

**ACADEMIC RESILIENCE IN MATHEMATICS AMONGST AT-RISK
GRADE 10 LEARNERS IN NAMIBIA: A PHENOMENOLOGY STUDY**

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ABSTRACT

Demands for technical and scientific expertise in many countries including Namibia made the Namibian government emphasise the need for effective teaching of mathematics and science in schools to enable learners to excel in these subjects. Despite that, school failure at Grade 10 level remains a challenge in Namibia. Learners continue to perform poorly, especially in mathematics over the past years. One intriguing manifestation of this record of performance is that there are some learners who may be considered to be at risk of school failure yet they excel in mathematics. These are learners of a low social economic status, who come from poverty-stricken families and communities ravaged by crime, violence, parental unemployment and substance abuse, just to mention a few. The focal point of this study is to understand the conceptual, experiential and practical ramifications of resilience displayed by such learners. Thus, a study on protective factors which contribute to academic resilience in mathematics might provide a stepping stone to success in learning mathematics and to the development of a subject/section in the school curriculum to foster academic resilience amongst Namibian learners.

A phenomenological research methodology was chosen with the aim of describing the lived experiences of those Grade 10 learners who are at risk of school failure yet have resilient outcomes in mathematics. A sample of eight learners who obtained a B grade/symbol or better in mathematics in the national Grade 10 formal examinations in 2014; and were considered at-risk of school failure; were selected with the help of their mathematics and life skills teachers. The research participants were interviewed using a three-phase approach. The standardised open-ended interview in the first phase focused on the context of the participants' experience with resilience. In the second phase the participants were asked to describe details of their lived experiences of resilience in the school context. Lastly in the third phase participants were encouraged to reflect on the meaning of their experiences of resilience. The interviews were

audio-recorded and transcribed. The transcripts were analysed thematically to identify core commonalities and meanings.

The results of this study have provided evidence that academic resilience in mathematics was displayed through the strong social bonds learners shared with both adults and peers/friends who promoted their desire to participate in the life of school and to achieve. Furthermore, findings showed that the context in which learners had/have to learn mathematics was best described as not being favourable for learning mathematics. Most of the participants were orphans born to un-educated/under-educated parents and lived in crowded homes in poverty-stricken neighbourhoods. These neighbourhoods were characterised by a high number of cuca shops/bars which emitted so much noise that it was challenging for the learners to study at home. Learners reported exposure to violence, alcohol and substance abuse in their streets. In addition, owing to low levels of parental education they receive/d little or no family support with their learning of mathematics; consequently, their home background failed to provide them with role models in mathematics. Instead, some of the participants live/lived with siblings who dropped out of school, parents who failed grade 10 and peers who disliked mathematics. These participants relied on their own self-determination, self-efficacy, self-help and optimism for learning mathematics. Because of these qualities learners were able to adapt to the challenges in their environment and achieve good results in mathematics. Bearing of these findings in mind the study developed a theoretical model for promoting academic resilience in mathematics herein referred to as the **triple I** (I-I-I) model for promoting academic resilience in mathematics through the perspective of the learner informed by the learners' lived experiences of the phenomenon.

The study provided some suggestions which if implemented might enable learners from disadvantaged backgrounds to succeed in mathematics. It is recommended that the Ministry of Education should revise the life skills syllabus to add a section aimed at promoting academic

resilience. Another suggestion is that parents should be encouraged by school principals and teachers to show interest in their children's education. For example, schools should also inform parents about school activities through the local media such as local radio stations. Schools should strengthen the parents' relationship with the school through the school board and encourage parents to attend school meetings by highlighting the importance of parental attendance to the learners.

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To my beloved son and his aunt: Aache Ivandro Davi Etuwete Ndjiku & Kauna-woye Frenanda Neshila, your tears and hard work were not in vain!

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DECLARATIONS

I, Kashinauua Faustina Neshila, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education.

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Kashinauua Faustina Neshila

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LIST OF ABBREVIATIONS/ACRONYMS

ANOVA:	Analysis of Variance
CHKS:	California Health Kids Survey
CRESPAR:	Centre for Research on the Education of Students Placed At Risk
DNEA:	Directorate National Examinations and Assessment
IPA:	Interpretive Phenomenological Analysis
JSC:	Junior Secondary Certificate
KYDP:	Katutura Youth Development Program
LDC:	Learning Development Centre
MBESC:	Ministry of Basic Education Sport and Culture
NIED:	Namibian Institute of Educational Development
NUST:	Namibian University of Science
SES:	Socio-Economic Status
RYDM:	Resilience Youth Development Module
UNAM:	University of Namibia

CHAPTER 1: INTRODUCTION

This present study focussed on the lived experiences of Grade 10 learners at-risk of school failure in the Khomas Education Region, who excel in mathematics despite the difficulties they experience in life. It also outlined the profile of a resilient learner and the context under which resilient experiences occur. In addition the study explored how individual learners make meaning of academic resilience in mathematics. This chapter presents the orientation to the study, statement of the problem, research questions, significance, and definitions of key terms, limitations and delimitations of the study.

1.1 Orientation of the Study

The aim of this qualitative study is to gain an understanding of the experiences of Grade 10 learners in the Khomas Education Region, who are from disadvantaged backgrounds and yet are able to succeed in mathematics. Disadvantaged backgrounds in this study include factors such poverty-stricken homes, unemployment, orphan hood, teenage parenthood, and staying in communities prone to crime, violence, alcohol and substance abuse (Wright, 2013). Hence attention to resilience represents a paradigm shift to a prevention-based approach from one of waiting until the negative consequences of poverty manifest in the learner school environment. For example, school interventions that address learning disabilities have historically been triggered by student failure (Smiley, 2011).

The field of research on resilience has evolved considerably given the large number of research studies on resilience done in the last forty years (Neshila, Miranda, & Zimba, 2015). However, most research in this area has been done in the United States of America and does not necessarily reflect the Namibian experience. Resilience is a widely studied construct that can be applied to children, adolescents, adults and the elderly across different ethnic and socio-economic backgrounds (see e.g., Belgrave, Chase-Vaughn, Gray, Addison, & Cherry, 2000,

Connell, Spencer, & Aber, 1994; Ripple & Luther, 1998; Smith & Carlson, 1997; Smokowski, Reynolds, & Bezruczko, 1999; Waller, Okamoto, Miles, & Hurdle, 2003). Research on resilience focuses on those individuals who have overcome difficult life circumstances and have become successful, as well as the factors that promote such adaptive functioning. Despite overwhelming adversity, many children successfully manage to bounce back and succeed (Benard, 1996; Herrero, 2014; McLeod, 2016). As a researcher, one wonders what characteristics (either intrinsic or extrinsic) make this possible, and how schools can create environments that may enable at-risk children to succeed in the Namibian context.

The high demand for technical and scientific expertise in many countries including Namibia makes governments stress the need for effective teaching of mathematics in schools to enable learners to excel in these subjects (Nambira, Kapenda, Tjipueja, & Sichombe, 2009). It is well documented that learners from low Socio-Economic Status (SES) backgrounds tend to perform worse at school in comparison to their peers; however, there are several studies showing that there is a group of learners who are academically successful despite their challenging backgrounds (see e.g., Borman & Overman, 2004; Martin & Marsh, 2006). What becomes clear from the current literature is that possessing the capacity to bounce back from challenges typically predictive of failure requires a combination of personal attributes, positive relationships, and institutional supports (Floyd, 1996; Richardson & Nixon, 1997; Wade & Olesola, 2002).

Namibia made strides in the provision of basic education over the past twenty six years after independence, yet and yet the Grade 10 learners' performance in the national examination remains a matter of great concern (EMIS, 2012; Naukushu, 2012; Neshila, 2011). The directorate of the national Examinations and Assessment (DNEA, 2015) observed that over the past six years mathematics has been amongst the subjects where learners showed poor performance at Grade 10 level. Khomas Educational Region was ranked amongst the bottom

five regions that did not perform well in mathematics (DNEA, 2015). The trend in the national performance in JSC mathematics results for 2010-2015 and the performance ranking for Khomas Education Region are presented in Table 1.1.

National Examination Year	JSC Percentage of Grade A-D (50% and above)	Percentage below D grade. (Below 50%)	Regional Rank of Khomas Education Region
2010	39.1	60.9	-
2011	41.1	58.9	-
2012	44.5	55.5	10 (4th last)
2013	32.7	67.3	12 (3 rd last)
2014	47.2	42.8	10 (5th last)
2015	25.2	74.8	12 (3 rd last)

Table 1. 1: JSC National Performance in Mathematics

These protective factors, once identified, can be used to create nurturing learning environments that recognise and incorporate the unique educational challenges and needs of learners at risk of school failure. Attention to resilience represents a paradigm shift of a prevention based approach, as opposed to waiting until the negative consequences of poverty manifest themselves in the school environment. Attention to resilience in learners is a prevention-based approach to supporting school learners from poor backgrounds. For example, previous school interventions that address learning disabilities have been triggered by learners' failure. However, there are examples of academic resilience in learners who are exposed to many challenges in their lives. The aim of this study is to explore the factors which contribute to this

academic resilience in mathematics amongst Grade 10 learners in the Khomas Region of Namibia.

1.2 Statement of the Problem

The study identified a problem of persistently poor performance in mathematics at Grade 10 level in the Khomas Region. A Strategic Plan for the Ministry of Basic Education, Sport and Culture (MBESC) which was prepared in 2001 set important goals that “all learners should achieve basic competencies in the required subjects of the curriculum by 2005” and that “all schools should improve the teaching and learning of English, mathematics, and Science by 2006” (MBESC, 2001, p. 5). Despite these stated goals, school failure at Grade 10 level remains a challenge in Namibia. Learners continue to perform poorly, especially in mathematics. In 2012 for example, only 32.7 percent of the Grade 10 learners who sat for the national examinations in the Khomas region performed well with grades of A-D in mathematics; whilst 67.3 percent of the learners performed poorly (DNEA, 2012). Describing this situation, Namwandi (Minister of Education from 2012 to 2015 in Namibia) stressed that “... year in, year out grades 10 and 12 results are a disappointment at least as far as some of us are concerned” (Nakale, 2013, p.3). One intriguing manifestation of this record of performance is that there are some learners who may be considered to be at risk of school failure (characterised by low socio economic status, poverty-stricken families, communities ravaged by crime, violence, parental unemployment and alcohol/substance abuse) and yet they manage to excel in Mathematics (Wright, 2013). To clarify matters in this regard, this study aimed to research the factors (Table 2.1, p. 55) which contribute to this academic resilience in mathematics amongst Grade 10 learners. The most urgent challenge for the current education system in Namibia is to increase learning achievement in secondary schools. Several reports show that

although enrolment and completion rates are relatively high, the majority of the learners leave school without the foundation skills and competencies they ought to have acquired (World Bank, 2005 & NIED, 2007). Although some educators may believe that these problems are beyond their control, research indicates that the actions of educators can alleviate such problems by fostering academic resilience. This is the capacity of learners to attain academic success in school despite exposure to personal and environmental adversities. The purpose of this study was to identify prime factors that help at-risk Grade 10 learners achieve such resilience in their mathematics results. Resilient learners are a minority but research focused on them can play an important role in increasing our understanding of the factors and conditions that could make a positive difference in the lives of learners at risk of school failure (Smiley, 2011).

