostly the case with Likert scales, indicate a difference in categories and also allow the categories to be ranked. Measuring the dependent variable at the ordinal level provided enough precision to accommodate the type of statistical procedures that were necessary to address the research question.

Pajares, Hartley & Valiante (2001) found that in the measurement of self-efficacy, Likert scales (in comparison with other scales) were shown to be empirically strong measuring instruments for addressing self-efficacy for self-regulation. Therefore the use of a Likert scale is contextually justified as well.

Step 4: Have initial item pool reviewed by experts

The initial questionnaire was compiled in the form of a Likert scale and consisted of 67 items. The selected panel of experts consisted of four senior lecturers/researchers from the Department of Industrial Psychology at the University of Pretoria. Each of the lecturers have extensive knowledge and experience in the area of questionnaire development. They were each supplied with a pack containing a brief description of the research study at hand and the main objective of the study. The pack further contained a copy of the questionnaire in the structure that it would be administered to students. The

experts were asked to scrutinise every item according to its clarity, relevance and whether or not the question is sufficiently challenging – taken from the guidelines in constructing self-efficacy scales (Bandura, 2001). The panel of experts were asked to judge the questionnaire in general as well as comment on any part of the questionnaire that they felt needed improvement. The feedback provided by the panel resulted in some items being removed totally from the questionnaire and some being improved upon with regards to clarity, relevance and challenge. The measuring instrument then consisted of 62 items.

As no real expert in the field of self-efficacy research was available within South Africa, a world renowned expert in the field – Ellen Usher was consulted. Ellen Usher (from Emory University in the United States of America) is responsible for countless publications in the field of academic self-efficacy and she works very closely with the leading expert in the field – Frank Pajares. Ms Usher was provided with the same pack as the other experts, except that she was given the refined questionnaire (after the panel's changes had been applied). Ms Usher's feedback proved priceless as she pointed out that the questionnaire in fact was measuring an aspect of self-regulation together with self-efficacy. This resulted in the measuring instrument being retained in its current form, and the research objective together with the literature study being redefined in order to include the concept of self-regulation.

The chosen panel of experts should be provided with a working definition of the construct being measured, and then be asked to rate each item with respect to its relevance to the construct. The panel of experts should also rate each item's clarity and conciseness; as well as point out any awkward or confusing items (DeVellis, 1965: 76). The decision to accept or reject an item remains the responsibility of the scale developer (DeVellis, 1965: 76).

Step 5: Consider inclusion of validation items

Social desirability is a form of validation, as it measures the attempt to present oneself in a way that society regards as positive (DeVellis, 1965: 77). This research study was aimed at constructing a specific measuring instrument from nothing and in order to ensure that the specificity of the items did not confuse respondents, it was decided to rather exclude validation items from the study. This could potentially be an area for a further study to be conducted.

Step 6: Administer items to a development sample

Due to the fact that many experts were consulted to address the content validity of the instrument, it was decided not to administer the questionnaire on a development sample, but rather administer it on the full sample drawn. In order to administer the questionnaire, discussions were held with lecturers on campus to obtain their permission to administer the questionnaire on their students during their class time. For those lecturers that agreed, questionnaires were handed out to consenting students during class time and proper instructions were given regarding the completion of the questionnaire. It was also made clear that students could take part in the study on a voluntary basis.

Step 7: Evaluate the items

The evaluation strategies to address the reliability and validity of the instrument are discussed in the following section.

Step 8: Optimise scale length

The size of the questionnaire in relation to the sample size drawn does have an impact the type of statistics that can be applied, and this is further addresses in the next section as well as the discussion of the research results in the article.

5.5 DATA ANALYSIS

In reaching the aim of this study it is essential to determine whether or not the scale has sufficient reliability and validity. Therefore the main focus of the data analysis is focused on determining the reliability and validity of the instrument.

5.5.1 Reliability

Reliability refers to the dependability or consistency of a measuring instrument (Neuman, 2003:178). According to DeVellis (1991:41), “Scales are reliable to the extent that they are comprised of reliable items that share a common latent variable.” The latent variable in this case refers to self-efficacy for academic self-regulation.