1.3 Questions of the Study

The main goal of this study was to explore the lived experiences of Grade 10 learners at-risk of school failure in the Khomas Education Region who excel mathematics despite the difficulties they experience in life. To this end, the following research questions were asked:

1. How do Grade 10 learners at risk of school failure in the Khomas Region display academic resilience in mathematics and in what contexts does such resilience occur?
2. How do the Grade 10 learners concerned understand and make sense of their experiences of academic resilience in mathematics?
3. How are individual differences reflected in the learners' accounts of their experiences of academic resilience in mathematics?

4. Based on the responses to the above research questions, what model could be used to promote academic resilience in mathematics amongst learners in the Namibian context?

1.4 Significance of the Study

The study is significant in the sense that there is as yet no study carried out in Namibian schools to investigate the learning approaches and factors that could help learners from disadvantaged backgrounds experience academic success in mathematics. It is, therefore, hoped that the findings of the study could reduce the high failure rates in mathematics, especially among the Grade 10 learners from disadvantaged backgrounds. In addition, these findings may help change the Grade 10 learners' perceptions regarding their learning attitude, behaviours and academic achievement capabilities in mathematics by revealing the strategies and giving them tips on how to excel in mathematics. Many educators struggle to answer the burning question of how to best help learners avoid the pitfalls of violence, drugs, and crime and at the same time become productive and contributing citizens (Richardson & Nixon, 1997). Thus, a study on protective factors which contribute to academic resilience in mathematics might provide a stepping stone to success in learning mathematics and to the development of a subject/section in the school curriculum that fosters academic resilience amongst Namibian learners. The model recommended by the study is hoped to enhance teachers' knowledge of dealing with learners and support their academic resilience in mathematics.

1.5 Limitations and Delimitations

The study was faced with several limitations that may affect the interpretation and generalisation of the results. These include the following:

- 1.5.1 The researcher had little control over the sampling method. As a result, the participants whom the researcher interviewed were from the same school and were identified by their class teachers.
- 1.5.2 The researcher had no idea of the true distribution of the population and of the sample. Hence the study employed a small sample of eight (8) research participants.
- 1.5.3 Although the main goal of the study was to explore factors that promote academic resilience in mathematics amongst at-risk Grade 10 learners in the Khomas Education Region, the researcher could not explore all the possible factors. There could be other factors that promote academic resilience in mathematics of which learners and the researcher were unaware.
- 1.5.4 The experiences given by the learners may not reflect the truth as some learners may have attempted to make a positive impression. The researcher assumed that all answers given by the learners represented their experience of academic resilience in mathematics.
- 1.5.5 Learners' ability to understand and respond to the interview questions was seen as a limitation. To ensure understanding of the questions the researcher had to rephrase the questions and, in some instances, give examples. Furthermore, the researcher used probes to avoid mechanistic answers.
- 1.5.6 Patton (2002) noted that interview data can have limitations that include distorted responses caused by personal bias, anger, anxiety, politics, and emotional state of the interviewee at the time of the interview. The data can also be subject to the memory lapses of the interviewee, and his or her self-serving responses (Patton, 2002).

1.5.7 The meaning of the participants' experiences may, to some degree, be distorted because of the participants' interaction with the interviewer. The researcher must take recognition of these possibilities and should use skills to minimise the distortion that can occur because of her role in the interview (Patton, 2002).

1.6 Definitions of terms used in the Study

A number of terms have been used in this study and are explained below:

Resilience: Firstly, resilience is not a static trait or something that one has or does not have. However, it is perceived as a continual process, and the interaction between a person and the environment that can protect one against psychological and physical trauma (Blum, 1998). Resilience, therefore, is used to describe a person's ability to overcome adversity (Bosworth & Earthman, 2001). In this study resilience is understood as a set of personal characteristics or external factors that assist the individual in overcoming hardship (Arastman & Balci, 2013).

Academic Resilience: In this context resilience is defined as the learners' ability to excel academically despite the adversities (poverty, racism, low family cohesion, family psychiatric illness, or alcoholism) in their lives (Alva, 1991).

Resilient Outcomes: For the present study, resilient outcomes refers to exceptional academic achievements well above the average of learners who have not or have been exposed to life adversity (Sandoval-Hernandez & Cortes, 2012; Hemingway, 2014). This definition recognizes the difficulty of achieving exceptional outcomes in the context of risk.

Learners at-risk of School Failure: This includes learners in the formal school system who are not using their full intellectual potential to meet the school's academic demands. Instead these learners appear lazy, disinterested in school, bored, rebellious and unable to relate to teachers (Knapp & Shields, 1991). They are learners who are academically disadvantaged and

of low socio-economic status (West and Pennell, 2003). It is the latter group of learners that this study focused on.

Locus of control: This is the location of the source of control for an individual and it is usually described as an internal or external locus of control (Donald, Lazarus, & Lolwana, 1997).

- **Internal Locus of Control:** Refers to the tendency to believe that success or failure is due to one's own efforts or abilities (Pajares & Miller, 1994).
- **External Locus of Control:** This is the tendency to believe that other factors such as luck, task difficulty or other people's actions cause success or failure (Schunk, 1995).

Protective Factors: These are internal characteristics of the individual as well as elements of the environment (Smiley, 2011). They are further divided into two categories, namely internal and external factors.

- **Internal Factors:** These include individual characteristics such as self-esteem, internal locus of control, perseverance, determination, motivation, learning from the behaviour of others and having past mastery experiences, or a memory of previous achievements (Bender, Thompson, McManus, Lantry, & Flynn, 2007; Smiley, 2011, Smith & Carlson, 1997). Many of these internal factors such as belonging and self-concept are described as having a buffering effect or protective effect against negative outcomes (Anderman, 2002).
- **External Factors:** In this context external factors refer to protective factors such as family support, guidance, participation in extracurricular activities and the outside influence of other adults, such as teachers or

religious figures or a neighbour (Blum, 1998; Cook, 2000; Smith & Carlson, 1997; Washington, 2008; Windham, Hooper, & Hudson, 2005). External factors such as supportive relationships, strong ties to parents, and positive role models are reported to have a buffering effect against negative outcomes (Aronowitz & Morrison-Beedy, 2004; Crosnoe & Elder, 2004; Overall, Altrows, & Paulson, 2006).

Self-efficacy: Learners' self-efficacy can affect their academic success. It is argued that some people believe that they have the ability and power to exert a great deal of control on the events that influence their lives (Bandura, 1986; Pajores & Heron, 2007; Schunk & Zimmerman, 2007). Self-efficacy, for the purpose of this study, is defined as the belief that one is capable of succeeding or accomplishing a given task (Woolfolk, 1995)

Self-esteem: This is the evaluation of our self-concept or the value that each of us places on our abilities and behaviours (Zimba, 2003).

1.7 Summary

This chapter explained the background of the research participants in order to establish the context of the study, followed by the statement of the problem and identification of four research questions that guided the study; then it discussed the significance of the study, its limitations and delimitations. Finally, the chapter concluded with a section which defines key terms that are used throughout the study.

1.8 Organisation of the dissertation

As alluded to above, Chapter 1 introduced the study by focusing on the background of the study, statement of the problem, research questions, and significance of the study, limitations and delimitations as well as definition of key terms. A review of relevant literature is included

in Chapter 2. This literature review discusses the concept of resilience and provides a review on the theory of resilience as the primary framework for the study. This includes a full discussion on the Bronfenbrenner ecological system model together with Silas Casillas' model of resilience (2008) to better understand how individuals develop through interactions with their surroundings. The evidence found in this area further underscores the need for the present study. Chapter 2 concludes with a discussion of the relevant literature on the relationship between resilience and academic achievement.

Chapter 3 of the dissertation explains the research methods that were used in this inquiry. This chapter provides a more comprehensive discussion of the characteristics of the research participants, population and sampling procedures. The chapter includes data analysis methods and concludes with ethical research considerations.

Chapter 4 features an analysis and interpretation of the collected data. The researcher presents case studies of each participant including relevant themes gleaned from their experiences.

In Chapter 5, the researcher discusses the results according to the research questions using concluding remarks and learners' verbatim responses.

Finally in Chapter 6, the researcher shares some reflections on the summary of the results, and on the process of conducting this study. Furthermore this chapter presents a model of academic resilience in mathematics. This model has been designed to promote resilience amongst learners in the Namibian context. The chapter concludes with a discussion of recommendations and implications for future research studies on resilience.

CHAPTER 2: LITERATURE REVIEW & THEORETICAL FRAMEWORK

2.1 Introduction

The review of literature commenced with an attempt at explaining the complex and fluidity nature of the construct of resilience, thus the first part of the literature focused on the definitions and conceptual issues of the definition of resilience. To ensure further clarity of the concept, part two of the literature discussed different measures of resilience and captured the relationship between resilience and academic achievement by presenting an overview of the research on academic resilience according to literature reviewed. This study however, would have been remiss if it did not provide indicators of academic resilience, as a result in part three of the literature review the profile of a resilient learner has been outlined. The fourth part of this chapter is dedicated to three key pillars of academic resilience, which are: psychological resilience, socio-economic status and learners' academic performance. This was deemed essential since resilience is a context based concept and cannot be studied in isolation. Following the critical review of the concept of resilience through the social lens, the final part of the chapter, Part 5 zoomed in on the theoretical framework of the study informed by various models relevant to academic resilience.

Smiley (2011) cautions that coping with painful events and unpleasant emotions are a struggle for every human being. The ability to cope effectively with these events can be termed resilience (Blum, 1998). Effective coping skills can be used throughout one's life, and can protect one from life's stressors and from facing mental health and/or substance use problems. Research on resilience is based on the strengths a particular person has and how such strengths help the person to overcome difficulties in life. The focal point of this study is to understand the conceptual, experiential and practical ramifications of resilience displayed by such learners. In essence, academic resilience is viewed as a result of the application of the psychological

construct of resilience in educational settings. It is these internal and external factors of resilience that help identify the resilience in individuals who are the focus of this study. The author concurs with Resnick's (2000) study which established that resilience is a concept that can be fostered in adolescents despite race, ethnicity, gender, social class, or geographic location.

Lack of resilience in adolescents has been associated with difficulties such as internalising problems, impulsivity, and poor reaction control (Martel, Nigg, Wong, Fitzgerald, Jester, Puttler, Glass, Adams, & Zucker, 2007). Again, Shannon, Beauchaine, Brenner, Neuhaus, and Gatzke-Kopp (2007) suggest that resilience protects against internalizing behaviour patterns as well as negative emotionality. Shannon et al. (2007) emphasise that high levels of resilience in young children may indicate less likelihood of development of behavioural difficulties, such as conduct disorders and depression which often have negative impacts on their academic performance.

Many resilience researchers agree that facing some type of adversity is necessary for resilience to develop (Shannon et al., 2007). Everrall, Altrows, and Paulson (2006) follow this line of argument and maintain that individuals do not possess resilience as an internal trait, but gain or increase their level of resilience by overcoming various types of adversity. Furthermore, resilience may depend on the context in which one experiences hardships (Washington, 2008), and many traits develop in a person because he/she can frame experiences with a more positive attitude rather than a defeatist one.

This review summarises the theory of resilience, metatheory of resilience, the Henderson and Milstein resilience model and the reciprocal causation model as concepts and theoretical

underpinnings of resilience research. Equally, the Bronfenbrenner Ecological System Model (1979) was used together with Silas Casillas Model of Resilience (2008) to gain a better understanding of how an individual develops through a complex system of relationships influenced by the surrounding environment consisting of the school, family and community dimensions. The factors that influence resilience are created in the family, school, neighbourhood, and the larger community. Resilience can also be understood from an ecological perspective as a construct that is fostered through relationships (Greene, 2002). Therefore the study drew from Bronfenbrenner’s ecological model to explore the phenomena of academic resilience in mathematics within an educational ecology comprising of the learner, home, classroom and school (Martin, Anderson, Bobis, Way, & Velar, 2012). In the model of resilience proposed by Silas Casillas, these factors can be placed into categories of ‘personal,’ ‘family,’ ‘school’ and ‘community’ (see Figure 2.1). The following sections (2.2 - 2.16) focused on the conceptual framework of the study.