5.5.1.1 Internal Consistency

According to Neuman (2003:179-181) there are different types of reliability in quantitative research. Due to the proposed research design being a cross-sectional study (conducted at one point in time), the form of reliability analysis that is most pertinent is that of internal consistency. This type of reliability applies when several items in a questionnaire all measure the same construct. The theory basically suggests that the relationships among items are logically connected to the relationships of items to their latent variable (DeVellis, 1991:25). Therefore a scale is internally consistent to the extent that its items are highly intercorrelated (DeVellis, 1991:25). Results that yield high inter-item correlations suggest that the items are all measuring the same thing (DeVellis, 1991:25). The objective in this instance was to ensure that the items in the measuring instrument developed are all measuring self-efficacy for academic self-regulation.

5.5.1.2 Item Analysis

Internal consistency can be determined by using a statistical procedure to measure Cronbach’s alpha, where a result of 0.80 will indicate a high level of reliability. In deciding whether or not an item should be retained or rejected, the

value of Cronbach's alpha will provide an indication. According to Neuman (2003:181) an item should only be retained if the statistical results yield an alpha value greater than 0.70. This means that retaining an item with an alpha value of less than 0.70 will more than likely detract from the overall reliability of the scale, depending on the alpha coefficient for the overall scale. In order to measure the reliability of the instrument, the SPSS programme will be used to conduct an item analysis, which generates reliability coefficients for each of the items in the instrument. These Alpha coefficients indicate which items should be retained and which should be discarded.

In developing the questionnaire, the following procedures were applied to secure an acceptable degree of reliability, as prescribed by Neuman (2003:180):

- The construct of self-efficacy for academic self-regulation was unambiguously defined in the context of academic success, and was clearly distinguished from related constructs. This was done to ensure that a single construct was measured.
- The most precise level of measurement should be endorsed. In this case, self-efficacy for academic self-regulation will be measured at the ordinal level, and a rating scale of 1-6 was used, so as to ensure that more detailed information is gathered.

5.5.2 Validity

Validity asks the question: Did the instrument measure what it was intended to measure (Delpont in De Vos, 2002:166)? As with reliability, only certain types of validity apply to this study.

5.5.2.1 Content Validity

Content validity determines whether or not the instrument actually measures what it is supposed to measure, and also asks whether or not the instrument provides an adequate sample of items that represent the concept (Delpont in De

Vos, 2002:167). According to DeVellis (1991:43) content validity concerns item sampling adequacy – the extent to which a specific set of items reflects a content domain. In the context of this study the content domain refers to the latent variable already identified, i.e. self-efficacy for academic self-regulation. Bandura (2001) states that content validity is a very important aspect to focus on when constructing any self-efficacy measuring instrument. To ensure content validity, Delpont (in De Vos, 2002:167) explains that the opinions of subject matter experts should be sought. As previously explained, a panel of experts was consulted with in order to ensure content validity. The feedback obtained from the four University lecturers well versed in the area of questionnaire construction, as well as that of one of the leading researchers in the field of academic self-efficacy and self-regulation proved extremely insightful. It resulted in a number of changes to the wording of certain items and even the elimination of others. One or two changes were also applied to the instructions of the questionnaire as well as its general layout.

5.5.2.2 Face Validity

Face Validity determines whether or not the instrument appears to measure what it is supposed to (Delpont in De Vos, 2002:167). This refers to the respondents' view of the instrument in terms of whether or not they feel that the instrument is a relevant measure. Bandura (2001) stresses that the most important type of validity that applies to self-efficacy scales is that of face validity. The panel of experts was also consulted in order to secure face validity. The feedback obtained from the panel was positive in the sense that they felt the questionnaire does indeed measure self-efficacy for academic self-regulation, and it is structured credibly enough to appear that it is measuring just that. The panel did not indicate that there is a likelihood that the questionnaire would induce resistance from respondents.

5.5.2.3 Construct Validity

Another form of validity to be addressed during this study is that of construct validity, which determines the degree to which an instrument successfully measures a theoretical construct (Delpont in De Vos, 2002:167). According to Hayton, Allen and Scarpello (2004) construct validity is a central issue when inferences or deductions must be made concerning unobservable or latent variables. This is definitely the case in the present study. As mentioned previously, the construct of self-efficacy for academic self-regulation was meticulously defined and distinguished from any other related constructs, such as self-concept and effectance motivation. This was done before the final questionnaire was developed in order to ensure that the items generated were in fact measuring the correct construct.