Figure 2.1 summarises the factors and conditions that promote academic resilience and was adapted from Sandoval-Hernandez & Cortes, (2012, p.12).

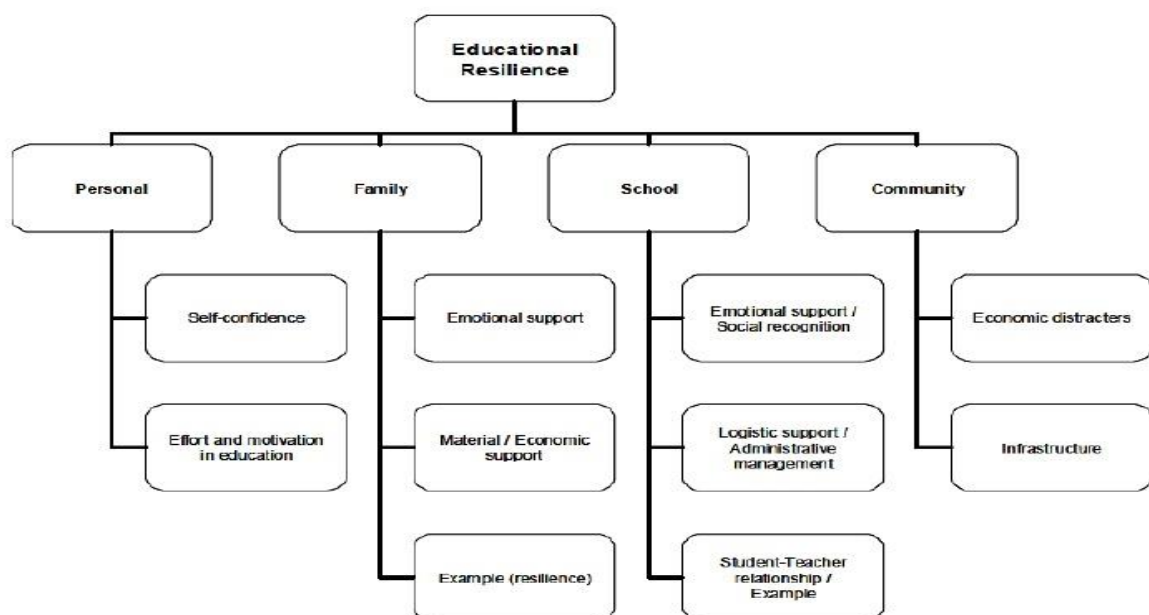


Figure 2.1: Silas Casillas 2008 Model of academic resilience

2.2 Defining Resilience and issues concerning Resilience

2.2.1 Definitions of Resilience

The root word for resilience is the Latin word “resiliens” which means to bounce or rebound after being stressed (Agnes, 2013; Smith, Dalen, Wiggins, Tooley, Christopher, & Bernhard, 2008). There are many definitions of resilience and they all contain two common elements: 1) An exposure to great risk and 2) Corresponding factors that help promote positive outcomes or reduce negative outcomes (Luther & Zigler, 1991; Fergus & Zimmerman, 2005; Fraser, Galinsky, & Richman, 1999).

Buthelezi (2007) warns of the fluid nature of the concept of resilience that has resulted in the discrepancies in the way in which the term is used and also in the way people rate themselves as either resilient or non-resilient. This is further evident in Rutter’s (1990) definition of resilience as a relative term in which resilience is defined together with a construct such as vulnerability, as the opposite pole of the continuum reflecting susceptibility to adverse consequences or to consequences upon exposure to a highly risky circumstance. At the other end of the continuum, “resilience can be the absence of diagnosis or the perceived positive response to adversity as opposed to expected negative outcome” (Rutter, 1990, p. 181). It appears that resilience levels are on a continuum where at different life stages, a person may be more resilient than at other life stages. Sandoval-Hernandez and Cortez (2012) observe that resilience is a subjective concept that is not easy to define since what may be considered resilient in one context may not be so in another context. Thus despite the numerous studies on resilience in many European countries and the USA, there is a need for the Namibian experience to be researched so that we may understand the factors that may contribute to resilience in the Namibian context. It is, however, clear that resilience and academic

achievement are partly products of a complex interplay of family, school, peer and community influences (Wasonga, Christman, & Kilmer, 2003).

At first, it is important to discuss the difference between varying definitions of resilience in the literature as well as similar terms that may be confusing (Smiley, 2011; Spruill, 2011; Wright, 2013). There is little difference between resilience and resiliency, hence, some writers use these terms interchangeably. Shannon et al. (2007) define resilience as the adaptive interactive process between a person and his/her environment, and resiliency as the specific internal attributes or personality traits that one possesses. Although both terms are relatively synonyms of one another, for the purpose of this research study, the term resilience will be used to ensure consistency of the key construct. The term resilience relates to how effectiveness in the environment is achieved, sustained or recovered despite adversity (Kaplan, 1999). Simply put, resilience is the ability to maintain competence despite stressful and difficult life circumstances.

According to Smith and Prior (1996) as well as Rutter (1993) resilience is a complex phenomenon that cannot be captured by any single indicator. For example, a learner can be resilient in one domain and not in another (Buthelezi, 2007). Literature evidenced different variations of definitions of the term resilience (Herrero, 2014). For example, the American Psychological Association (APA) (2010) defines resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats and even significant sources of stress – such as family and relationship problems, serious health problems or workplace and financial stresses. On the other hand, Masten, Best, and Garmezy (1990) define resilience as “the process of, capacity for or outcome of successful adaptation despite challenging or threatening circumstances” (p. 426). Vaillant (1993) defines resilience as the “self-righting tendencies” of

a person, “both the capacity to be bent without breaking and the capacity, once bent, to spring back” (P.248). In support of this definition, Fredrickson and Barrets (2004) also define resilience as the flexibility in response to changing demands and the ability to bounce back from difficult life experiences.

Zimmerman and Arunkumar (1994) observe that resilience “is not a universal construct that applies to all life domains. Children may be resilient to specific risk factors, but quite vulnerable to others. Resilience is a multidimensional phenomenon that is context – specific and involves developmental change” (p. 4).

Research has shown that resilience refers to a class of phenomena characterised by good outcomes in spite of serious threats to adaptation or development. Resilience has, therefore, been characterised as the ability to:

- bounce back and cope effectively in the face of difficulties
- bend, but not break under extreme stress
- rebound from adversities
- handle setbacks, persevere and adapt even when things go away
- maintain equilibrium following highly aversive events

(Luthar, Cicchetti & Becker, 2000; Masten & Reed, 2002; Rutter, 1999).

Research on resilience needs to take into account not only the multiplicity of potentially adverse experiences, but also differences in the nature of specific stressful experiences (Kinard, 1998). This is because the different resources available at the time, the variables and the protective factors that enhance resilience are all dynamic (Buthelezi, 2007). In addition to that, Bliensenes and Loser (in Buthelezi, 2007, p. 16) state that “there is a multitude of constructs

that are related to vulnerability such as resilience, hardiness, adaptation, adjustment, mastery, plasticity, person environment fit or social buffering”. However, the message here is that there are seeds of resilience within each person and outward appearance or behaviour should not blind us to that fact (Thomsen, 2002). Evidently there is a common understanding that all people are resilient at different levels in their lives, and this resilience displayed in varying ways. To conclude, resilience is tied to the ability to learn to live with ongoing fear and uncertainty, namely the ability to show positive adaptation in spite of significant life adversities and the ability to adapt to difficult and challenging life experiences. As Hemingway (2014) once wrote, the world breaks everyone and afterwards many are strong at the broken places. It suffices to say that resilience turns victims into survivors and allows survivors to thrive. According to Masten (1994), resilient individuals can be distressed, but they are able to manage the negative behavioural outcomes in the face of risks without becoming debilitated. Therefore, resilience is a relational concept conveying connectedness to family, schools and community. One can speak of resilient families, schools and communities as well as resilient individuals.

2.3 Resilience as an outcome of Risk and Protective Factors

2.3.1 Risk Factors

Kirby and Fraser (1997) define risk factors as “any influences that increase the probability of onset digression to a more serious state, or maintenance of a problem condition (pp. 10-11). These include characteristics which are thought to represent a group of people, usually children with a high probability of an undesirable outcome (Masten, 1994; Wright, 2013). Masten (1994) further notes that scholars have approached the study of risk factors in one of two ways: 1) they have either examined the specific risk factors or particular antecedent that they attempted to link to future outcomes or 2) they have studied cumulative risks, in which they have tried to define the effects of additional risks. This study focused on the latter as it aimed

to investigate the factors that promote academic resilience in mathematics amongst Grade 10 learners who are at risk of failure.

This research study, though it is phenomenological, also borrowed from the ecological theory which holds that a child develops in a complex system of relationships affected by multiple levels of the surrounding environment. The environment is defined as the series of nested structures made up of the microsystem (the child's immediate environment), the mesosystem (interactions among microsystem factors) the exosystem (in the wider community), and the macro system (consisting of values, laws, customs, etc.) (Bronfenbrenner, 1979, cited in Rosa, 2013).

It appears researchers concur that proximal risk factors defined as those factors close to the individuals such as: abusive parents, family dysfunction, are more influential than distant risk factors, e.g., high crime neighbourhood, lack of support resources in the community, and limited access to health services (Masten, 2001). However, Bronfenbrenner, Moen, and Garabino (1984) pointed out that research methodology based on the assumption that these macro factors have more influence on an individual's development is a shortcoming in studies on the risk factors. The present study's methodology was free of such assumption. Furthermore, literature reveals that scholars were of the view that risk should be viewed as a dynamic process and that response to risk varies among individuals and with their life contexts (Cowan, Cowan, & Shulz, 1996).

The process of defining and examining risk factors has proven to be a challenge in resilience research studies. For example, Howard and colleagues (Unger, 2005) argue that a potential problem with research is that researchers assume that all participants share the same understanding of risk and resilience. Likewise, Luthar et al. (2000) write, "some individuals

may well see themselves as being relatively well off, even though scientists may define their circumstances as being highly stressful” (p. 550). Consequently, learners with significant risk factors can be excluded from resilience research because they may not display difficult or antisocial behaviour typically attributed to those with risk factors. The researcher acknowledges that the life skills teacher or mathematics teacher might have fallen prey to this fact in selecting participants for the present study. Despite the challenges involved while constructing risks, researchers agree that resilience research is both promising and beneficial (Masten, 2001). Condly (2006) adds that “an accurate description of the nature of risk is crucial to the understanding of how it affects people, how resilience operates, and how to develop interventions in the real world. Because risks are multifaceted in nature, it necessarily follows that resilience is multifaceted (P. 225). Resilience, therefore, is not one specific thing, but a combination of skills and positive attributes that people gain from their life experiences and relationships. These attributes help them solve problems, cope with challenges and bounce back from disappointments.