5.5.2.4 Factor Analysis

According to Hayton, Allen and Scarpello (2004) Factor Analysis is an important tool for questions of validity. It is a statistical method for conducting data reduction and for reaching a more parsimonious understanding of measured variables by determining the number and nature of common factors needed to account for the patterns of observed correlations (Hayton, Allen and Scarpello, 2004). There exist essentially two types of factor analysis – descriptive factor analysis and exploratory factor analysis. When a research study is concerned with scale development, an EFA (exploratory factor analysis) is the more appropriate type (Hayton, Allen and Scarpello, 2004). EFA is principally concerned with the objective of determining the number of factors to be retained in the questionnaire. This is an extremely important objective to achieve as it distinguishes between the major and minor factors being measured by the questionnaire and assists in specifying the correct amount of factors. Hayton, Allen and Scarpello (2004) explain that specifying too few or too many factors can substantially affect statistical results.

5.5.2.5 Parallel Analysis

Parallel Analysis is a statistical method that has been empirically shown to be one of the most accurate methods for determining the number of factors to retain in a questionnaire (Hayton, Allen and Scarpello, 2004). It was chosen to use PA (Parallel Analysis) instead of factor analysis to address construct validity and factor retention issues. Although conducting PA still involves a part of the factor analysis procedure. The steps to be followed in conducting PA, according to Hayton, Allen and Scarpello (2004) are as follows:

- *Step 1: Generate random data.*
 - Establish number of observations and variables in the real data.
 - Establish values taken by real data set. In this case it refers to the Likert Scale of 1-6.
 - Create a random data set using SPSS
- *Step 2: Extract Eigenvalues from the Random Data Correlation Matrix*
 - Extract eigenvalues from the random data set by means of a principal components analysis using SPSS.
 - Note all eigenvalues in a Microsoft Excel spreadsheet.
 - Repeat step one and two a minimum of fifty times to create a set of fifty or more eigenvalues.
- *Step 3: Average Eigenvalues*
 - Take the mean, and 95th percentile of all eigenvalues generated by principal components analysis of random data sets
 - The result will be a vector of average (and 95th percentile) eigenvalues equal in size to the number of variables and diminishing in value.
- *Step 4: Compare real data with parallel random data*
 - Plot eigenvalues from the real and random data sets.
 - Retain only those factors whose eigenvalues are greater than the eigenvalues from the random data.

A normal EFA involves retaining factors with eigenvalues greater than one. This method can be somewhat arbitrary as it draws distinctions between factors with eigenvalues just above and just below one (Hayton, Allen and Scarpello, 2004). Another method used in determining the number of factors to retain is that of Cattell's scree test, which involves an examination of a plot of the eigenvalues for breaks or discontinuities. Essentially, the factors that do not form part of the scree are retained as relevant factors. This method suffers from subjectivity and ambiguity, especially when there are no clear breaks or two or more apparent breaks. The use of PA negates these shortcomings caused by the normal factor analysis procedure as it adjusts for the effect of sampling error. The rationale behind PA is that a researcher should only be interested in a factor that does not account for more variance than the parallel factor obtained from random numbers, because meaningful components extracted from actual data should have larger eigenvalues than parallel eigenvalues obtained from random data (Hayton, Allen and Scarpello, 2004).

The application of these statistical procedures will provide the answers required to address whether or not the newly constructed questionnaire contains sufficient reliability and validity.

REFERENCES

- Bandura, A. 1977. *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. 1986. *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. 1994. Self-efficacy. In: V.S. Ramachaudran (Ed.). *Encyclopaedia of human behaviours* (Vol.4, pp 71-81). New York: Academic Press.
- Bandura, A. 1995. *Self-efficacy in changing societies*. New York: Cambridge University.
- Bandura, A. 2001. *Guide for constructing self-efficacy scales*. Stanford University.
- DeVillis, R.F. 1991. *Scale development. Theory and applications*. London: Sage Publications.
- Fouche, C.B. & Delpont, C.S.L. 2002. Introduction to the research process. In: De Vos, A. S. (eds). *Research at grass roots*. Pretoria: Van Schaik Publishers.
- Fouche, C.B. & De Vos, A.S. 2002. Quantitative research designs. In: De Vos, A. S. (eds). *Research at grass roots*. Pretoria: Van Schaik Publishers.
- Greenhaus, J.H., Callanan, G.A. & Godshalk, V.M. 2000. *Career Management*. Orlando, FL: Harcourt, Inc.
- Hackett, G. 1995. Self-efficacy in career choice and development. In: Bandura, A. (eds). *Self-efficacy in changing societies*. New York: Cambridge University.