2.3.2 Protective Factors

It should be pointed out that the study of protective factors in general, involved a paradigm shift in models of enquiry that direct the researcher’s attention from risk factors to the process of how people successfully negotiate risk (Jessor, 1993). A protective factor generally describes the circumstances that moderate the effects of risks and enhance adaptation (Masten, 1994). Literature divides these factors into two categories, namely, internal protective factors and external protective factors. Werner and Smith (1982) explains that protective factors both internal and external - may buffer, intercept, or even prevent risks. Internal protective factors include individual personal characteristics such as self-efficacy, perseverance, determination, internal locus of control, to mention a few. Banatao (2011) notes that these individual traits also known as Internal Learner Assets (ILA) do not cause resilience, but rather are illustrative

of the positive developmental outcomes of resilience (Benard, 2004). When learners are nurtured in their environment (i.e. home and school), encouraged and allowed to develop their basic human needs, they develop individual resilience strength such as: problem-solving skills, autonomy, social competence and a sense of purpose. These are the manifested developmental outcomes when the said resilience strategies are engaged (Banatao, 2011). Benard (2004) notes that these resilience strengths contribute greatly to the learners' ability to avoid health risk behaviours such as alcohol abuse, tobacco abuse and other drug abuse, teenage pregnancy as well as violence.

External protective factors can be defined as those that learners receive from their care givers such as parents, friends, peers and teachers at school. Benard's (2004) theoretical framework suggests that when schools, families and communities create caring relationships with children, provide opportunities for participation and contribution, and maintain high expectations, youth i.e. learners flourish into healthy, happy and productive persons. As healthy learners, they acquire personal strength and exhibit resilience. According to Banatao (2011), when learners are resilient they are receptive to learning, notice the care and encouragement modelled by adults and develop better relationships with themselves and with those around them.

Resilience involves a dynamic process involving an interaction between both risk and protective processes, internal and external to the individual, which can modify the effects of an adverse life event (Rutter in Ahern, 2007). Therefore, it is essential to report on different types of resilience found in the reviewed literature. Masten, Best and Garmezy (1990, cited in Buthelezi, 2007) identified three types of resilience that are used in this study as a point of departure when investigating the concept of resilience. The three types of resilience that can be distinguished are demonstrated by:

- positive outcomes despite experiencing a high-risk environment,
- competent functioning in the face of acute or chronic major life stressors, and
- recovery from trauma.

Amongst various definitions of resilience, Buthelezi (2007) argues that Thomsen's definition of resilience encompasses these three forms of resilience. Thomsen (2002, cited in Buthelezi, 2007) describes resilience as a person's ability to remain steady or to bounce back in spite of adversity drawing on strengths from both the internal and external environment to overcome challenges. This means that the risk and the protective factors within the external and internal environment complement one another given that the protective factors outweigh the risk factors. Buthelezi (2007) cautions that these could lead to poor adaptation or a positive outcome depending on the circumstances in the environment. For all intents and purposes, learners are considered resilient if they function within the normal and acceptable bounds on measures of competence with respect to behaviour, social and cognitive functioning irrespective of their exposure to difficult life circumstances.

2.4 Conceptual Issues of Resilience

The current state of resilience literature indicates that to date, there are a number of factors that have made the term resilience difficult to standardise and apply as in the case with other educational and psychological concepts (Buthelezi, 2007, Glantz & Johnson, 1999; Kumpfer, 1999). According to Buthelezi (2007), this has to a certain degree hindered the research on this concept and caused inconsistencies in its use as it turns out to be heavily laden with subjective assumptions. The following are the issues raised concerning resilience (Glantz & Sloboda as cited in Buthelezi, 2007, p.19).

- The concept of resilience is used variously and indiscriminately as a trait, quality, a process or an outcome.

- There is no consensus on the referent of the term, standard for its application, or agreement on its role in explanations, models and theories.
- The problems and inconsistencies in measurements, findings and interpretations in the published literature raise serious questions about utility and heuristic value of the concept of resilience.
- Positive outcomes only need to be accounted for when significant, negative determinative factors are present and the predicted negative outcomes do not manifest themselves. This view assumes that normal functions and behaviour are by nature basically healthy and adaptive and that negative outcomes must, therefore, be the product of negative influences.

As alluded to in the review of literature, continued research on resilience is dependent on time, context and the individual being studied; given this evolving nature of resilience it necessitates continued research on this elusive yet important concept. Thus despite all the issues highlighted above, the basic premise of the concept of resilience is far reaching and its promise as a human behaviour and practice concept is yet to be realised (Banatao, 2011; Smiley 2011).

2.5 Challenges for Operational Definition of Resilience

Clearly there are different operational distributions of resilience which can pose a challenge in summarising the critical components of resilience or determining estimates of the rate of resilience in a similar target population of high-risk youth (Buthelezi, 2007). To this end, Egeland and Eikson characterise resilience as the positive end of a distribution of outcomes in a sample of high-risk children (as cited in Buthelezi, 2007). Kumpfer (1999) adds that “additional research in this field suffers from the difficulties separating cause and effects, and for locating good measures for resilience variables” (p.182).

Henry (as cited in Buthelezi, 2007) points out methodological issues of resilience that may pose difficulties to researchers and leads one to ask: resilience in whose eyes, by whose standards and compared to what? Generally children are considered resilient if they “function within normal or acceptable measures of competence with respect to behavioural, social and or cognitive functioning” (Henry cited in Buthelezi, 2007, p. 21).

Kinard (as cited in Buthelezi, 2007; Smiley, 2011) identifies six key issues that have continued to pose major challenges for formulating an operational definition of this study as follows:

- Distinguishing between factors determining resilience and factors related to resilience.
- Selecting the source of data
- Deciding how many sources of data to use
- Choosing scoring criteria to measure resilience
- Examining resilience over time

Various sources of data for measuring the construct resilience have been used in both longitudinal and cross sectional research. For example, some sources include “material rating, teacher rating, peer rating, children’s self-report, achievement tests and school performance” (Kinard cited in Buthelezi, 2007, p. 21). For the purpose of this study teacher ratings and school performance were used. In conclusion two challenges emerged from the reviewed literature: 1) difficulty in consolidating critical components of resilience and the rate at which it affects the youth, and 2) difficulty to separate cause and effect measures.

2.6 Behaviour as a Measure of Resilience

Resilience can be measured by looking at the behaviour displayed by the learner (Herero, 2014; Wright, 2013). This can be a challenge in a sense that behaviour is judged in the context of the observer and the observed (Spruill, 2011). However, Buthelezi (2007) explains that, “the

business of behaviour is inherent and there is no objective way to judge appropriateness and acceptability for people who have different characteristics” (p. 22). Kinard also points out another challenge in using educators as sources of data, arguing that educators have “limited contact” with “children in a structured environment” (cited in Buthelezi, 2007, p. 23). Literature further indicates that teacher ratings are influenced by characteristics of children’s families, such as child gender, socio-economic status or ethnicity (Kinard, 1998; Morales & Trotman, 2011). For example, in this study teachers (specifically, life skills teachers and register class teachers) were tasked to identify learners who were at risk of school failure using the knowledge (i.e. socio-economic status and performance in mathematics) they have of their learners.

2.7 Academic Achievement as a Measure of Resilience

There is an ongoing debate amongst researchers on whether resilience should be defined as innate ability or as a current performance. However, research reveals strong evidence connecting resilience and academic achievement (De Baca, 2010). According to Kinard (as cited in Buthelezi, 2007) intelligence tests, academic achievement tests, grades in school as well as parent and teacher ratings are popular methods of determining whether a person is resilient or not resilient. Masten and Powell (2003) suggest that for school age children, appropriate indicators of resilience would be academic success and positive relationships with peers as well as adults. For this study, learners’ grades in mathematics in standardised Grade 10 national examinations were used as one of the criteria for identifying research participants. Another study that used academic grades as a criterion for resilience was conducted by Gonzalez and Padilla (1997). They examined factors that contributed toward academic resilience and achievement in 133 resilient and 81 non-resilient Mexican American high school learners. They found that learners obtained high grade point average in the tenth grade despite

coming from a low socio-economic background because of protective factors such as sense of belonging to school and regular teacher feedback. In another study, Gray, Padron, and Waxman (2003) found that children with higher levels of educational support from their teachers and friends were more likely to feel encouraged and prepared to attend college, enjoy coming to school and being involved in high school activities, experience fewer conflicts and difficulties in their inter-group relations with other learners and experience fewer family conflicts and difficulties.

Furthermore, in a study by Borman and Overman (2004), some individual characteristics that distinguish academically successful or resilient elementary school learners from minority and low socio-economic status (SES) backgrounds from their less successful, or non-resilient, counterparts were identified. These characteristics included greater engagement in academic activities, an internal locus of control, efficaciousness in mathematics, a more positive outlook toward school and more positive self-esteem.

Again in another study He (2014) evaluated an attribute model for academic resilience in mathematics and examined its relationships with learner performance. Participants were given a test on mathematics assessment in algebraic reasoning to measure the learners' performance in the major domains of algebra and key processes of algebra. Results of the study indicate that resilience of learners in terms of self-efficacy, coping skills and educational aspiration directly influences how well they perform in mathematics.

2.8 Academic Resilience and Achievement

Since children can manifest resilience, competence, and high levels of functioning within one domain while not in another, the study of academic or educational resilience, as a subset within the field of resilience research has emerged (Luthar et al., 2000; Wang, Haertel & Walberg, 1994). For example, Kaufman, Cook, Arny, Jones, and Pittinsky (1994) studied learners with histories of maltreatment. Almost 66 percent of the learners were academically resilient, while

21 percent manifested resilience in the domain of social competence. For the past several decades, multidisciplinary empirical resilience research from the field of developmental psychopathology, psychology, sociology and anthropology has addressed the utility of resilience as a scientific construct (Banatao, 2011).

Resilience research has examined academic success and persistence despite stressful events and conditions during childhood and adolescence (Alva, 1991; Wang et al., 1994). Some of the well-established risk factors included being a minority learner attending an inner-city school or coming from a low-income family background where English is not a primary language (Perez, Espinoza, Ramos, Coronado & Cortes, 2009). Resilience researchers seek to answer a number of questions. Why are some learners debilitated by setbacks, poor performance, stress and study pressure, whereas others pick themselves up, recover, and move on? Why do some learners get caught in a downward spiral of underachievement whereas others respond proactively to poor performance and break this downward spiral? Why do some learners crumble under the pressure of school whereas others are energised and embrace the challenges before them (Martin, 2002; Smiley, 2011; Wright, 2013)? Resilience research has demonstrated that despite the presence of many learners who perform poorly and continue the downward trend (Dauber, Alexander & Entwisle, 1996), there are a significant number of learners who manage to do well in school despite exposure to difficult life situations (Jimerson, Egeland, & Teo, 1999). The answers to the aforementioned questions may very well lie in academic resilience (Martin, 2002; He, 2014).

Researchers of academic resilience generally agree that academic resilience involves learners' positive academic outcome (e.g. grades) despite the risks/adversities (e.g. low SES) to which learners are exposed. Morales and Trotman (2004) define academic resilience as individuals'

positive educational achievement outcome anomaly despite their exposure to risk factors. Wang et al. (1994) define academic resilience as the heightened likelihood of success in school and other life accomplishments despite environmental adversities brought by early traits, conditions and experiences. In a qualitative study conducted on three high achieving African American high school learners, Gayles (2005) described academic resilience as “academic achievement when such achievement is rare for those facing similar circumstances or within a similar sociocultural context” (p. 50).

Despite the substantial progress made towards understanding academic resilience, the concept of academic resilience in mathematics has surprisingly not received a great deal of attention in the research literature (He, 2014; Herrero, 2014). In the few papers that deal with the issue, most are quantitative (Borman & Overman, 2004; He, 2014); thus qualitative studies such as this present study are essential in providing a detailed description of the lived experience of academic resilience in mathematics from the participants’ point of view.

There has, been substantial focus on academic resilience as a construct (Connell, Spence, & Abery, 1994; Gayles, 2005; Martins, 2002; Martins & Marsh, 2006, 2008; Morales, 2000; Morales and Trotman, 2011; Perez, et al. 2009; Schoon, Parsons, & Sacker, 2004; Wang & Gordon, 1994). In these studies, socioeconomic adversity was found as a significant risk factor for educational failure as it influences consequent adjustment in work and health related outcomes (Schoon et al., 2004). These authors also found that the impact of such social risk can be modified by a variety of social psychological factors including teacher expectation, educational motivation, parental involvement and job aspiration, and good behavioural adjustment (Schoon et al., 2004). Furthermore, Martin and Marsh (2006) observed that when academic resilience was measured separately it would predict educational and psychological

outcomes, such as the enjoyment of school, class participation, and general self-esteem. In a study that employed a construct validity approach and examined educational and psychological correlates of academic resilience with a sample of 402 Australian high school learners, Martin and Marsh (2006) found that in terms of the measure of academic resilience, boys and girls were not substantially different from each other in terms of academic performance.

Having made the above remarks, it becomes clear that understanding resilience has grown substantially in popularity over the past four decades and there exists a burgeoning literature on the topic. However, there are only a few studies on resilience in adolescents from poor families (Buckner, Mezzacappa & Beardslee, 2003; Gizir, 2004). Moreover, the researcher did not come across literature considering the academic resilience in mathematics, especially in the Namibian context. If research in academic resilience is pursued along the same lines as the larger body of research in resilience, it can be proposed that enhancing academic resilience requires us to enhance the protective factors in learners' lives and reduce the risk factors. In this respect it was expected that the findings of the present study might provide additional evidence regarding how individuals from disadvantaged backgrounds succeed in mathematics.

2.9 Research on Academic Resilience

Banatao (2011) notes that studies of learner resilience cut across race, ethnicity, socioeconomics, age, international borders, and gender. Research on academic resilience has established that when caring teachers and schools provide a curriculum that engages learners in active participation while maintaining high expectations, their learners are more apt to demonstrate resilient characteristics (Padron, Waxman, & Huang, 1999; Rutter, Maughn, Mortimore, & Ouston 1979; Solomon, Battistich, Watson, Schaps, & Lewis, 2000; Solomon, Battistich, I1-Kim, & Watson, 1997; Solomon, Watson, Battistich, Schaps, & Delucchi, 1997).

It was found that when learners reported caring adults and high expectations in their schools, they also demonstrated motivation and positive attitudes, leading to a high level of engagement in learning. Some studies concluded that more positive learner behaviours are related to higher achievement (see, e.g., Freiberg et al., 1995; Hawkins et al., 1997; Hemingway, 2014; Martin, Anderson, Bobis, Way, & Vellar, 2012). In addition, learners who expressed strong social bonds with adults, and with their peers, proved less likely to disengage from school and more likely to participate in the academic life and to achieve (Resnick, Bearman, Blum, Bauman, Harris, & Jones, 1997; Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989).

Garmezy, Masten and Tellegen (1984) has greatly contributed to research on resilience through his classical work focusing on studies of risk, competence, protective factors. The study examined the impact of life stressors on the competency levels of 612 elementary school children in Grades 3-6 in two urban Minneapolis schools. This was a longitudinal study that was designed to examine competence among normative schools cohort with various kinds and levels of adversity. A sample was selected to reflect the diversity of socioeconomic status (SES) and ethnic minorities within the public school district at the time. The focus of the Garmezy et al. (1984) study was on the relationship between competence, adversity, internal functioning, and a collection of individual and family attributes. A sample of 205 children and families participated in the follow-up studies at ages of 7, 10 and 20 years to provide longitudinal data on competence, which later became known as resilience (Luthar, 2003). Garmezy et al. (1984) discovered that disadvantaged children with lower cognitive abilities and low SES, as well as less positive family support, were generally less competent and more likely to be disruptive in school. Surprisingly, these authors found that some of the disadvantaged children were competent doing well academically, and did not display behavioural problems. As a result,

researchers including the present study, questioned why some children did not succumb to adversity and did not develop negative adaptations.

Rutter et al. (1979) were some of the first scholars to suggest that both individual characteristics and children's environment constituted important protective factors to fostering resilience. They concluded that learners coming from disadvantaged families were more likely to demonstrate resilient characteristics if they attended schools that provided a source of external protective factors, such as fostering a sense of achievement, academic pressure and high expectation, attentive caring teachers and good teacher learner relationships (Rutter et al., 1979). Thus, Rutter and his colleagues established the notion that schools play a key role in youth resilience.

In a study that used academic grades as one of the criteria for resilience, Gonzalez and Padilla (1997) examined factors that contributed to the academic resilience and achievement of 133 resilient and 81 non-resilient Mexican-American learners from three high schools in California. An Analysis of Variance (ANOVA) revealed that resilient learners had significantly higher perceptions of families/peer supports, teacher feedback, positive ties to the school, value placed on the school, and peer belonging than the non-resilient learners. Regression analysis revealed that learners' sense of belonging to school was the only significant predictor of academic resilience. These findings suggest that a school's purposeful fostering of the resilience construct, specifically caring relationships and meaningful opportunities to participate at school, may lead to higher grades and greater academic achievement among its learners.

The Center for Research on the Education of Student Placed At Risk (CRESPAR) in USA has participated in several studies of academic resilience (Banatao, 2011). An example of a CRESPAR study involved a longitudinal mixed methodology study of Chicago learners

transitioning from the smaller setting of elementary school to high school (Roderick, Chiong, DaCosta, Arney, Stone, & Waxman, 1997). Reviews of this study and other CRESPAR studies by Nettles, Mucherach, and Jones (2000) found that caring parents, participation in extracurricular activities and supportive teachers were beneficial to learners' academic achievement. Following this, Nettles et al., (2000) developed their own research that studied 75 African American fourth and fifth graders. The researchers found that learners' perceived exposure to violence to be a significant positive factor on mathematics and reading achievement, while teacher support had a positive impact on mathematics achievement. These findings supported, and were consistent with, the previous findings of CRESPAR research. The impact of external protective factors leading to learner resilience and increased academic achievement continued as a valid scientific construct (Banatao, 2011). However, a criticism of this study, centres on the fact that the relationship between learner achievement and teacher support did not apply to reading achievement as it did for mathematics. Therefore, this finding indicates that another factor for improved mathematics performance, such as teacher expertise, may be more at work than the protective factors of resilience, otherwise gains would have been generalised to reading achievement as well (Banatao, 2011).

Borman and Overman (2004) carried out a research study based on data from prospectuses of The Congressionally Mandates Study of Educational Growth and Opportunity. The longitudinal design study tracked the mathematics progress of low-SES children from third through sixth grades. Their work involved across-group analyses of the three ethnic groups: African-American, Hispanic and white learners. They determined whether the allotments of the individual and school characteristics associated with academic resilience were different as a function of race/ethnicity and whether any of the characteristics were more important predictors of resilience among certain racial/ethnic sub-groups. For clarification on how

schools may affect learners' resilient outcomes, Borman and Overman formulated and tested four models of the risk factors and resilient-promoting features of schools, namely a) effective schools, b) peer group composition, c) school resources, and d) the supportive school community model. It was found that research on academic resilience that focused on at-risk minority learners has been well justified, in that the 'double jeopardy' of being poor and from a minority group exposed learners to greater risks and fewer resilience-promoting conditions.

In addition, learners from relatively homogenous low-SES backgrounds were found to have lower academic self-efficacy and were exposed to school environments that are less conducive to academic resilience. Borman and Overman (2004) established that the most powerful school models for promoting resilience appear to be those that include elements that actively shield children from adversity. Their study also revealed that resilient learners tend to develop much stronger and more supportive relationships with their teachers than non-resilient learners do. Other findings worth noting include the limitations of their study associated with the definition of resilience and the definitions of the school effects models. While the authors acknowledge that resilience is an elusive construct they perceive resilience in mathematics as a developmental process occurring over Grades 4, 5 and 6 that is eventually characterised by higher than expected academic performance despite the adversities associated with poverty and initial low achievement. One critique of Borman and Overman (2004) study is that it failed to distinguish potentially important differences on an array of factors that may have affected learners' outcomes, including differences in access to early childhood interventions and potential family background differences associated with early cognitive development (Banatao, 2011). In the absence of these factors, the models developed are insensitive to potentially important differences in learners' early academic development. The present study aimed to develop a school-level model for fostering academic resilience in mathematics.

He (2014) evaluated an attribute model for academic resilience in mathematics and examined its relationship with learner performance. He's study had used the first wave of data from the high school longitudinal study. A total of 2398 ninth graders were selected by using combined criteria of the lowest socioeconomic status and ethnicity groups of interest (i.e. Hispanic, African American, and white). A sum of 15 items was selected from the Student Questionnaire to measure the three attributes in the conceptual model, i.e. self- efficacy, coping skills, and educational aspirations. He (2014) found that academic resilience as represented by the three attributes significantly accounted for the variations in learners' mathematics performance with self- efficacy and coping skills but not educational aspiration. Further his study evidenced that the three- attribute model of self-efficacy, coping skills, and educational aspiration seems to represent the construct of learners' academic resilience in mathematics very well. He's (2014) findings on self-efficacy were inconsistent with the literature in that his study showed that self-efficacy is a rather weak predictor of learner performance. A limitation of He's study is that academic resilience was examined only at one time (ninth grade) which is static as opposed to academic resilience being viewed as a process. Lastly, while the tested attributes provide a model for mathematics academic resilience, they are limited in depicting a full picture of the complex phenomena; hence the present study uses a qualitative approach to widen deep understanding of the learners' lived experiences of academic resilience as a phenomenon (He, 2014).

A study by Perez *at al.*, (2009) focused on the academic resilience of undocumented Latino high school students, community college students, and university students from across the United States. In particular, the study examined psychosocial stressors such as undocumented status, socioeconomic hardship, and low parental education that represent significant

challenges for Latino immigrant adolescents. The study indicates that six percent of participants were found to be highly vulnerable, that is, reporting various risk factors, but lacking in personal and environmental resources. The authors suggested that when faced with the challenges of living in poverty, working long hours at a job during school, low levels of parental education, feeling a high sense of rejection owing to their legal status, undocumented resilient Latino youth draw on available personal and environmental resources such as teacher support, family support or peer support (Perez et al., 2009). Perez, et.al (2009) established three distinct profiles: high risk learners with low levels of protective factors (high risk), low risk learners with high levels of protective factors (protected), and high risk learners with high levels of protective factors (resilient).

Perez et al. (2009) revealed that resilient and high risk learners worked longer hours at a job during high school, reported higher levels of feelings of societal rejection because of their undocumented status, and had parents with low levels of schooling, as compared to protected learners. They also found that both resilient and protected learners reported higher levels of parental valuing of school, extracurricular participation, and volunteering.

In a similar study by Jowkar, Kojuri, Kohoulat, and Hayat (2014) with 604 participants (307 girls and 297 boys) from Shiraz high schools in Iran, established achievement goal theory as a powerful framework for conceptualising difference in the quality of learners engagement, persistence on task, and academic resilience. The study focused on the relationship between achievement goal orientations and academic resilience. Participants completed the achievement goals questionnaire and resilience Youth Development Module Scale (RYDM).