Hayton, J.C., Allen, D.G., & Scarpello, V. 2004. Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organisational research methods*, 7(2):191-205.

Lane, J. & Lane, A. 2001. Self-efficacy and academic performance. *Social behaviour and personality*, 29(7):687-694.

Lavin, D.E. 1965. *The prediction of academic performance*. New York: Russel Sage Foundation.

Multon, K.D., Brown, S.D. & Lent, R.W. 1991. Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of counselling Psychology*, 38(1):30-38.

Neuman, W.L. 2003. *Social research methods*. USA: Allyn and Bacon.

Owen, S.V. & Froman, R.D. 1988. Development of a college academic self-efficacy scale. *A paper presented at the annual meeting of the National Council on Measurement in Education*. New Orleans, LA.

Pajares, F. 1996. Self-efficacy beliefs in academic settings. *Review of educational research*, 66(4):543-578.

Pajares, F. 2002a. *Overview of social cognitive theory and of self-efficacy*. [Online] Available from: <http://www.emory.edu/EDUCATION/mfp/eff.html>.

Pajares, F. 2002b. *Self-efficacy beliefs in academic contexts: An outline*. [Online] Available from: <http://www.emory.edu/EDUCATION/mfp/efftalk.html>.

Pajares, F., Hartley, J. & Valiante, G. 2001. Response format in writing self-efficacy assessment: Greater discrimination increases prediction. *Measurement & evaluation in counseling & development*, 33(4):[8].

Pajares, F. & Schunk, D.H. 2001. Self-beliefs and school success: Self-efficacy, self-concept and school achievement. In: Riding, R. & Rayner, S. *Perception*. London: Ablex Publishing.

Pajares, F. & Valiante, G. n.d. Student's self-efficacy in their self-regulated learning strategies: A developmental perspective. *Psychologia*. No known.

Schunk, D.H. & Pajares, F. 2002. The development of academic self-efficacy. In: Wigfield, A. & Eccles, J. (eds). *Development of achievement motivation*. San Diego: Academic Press.

Schunk, D.H. & Pajares, F. 2004. Self-efficacy in education revisited. Empirical and applied evidence. In: Anon. *Research on sociocultural influences on motivation and learning*. United States: Information Age Publishing, Inc.

Schunk, D.H. & Zimmerman, B. J. 1997. Social origins of self-regulatory competence. *Educational psychologist*, 32(4):195-208.

Sternberg, R.J. 2001. *Psychology: In search of the human mind*. Orlando, FL: Harcourt, Inc.

Strydom, H. & Venter, L. 2002. Sampling and sampling methods. In: De Vos, A. S. (eds). *Research at grass roots*. Pretoria: Van Schaik Publishers.

Trockel, M.T. & Barnes, M.D. & Egget, D.L. 2000. Health-related variables and academic performance among first-year college students: Implications for sleep and other behaviours. *Journal of American college health*, 49(3).

Usher, E.L. & Pajares, F. 2005. Inviting confidence in school: Sources and effects of academic and self-regulatory beliefs. Paper presented at the meeting of the American Educational Research Association, Montreal, Canada.

Vrugt, A.J. & Langereis, M.P. & Hoogstraten, J. 1997. Academic self-efficacy and malleability of relevant capabilities as predictors of exam performance. *Journal of experimental education*, 66(1):61-73.

Zimmerman, B. J. 1989. A social cognitive view of self-regulated academic learning. *Journal of educational psychology*, 81(3):329-339.

Zimmerman, B.J. 1995. Self-efficacy and educational development. In: Bandura, A. (Eds). *Self-efficacy in changing societies*. New York: Cambridge University.