Through simultaneous multiple regression analysis the researchers investigated the prediction of academic resilience by achievement goal orientations. Jowkar *et al.*, (2014) found that mastery approach goal orientation was a positive predictor of academic resilience, where mastery- oriented learners reported the importance of getting goal grades, learning and growing from their mistakes. Also from the study by Jowkar *et al.*, (2014), the authors established that performance goals (approach & avoid) was significant predictor of academic resilience. Goal orientation, however, was reported as not being a predictor of academic resilience contrary to existing literature. Clearly, findings in general on a resilience study is limited in terms of generalisation.

Another study on academic resilience was done by Banatao (2011) which investigated the relationships between school protective factors and learner achievement. The study used both descriptive and inferential statistics, to analyse Resilience Youth Development Module (RYDM) data of the California Health Kids Survey (CHKS) for all California schools in Grade 7 (2003- 2004, 2005- 2006, and 2007- 2008). According to Banatao (2011) statistical sampling and statistical analysis illustrate significant relationships between events and the likelihood of occurring phenomena, but cannot with complete certainty directly attribute the occurrence of one event to another seemingly related occurrence. He found that simple correlations between caring school relationships, high school expectations (school support), and school meaningful participation, to school academic achievement were statistically significant. Further, school meaningful participation was found to be predictive of increased academic outcome. However, the relationship between external school protective factors and learner academic outcome continues to be complex. The study was unable to validate whether high levels of internal learner assets were predictive of improved academic outcomes. Banatao (2011) established that although the school connectedness variable is not part of the resilience construct, there is a strong relationship between the constructs of school connectedness, school meaningful

participation, and learners' achievements. This present study reviewed school connectedness (identifying with the school) when developing an academic resilience model of mathematics for the school context.

Buthelezi (2007) analysed the school context for factors that promote or impede resilience among adolescent learners. A sample of 4 schools within the Pinetown district in Kwazulu Natal was drawn from a population of all Grade 10 learners in the four schools whose ages fell between 14 and 20 years. Using mixed-methods research approaches Buthelezi's study involved open and closed ended questions and found that the majority of the black high school learners who came from poor families and whose parents were illiterate still perceived themselves as resilient. The findings showed that learners who received high levels of support tend to be resilient (Buthelezi, 2007). Buthelezi's (2007) study revealed that resilient learners tend to be more assertive and independent. Further, the study established that the most important resilience factors were learning life skills e.g. coping skills, developing high self-esteem and self-control; setting and communicating high expectations; increasing social bonding; providing opportunity for meaningful participation; providing a caring and conducive environment and setting clear and consistent boundaries. The work of Buthelezi (2007) confirms the relevance of the elements of the Resilience Model (Henderson & Milstein, 1996) in promoting resilience in the school context. As mentioned earlier in this literature review, the study by Buthelezi (2007) also revealed that to a large extent, learners use external rather than internal sources to resolve their problems, with the teacher being the most consulted person, followed by a trustworthy friend. In her findings, caring educators who give and receive respect from learners were reported by Buthelezi to be an asset in the school context.

Furthermore, Buthelezi (2007) like various other authors, indicated the variations in operationalisation and measurement of key constructs of resilience (Banatao, 2011; He, 2014; Smiley, 2011). Conversely, the expanding field of research on academic resilience lends itself to greater precision of terminology and to the many multidisciplinary spheres of resilience by concentrating on a particular domain of schools (Luthar & Burak, 2000). For example the present study focused on academic resilience in mathematics rather than resilience in general.

2.10 Characteristics associated with Academic Risk and Resilience

“The resilient child is one who “works well, plays well, loves well and expects well” (Bernard, 1997). Historically children from poor backgrounds have been disproportionately placed at risk of academic failure (Natriello, Mcdill, & Pallas, 1990). Along with poverty, researchers also have associated an individual’s status as being from a racial or cultural minority with academic risk (Gordon & Yowell, 1994; Natriello, et al., 1990). Borman and Rachuba (2001) established that beyond such individual factors, schools that teach children of poverty and of colour may also introduce risk factors by failing to provide a supportive school climate, institutionalising low academic expectations, or delivering inadequate educational resources.

Over the years researchers began to look at the other side of risk and focused on the factors that enable at-risk learners to “beat the odds” against achieving academic success. Borrowing from the field of developmental psychopathology, a growing body of educational research has identified individual attributes that promote academic resilience. Developmental psychologists such as Rutter (1987) and Garmezy (1991) have recognised that from those groups believed to be at high risk for developing particular difficulties, many individuals emerge unscathed by adversity. Furthermore, the observation that only one out of four children of alcoholic parents will become alcoholic is a familiar example of this phenomenon (Benard, 1991). It is worth

noting that the capacity for resilience varies from individual to individual and it may grow or decline over time, depending in part on protective factors within the person that might prevent or mitigate the negative impacts of stressful situations or conditions (Henderson & Milstein, 1996).

Resilience studies on individual's strengths to overcome adversity were conducted in four major waves and this present study falls in the first wave (Borman, Rachuba, 2001; Carle, & Chassin, 2004). These waves do not relate to chronology but to other aspects. In order to determine the differences between resilient individuals and others in similar situations who did not cope as well, the first wave of research focused on an individual's strengths and available resources (Moore, 2013; Smiley, 2011; Wright, 2013). Despite a variety of perspectives and methodologies, researchers consistently found the same potential promotive and protective factors (see Table 2.1) commonly associated with resilience in children and youth (Cutuli, Herbers, Lafavor, & Masten, 2008, p. 79; Hemingway, 2004).

Promotive/ protective factors
Positive relationships with caring adults
Effective parenting
Intelligence, problem-solving skills
Perceived efficacy, control
Achievement motivation, persistence
Self-regulation skills
Effective stress management
Positive friends, romantic partners
Faith, hope, spirituality

Religion, cultural systems
Beliefs that life has meaning
Effective teachers, schools

Table 2.1: Commonly observed predictors of resilience in young people

Review of literature, evidenced eight (8) key qualities/ predispositions which are considered as most representative of personal attributes of the resilient child (Bernard, 1993; Clarke & Clarke, 1984; Garmezy, 1985; Werner & Smith, 1988;, all cited in Murray, 2003):

- 1) Having stable relationships with peers
- 2) Possessing well developed problem-solving skills
- 3) Considering realistic future plans
- 4) Having a positive sense of being able to achieve and deal effectively with tasks
- 5) Experiencing success in one or more areas of their life
- 6) Being able to communicate effectively
- 7) Possessing a strong attachment with at least one adult
- 8) Acceptance of responsibility for themselves and their behaviour

The researcher researched on the personal attributes Namibian resilient learners possess.

2.10.1 Profile of a resilient learner

The identification of the characteristics of resilient learners helps to further define resilience (Learning Development Centre (LDC), 2004). Resilient children usually have four attributes that are expressions of resilience and not causes (Kiswarday, 2012). These attributes include: 1) social competence, 2) problem-solving skills, 3) autonomy, and 4) a sense of purpose and hope for a bright future.

2.10.1.1 Social Competence

Social competence refers to qualities such as responsiveness; especially the ability to elicit positive responses from others - flexibility, empathy, caring, communication skills, and a sense of humour. Bernard (1997) reports that from early childhood on; resilient children tend to establish positive relationships with both adults and peers that help bond them to their families, school, and community. Social competence may be defined as the personal strength that “includes the characteristics, skills, and attitudes essential to forming relationships and positive attachments to others” (Benard, 2004, p.14). Goleman (1995) refers to social competence as one of the five components of emotional intelligence, while Gardner (1993) refers to it as “interpersonal intelligence” among his original concept of multiple intelligences.

2.10.1.2 Problem-solving Skills

Benard (1993) defines problem-solving skills as the ability to think abstractly and to be able to attempt alternate solutions for both cognitive and social problems. He argues that two skills are especially important: firstly, planning, which facilitates seeing oneself in control and secondly resourcefulness in seeking help from others. In the context of mathematics learning, Schoenfeld (2014) established that the extent to which learners have opportunities to conjecture, explain, make mathematical arguments, and build on one another’s ideas, promotes their capacity and willingness to engage mathematically (agency) and recognition for being capable of solving mathematical problems. Again he insist that provision of meaningful participation in mathematics learning ensure that learners become mathematically solid which in turn result in positive identities as doers of mathematics. The literature on children growing up in slums provides an extreme example of the role these skills play in the development of resilience. These children must continually negotiate the demands of their environment or die (Felsman, 1989).

This personal strength in resilience is often referred to as “good intellectual functioning” (Masten & Coatsworth, 1998; Wright, 2013). Worth noting here is the important role of critical thinking and an insight trait to complement the personal strength. Banatao (2011) suggests that critical thinking and insight are especially important because they instil a consciousness which indicates that forms of oppression (such as an abusive parent, insensitive school, or experiences with racism) can be overcome. These abilities prevent internalised oppression and a sense of victimhood (Freire, 1993, He, 2014; Spruill, 2011). In addition, insight allows children to realise that not all parents are abusive, that a parent’s erratic moods are not abnormal, and that other children have different adverse circumstances (Hemingway, 2004; Smiley, 2011; Wolin & Wolin, 1993).

2.10.1.3 Autonomy

Autonomy is a personal strength which underlines intrinsic motivation and has profound impacts on teaching and learning. Deci (1995) describes autonomy as being associated with positive health, a sense of well-being, a true sense of self and identity, and one’s feeling of power. Autonomy is having a sense of one’s own identity and an ability to act independently and exert some control over one’s environment (Benard, 1993; Herrero, 2014). Several researchers have also defined autonomy as the ability to separate oneself from a dysfunctional family environment – to detach sufficiently from parental distress to maintain outside pursuits and satisfactions – which is a major characteristic of resilient children growing up in families with alcoholism and mental illness (Berlin & Davis, in Benard, 1993). Autonomy also includes several psychological functions such as: positive identity, internal locus of control, initiative, self-efficacy, mastery, adaptive distancing, resistance, self-awareness, and mindfulness (Banatao, 2011; Wright, 2013).

Positive identity is often used synonymously with positive self-evaluation or self-esteem. It is consistently used to describe resilient children who have overcome great odds (Masten & Coatsworth, 1998; Werner & Smith, 1992; Spruill, 2011). Strong positive ethnic identity is associated with high self-esteem, a strong commitment to do well in school, a strong sense of purpose in life, and a high academic achievement (Eccles & Gootman, 2002). Benard (2004) states that learners' positive outlook of self, fosters a pride in learning and promotes positive growth and development in school.

Autonomy also includes a generalised sense of locus of control (Werner & Smith, 1992). It is also essential for resilient learners to recognise what is not in their control, or is out of their "sphere of influence" (Stolberg & Mahler, 1994). For example, abused children or learners who are discriminated against at school must not feel as if their mistreatment was their fault, rather, that it was beyond their sphere of control (Banatao, 2011, He, 2014). Initiative is aligned with locus of control; which is associated with motivation from within to direct effort and attention towards a challenging goal (Larson, 2000; Miller, 1990). Furthermore, Larson (2000) sees initiative just like autonomy, at the heart of other strengths such as creativity, leadership, altruism, and civic engagement to achieve success.

Self-efficacy and mastery is also included within Benard's review of the construct of autonomy (Benard, 2004). Self-efficacy may be defined as the belief in one's power to determine personal outcomes (Bandura, 1995). Mastery, the feeling of doing something well or feeling competent, is associated with self-efficacy. Mastery experiences help to develop a sense of efficacy (Benard, 2004). Further, when people experience feelings of success, they believe that they have skills to succeed and will be more ready to bounce back from setbacks or failure (Bandura, 1995). Adaptive distancing refers to the power of children to separate themselves from negative

situations or conditions, realising that they are not responsible for the situation, and that their life can be different (Banatao, 2011). Resistance is a form of adaptive distancing (Beardslee, 1997). It is the refusal to accept negative messages about one's self, gender, race, or culture.

Self-awareness and mindfulness includes observing one's thinking, feelings, moods, and strength with the ability to step back from one's emotions (Banatao, 2011). Resilience literature refers to this attribute as a transformative, reframing power that is the essence of resilience (Beardslee, 1997; Benard & Marshall, 1997; Wolin & Wolin, 1993).

2.10.1.4 Sense of Purpose and a Sense of a Bright Future

A sense of purpose entails having goals, educational aspirations, persistence, hopefulness, and a sense of a bright future (Benard, 2004) for the learners. Likewise, goal direction, achievement motivation, and educational aspirations, are assets associated within a sense of purpose, are attributed to learners' success in school (Anderman, Austin, & Johnson, 2002). Again, these assets are attributed to those who do not abuse alcohol and drugs, and do not drop out of school despite multiple risks (Masten, 1994; Watt, David, Ladd, & Shamos, 1995; Werner & Smith, 1992; Wigfield & Eccles, 2002). Thus, motivation is linked to academic success, with factors such as higher rates of high school completion, increased college enrolment, increased achievement scores in mathematics and reading achievement and higher grades (Scales & Leffertt, 1999). This strength is related to the deep belief that one's life has meaning (Banatao, 2011). Werner and Smith (1982, 1992) describe one's sense of purpose as the most powerful asset to propel young people toward healthy outcomes despite life's challenges. Combined with positive self-identity, a strong positive future-focus is associated with academic success and fewer health-risk behaviours (Masten & Coatsworth, 1998; Wyman, Cowen, Work, & Kerley, 1993).

To reiterate this point, when resilience is fostered and engaged, personal strengths such as social competence, problem-solving skills, autonomy and sense of purpose emerge. In short, these personal strengths comprise resilience in youth (Benard, 2004). Benard (2004) further cautions that when looking at the profile of a resilient child, we must look beyond personality traits and the ever-present temptation to “blame the victim” or “fix the kid” and examine the environmental characteristics that have fostered the development of resilience. Families, schools, and communities that have protected children growing up in adversity are characterised by 2.10.1.5 (a) caring and support, 2.10.1.5 (b) positive expectations and 2.10.1.5(c) ongoing opportunities.

2.10.1.5 (a) A Caring Environment

In support of Maslow’s humanistic theory, Carl Rogers believed that every person can achieve their goals, wishes and desires in life if the environment supports such growth (McLeod, 2016). Given the incredible stresses which the family system is now experiencing, schools have become a vital refuge for a growing number of children, serving as a “protective shield to help children withstand the multiple vicissitudes that they can expect from a stressful world” (Garmezy, 1991, p. 129) and hence the school can foster resilience in the children. Garbarino (cited in Benard, 1993) in his study on resilience of children living in war conditions, including inner-cities in the United States, observed that despite overwhelming pressures in the environment, 75 to 80 percent of children can use school activities as a support for healthy adjustment and achievement when schools are sensitive to such children and their challenges. The researcher investigated whether Namibian children display resilience under challenging circumstances or not.

The influence and importance of caring and supportive school environments as protective factors is found throughout the literature. Henderson and Milstein (1996) state that, “more than any other way, the schools build resilience in learners through creating an environment of caring personal relationships” (p. 17). Other researchers (e.g, Rutter, 1984; Masten et al., 1990) concurred that a caring and support ethos are the most critical variable throughout childhood and even adolescence as they enhance resilience in learners. A caring and supportive environment facilitates a proper foundation for trust required between teachers and learners to foster resilience. Trusting relationships serve as the base for healthy future development in schools (Erickson, 1963) specifically within the school setting. Werner and Smith’s (1998) study emphasises the role that a teacher can play in creating caring learning environments that are critical in fostering resilience. In the same vein, Coburn and Nelson (1989) found that positive role models in the lives of resilient children were favourite educators who took a deep interest in them. Learners reported that these educators went beyond the traditional roles of teachers by serving as positive role models and individuals whom the learners could trust and such educators demonstrated deep care (Dreyer, n.d).

Learners need a conducive learning environment which fosters resilience and promote opportunities for success (Schussler & Collins, 2006; Wright, 2013). This study aimed to find out how the learning environment can be made supportive to promote resilience in mathematics in Namibian schools. Learners not only perceive that they are welcome in class but also feel comfortable asking questions. Classrooms are safe and orderly; well-defined and appropriate routines and procedures are the norm and are applied with equity, purpose and consistency (Wright, 2013). Teachers effectively address misbehaviour, and learners feel an overall connection between themselves, the teacher, and classmates (Wright, 2013). This environment

will enable learners to feel comfortable to the point of asking questions freely and generate mathematical discussions in class.

In particular; research suggests that at-risk learners have a strong need to perceive that an environment is caring, respectful, and supportive (Wright, 2013). Similarly Carl Rodgers and Abraham Maslow), two of the great scholars of human psychology, (cited in McLeod, 2014), concluded that for a person to grow, they need an environment that provides them with genuineness (openness and self-disclosure), acceptance (being seen with unconditional positive regard), and empathy (being listened to and understood) without which relationships and healthy personalities will not develop. A nurturing classroom embodies affective characteristics that promote learning and trust (Poplin & Weeres, 1992). Nurturing of resilience in a caring and protective environment - is this the case in Namibia? Learners are more likely to do well when the environment fosters a belief that they can achieve. As one learner, who participated in Wright's study (2010) said: "In some classes you feel like just doing it - at least trying. You feel like the teacher is pushing you as far as you can go" (p. 82). Although research indicates that resilient learners are most likely to have personal characteristics discussed above, it is helpful to consider additional aspects that contribute to resilient learners' achievement, i.e. the learning environment, instructional pedagogy, and teacher disposition.

Instructional Pedagogy

Fostering resilience requires instruction that is learner-centred and engaging, "where learners are involved in challenging lessons that would help them develop new skills and learn to focus their attention" (Waxman, Gray & Padron, 2003, p.14). Although educators tend to believe that struggling learners have a preference for less complicated tasks, research indicates that they instead favour assignments that spark curiosity and encourage thinking (Benard, 2004; Wright,

2010). Wright (2013) suggests using lessons that stimulate active participation in the learning process rather than merely allowing them to sit and listen. He further explains that instructions are relevant when presented in meaningful chunks, and relate to real-life situations, while prompting reasoning and joyful learning.

Teacher Dispositions

Teachers who contribute to resilient learners' positive learning experiences express high expectations, are competent in their content areas, and challenge learners to do their best (Smiley, 2011; Spruill, 2011; Wright, 2013). These teachers cultivate knowledge and ensure that learners have the capacity to learn. Wright (2010) describes teachers who foster resilience as caring and appreciative of the cultural experiences learners bring to the classroom. Such teachers emphasise positive teacher-learner relationships, make learning interactive, and value learners' voice (Wright, 2013). Teachers are approachable and communicate rigorous, yet realistic expectations of their learners. Likewise Schoenfeld (2014) stated that effective mathematics teachers uses powerful instructions which meets the learners where they are and gives them the opportunity to move forward.

Table 2.2 summarises the factors that are supporting resilience in the classroom. These are: the learning environment, instructional pedagogy and teacher dispositions (Wright, 2013, p.2).

The Learning Environment	Instructional Pedagogy	Teacher Dispositions
Respectful	Meaningful engagement	Competent
Nurturing	Connected	Inspire self-efficacy
Orderly	Evidence-based	Value learners' voice
Questioning valued	Relates to the real world	Exhibit positive teacher-learner relationships
Consistent classroom	Develops digital literacy	
Routines and procedures	Embedded in the instructional strategies	

Table 2.2: Factors Supporting Resilience

Resilient youth take the opportunity to fulfil their basic human need for social support, caring and love. If this opportunity is unavailable to them in their immediate family environment, it is imperative that the school gives them the chance to develop caring relationships (Benard, 2004). Besides providing a culture and support, an ethos of high expectations also serves as a protective factor for resilient learners. The researcher would like to ascertain if teacher-learner relationship and interactions are caring, filled with love and communicate high expectations from the Namibian learner as well.

2.10.1.5 (b) Positive Expectations

Literature has demonstrated that schools which established high expectations for all learners and give them the support necessary to live up to the expectations have incredibly high rates of academic success (Benard, 1993; He, 2014; Wright, 2013). In particular, schools that create a

culture of high expectations for all learners experience greater rates of academic success (Barley, Apthrop & Goodwin, 2007; Hemingway, 2004; Levin, 1988; Rutter, 1979). Furthermore, Rutter's (1979) study found that school environments could act as an important protective factor that buffers children against the adverse effects of stress. More specifically, Rutter identified characteristics of effective schools that include: focus on academic achievement, clear expectations and rules, and high levels of learner involvement. These schools reported high rates of attendance and academic attainments and lower levels of delinquency and behavioural disturbances. Simply put, Rutter's (1979) study revealed that behavioural disturbances decreased over time in schools possessing a culture of high expectations and increased in schools that did not foster similar learning environments which focuses on learner participation in learning tasks.

In another study by Barley et al. (2007) that examined over 700 high-performing, needy schools, researchers found that academically successful schools cultivated a culture of high expectations. Barley and colleagues established that "what appears to distinguish high-performing schools from low-performing ones is the less tangible aspects or technical processes of schooling, and more the intangible and sometimes elusive aspects, such as a school's mission, culture and its teachers' and learners attitudes and beliefs" (p. 5). High expectations in schools encourage and remind learners that they are capable of achieving beyond their own belief. The key message here is that all learners can succeed. Weinstein (cited in Benard, 1993) identified the following ways, outlined below, through which we can communicate positive, high expectations to learners.

Teacher Behaviour and Attitudes

Teachers who convey the message that “this work is important, I know you can do it, I won’t give up on you” and who play to the strengths of each child, especially on learners who receive the opposite message from their families and communities, tend to motivate their learners to achieve (Benard, 1993). For children who are used to thinking of themselves as stupid or not worth talking to or deserving rape, violence and beatings, a good teacher can provide an astonishing revelation (Kidder, cited in Benard, 1993). That is, a good teacher can give a child at least a chance to feel, “She thinks I’m worth something; maybe I am” (Kidder, in Benard, 1993, p.32). Howard’s work (cited in Benard, 1993) established that children achieve more when they are directly taught that intellectual development is something they all can achieve through effort, as opposed to being an in-born ability of an individual.

Motivation and Responsibility for Learning

Schools that are especially successful in promoting resilience build on learners’ intrinsic motivation and interests through a varied and rich curriculum that encourages cooperation instead of completion (Benard, 2004). Moreover, active learner participation and decision making in both the curriculum and assessment fosters learners’ responsibility and ownership for learning. In addition to providing a culture of care and support, schools that foster resilience also recognise the value of creating meaningful opportunities for learners’ participation. The study sought to find out how learners are motivated and kept responsible for their own learning in a Namibian mathematics classroom. Including identifying mathematics activities that draw learners’ attention and encourage them to keep learning mathematics.

2.10.1.5 (c) Meaningful Participation

Katz (as cited in Banatao, 2011) explains that providing many meaningful opportunities (such as opportunity for peer tutoring, cooperative learning of mathematics, participation in mathematics clubs) for learners is crucial in emboldening resilience in learners. It is believed that these opportunities have the power to shield the learners from toxic or hostile environments. Banatao (2011) notes that such opportunities often provide learners with an opportunity to believe and dream in an environment that is both safe and stable. Benard (1995) concurs with the notion that providing youth with opportunities for meaningful involvement and responsibility within the school setting is a natural outcome for schools that have high expectations. Rutter's (1997) study found that children who were given a lot of responsibility at school and participated very actively in all sorts school activities; they were treated as responsible people and reacted accordingly. Scholars continue to acknowledge participation as a fundamental need and remind us that learners must not be viewed as empty vessels that we fill with knowledge (Freire, 1970, Henderson & Milstein, 1996). For example, schools can infuse participation in classroom activities by employing strategies such as: giving learners more opportunities to respond to questions; asking for their opinions on issues; asking questions that are critical, and provoking reflective thinking; making learning more hands-on; and peer tutoring (Benard, 1993). According to Sarason (1990), when one has no stake in the way things are, when one's needs or opinions are provided no forum, when one sees oneself as the object of unilateral actions, it takes no particular wisdom to suggest that one would rather be elsewhere. The researcher would, therefore, like to find out whether Namibian learners were given ample opportunities to participate in school affairs and more specifically in mathematics lessons.

The challenge for Namibian schools is to engage children by providing them with opportunities to participate in meaningful activities and roles. Therefore, schools are better situated to foster resilience through the use of cooperative learning strategies and opportunities to participate in school governance (Brooks, 2006). Such strategies bond young people to their school community and can promote all the traits of resilience such as: social competence, problem solving skills, autonomy, and a sense of a bright future.

Evidence from the literature shows that a nurturing school climate has the power to overcome incredible risk factors in the lives of children (Benard, 1993). Furthermore, Benard (1993) urges scholars to acknowledge that creating this climate for learners necessitates creating this environment for all school personnel. Fostering resilience in young people is ultimately an “inside-out” process that depends on educators taking care of themselves. In his study Munscrib (as cited in Benard, 1993, p 5) established that teachers who choose to see themselves and others as winners are able to see the strength in the learners. Again, teachers must see their own strengths, to look beyond their risks and see their own resilience means acknowledging their own inner resilience in order to be able to foster resilience in their learners. In their book *Resiliency in Schools*, Henderson and Milstein (1996), suggest “a call to action to focus on, understand and enhance the development of resilience is arising not only from social scientists but also from educators who are beginning to understand the need for schools to be resilience–fostering institutions for all who work and learn in them.” (p. 2).

The section that follows reviews psychological resilience as part of the new wave of resilience research.

2.11 Psychological Resilience

Richardson (2002) notes that a new wave of research has begun to integrate personal and environmental components of resilience, like this present study, by examining resilience more holistically and in an interdisciplinary manner. Accordingly, resilience is now being studied psychologically, biologically and socially and involves an interaction of individual and environmental characteristics (Almeon & Gladon, 2007; Kim-Cohen, 2007; Smolka, Buhler, Schumann, Klein, Hu, & Moayer, 2007). However, the research literature base for resilience emerged almost five decades ago with Garmezy's (1970) seminal work that focused on the resilience of children diagnosed with schizophrenia. His work established that many of these children thrived despite their high-risk status (Garmezy, 1974; Garmezy & Streitman, 1974). Garmezy (1985) identified three broad set of protective factors for these stress-resistant children, namely 'personality features, family cohesion and an absence of discord, and the availability of external support systems that encourage and reinforce a child's coping efforts'.

After the initial study of resilience in the 1970s and 1980s, resilience was defined as a phenomenon that recognised the risk/adversity to which an individual was exposed and the positive adaptation to it (Luther & Cicchetti, 2000). The research base has continued to grow exponentially with more studies conducted in an effort to better understand the underlying factors/components of resilience and how they interact across various risk factors and obstacles. However, the work of Rutters (1987 a, 1987 b, 1987 c, 1993, 1995, 2006, and 2007) stands out for its contribution to understanding the protective mechanism of resilience.

In recognition of Rutter's work, Luther, Cicchetti, and Becker (2000) called for researchers to look at the underlying mechanisms of resilience which are essential not only for advancing theory and research in the field, but also for designing appropriate prevention and intervention

strategies for individuals facing adversity. Furthermore, Luther et al. (2000) cautioned researchers to use terminology with a clear indication that their work is focused on a process and not on a personality trait. They clarified the definition of resilience by referring to it as “a dynamic process encompassing positive adaptation within the context of significant adversity” (p. 543). According to Luther et al. (2000) the nature of resilience is multidimensional, or context bound. The fact that some high-risk children are resilient in some domains does not necessarily guarantee the same resilience for them in other areas (He, 2014). To this end, authors encourage future resilience researchers to use circumscribed terms such as “academic resilience” (Martin, 2002) to bring greater precision in the literature. In response, this study focused on academic resilience that is particular to learning mathematics.

2.12 Socio-economic Status and Academic Performance

He (2014) insists that although resilience is a dynamic process of interaction between individual attributes and the risks factors, one specific factor really stands out in the academic context. This is the socio-economic status (SES). This perspective is given weight by the extensive research conducted on the relationship between SES and student academic performance (e.g, Linnehan, Weer, & Stonely, 2011; Okpala, Okpala & Smith, 2001; Sung, Padilla, & Silver, 2006) and their findings have consistently identified SES as a significant factor that is associated with learner academic performance across countries and ethnic groups (Frederickson & Petrides, 2008; Liu & Lu, 2008; Malecki & Demaray, 2006). To exemplify this, Fredrickson and Petrides (2008) concluded that learners with high SES outperformed their peers with low SES. Worth noting here is that not all learners from low SES backgrounds suffer from poor grades (He, 2014). Learners who are considered resilient are able to demonstrate performance above average or even excel despite their low socioeconomic status.

A family's SES affects a learner's achievement through the negative effect that low SES has on parental efficacy and ability to promote academic achievement in their children (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). Again, Spruill (2011) observes that low SES can shake the confidence parents have in protecting their children from societal hazards that can stunt their academic development. Thus lack of confidence in parent to protect their children may affect learner performance in school. Bandura et al. (1996) stresses that the higher the SES of a family, the higher the academic aspirations parents have for the child. Therefore, high levels of parental efficacy assist with the construction of a strong sense of efficacy and academic aspiration within the child (Bandura et al., 1996).

While it does not appear that any single factor places a learner at risk of school failure, poverty is considered as a major at-risk factor (Lenry & Symes, 2001; Ghokan & Ali, 2013; Neshila, Miranda & Zimba, 2015; Waxman, Grey & Padron, 2003). Poverty is pervasive as it is difficult to pin down and its human face is disturbing, yet its presence is seen almost every day in the Namibian classroom (National Planning Commission, 2002). Some of the factors related to poverty that may place a child at-risk for academic failure are: very young parents, single or poorly educated parents, unemployment, abuse and neglect, substance abuse, dangerous neighbourhoods, homelessness, mobility, and exposure to inadequate or inappropriate educational experiences (Neshila et al, 2015). For example, Namibian learners in the Khomas Region especially in informal settlements or rural urban areas, come from communities with high incidences of domestic violence, rape, passion killing, baby dumping and many more adverse conditions that impact their educational achievements (Ministry of Gender and Child Welfare, 2012).

However, research on resilience has provided evidence that some children and youth can survive and continue successful interactions with the environment despite the social ills mentioned above (Neshila et al., 2015). Research studies on resilience, such as this present

study, therefore have important implications for improving the education of learners at risk of academic failure; because they provide a framework for examining why some learners from disadvantaged backgrounds are resilient and others are not (Ghokan & Ali, 2013, Waxman et al., 2003).

The following section focuses on factors beyond SES and teaching pedagogy that influences teaching in school. Some of these are non-cognitive in nature but influence academic achievement/ performance and are most pertinent to this study. They include but are not limited to: parental factors, self-efficacy and the influence of peers.

2.13 Parental (Familial) Factors

Parents influence learner academic success (Bandura et al., 1996). In fact, they are considered to be the most important predictors of their children's educational aspirations (Conklin & Dailey, 1981; Hossler, Schmit, & Vesper, 1999; Hossler & Stage, 1992; McCarron & Inkelas, 2006; Wright, 2013). Spruill (2011) suggests that parental efficacy refers to actions and involvement by parents that affect the self-efficacy and aspirations of the child. Literature evidenced that when parental efficacy and engagement is low, learners do not aspire to attend school (Bandura et al., 1996; Hossler et al., 1999). Again parental efficacy and engagement improve learners' academic achievement (Auerbach, 2007; Stewart, 2008). Spruill (2011) establishes that higher levels of parental efficacy encourage higher levels of academic achievement for learners as well as promote self-efficacy within learners. In addition, Bandura et al. (1996) indicate that learners who are raised in families with higher levels of parental efficacy tend to be more disciplined, less likely to succumb to peer pressure, and less likely to become delinquent.

A review of the literature also reveals that parental efficacy is closely related to parental encouragement, parental involvement, and parental support (Cabrera & La Nasa, 2001; Hossler et al., 1999; Stewart, 2008). Spruill (2011) insists that parental encouragement is the amount of time parents and learners discuss parental expectations and hopes with their children. Again, it includes, but is not limited to, such activities as parents saving for their child's education, taking the child to career fair exhibitions, and enhancing personal knowledge regarding school activities (Cabrera & La Nasa, 2001). Therefore, interpersonal contact with both the teacher and the learners provides parents with a measure of the child's progress and further allows parents to stress the importance they place on academic achievement (McCarron & Inkelas, 2006; Smith & Fleming, 2006; Stewart, 2008). Although parental support can be exhibited in a myriad of ways, one way is to attend school events. However, for parents with low SES, work situations sometimes prevent them from doing so (McCarron & Inkelas, 2006; Smith & Fleming, 2006; Stewart, 2008; Tierney & Auerbach, 2005). Parental involvement is perceived as an integrative kind of thinking and effective approach to school improvement emerging from education systems especially with respect to learners' learning (Hamunyela, 2008, p.113). At the heart of parental involvement lies the belief that in order for schools to educate all youth effectively, parents and families should become fully involved in the process of educating learners (Fullan, 1998; MEC, 1993; Sanders & Epstein, 1998). Furthermore, parental involvement is viewed as an important way to improve the quality of education, and the way to facilitate access to progression within education (MEC, 1993; Singh, Mbokodi & Msila, 2004).

Another parental factor that has a direct impact on learner's academic achievement and aspirations is the educational level attained by the parent (Spruill, 2011). Researchers note that the higher the parental educational level, the more likely a learner is to attend College/

University (Hossler et al., 1999; Hossler & Stage, 1992; Smith & Fleming, 2006). Parental influences lead to action, thus both verbal and non-verbal parental messages communicate to the child the parents' expectations and values regarding the importance of education (Hossler et al., 1999; McCarron & Inkelas, 2006; Smith & Fleming, 2006). Thus the key message here is that parental engagement and efficacy have the power to increase the potential for learners' academic success (Bandura et al., 1996; Smith & Fleming, 2006; Spruill, 2011).

2.14 Self-Efficacy

According to Spruill (2011), parental efficacy is not the only form of efficacy that affects academic success. Equally important is the learners' self-efficacy. Researchers define self-efficacy as people's belief that they have the ability and power to exert a great deal of control on the events that influenced their lives (Bandura, 1986; 1997; Mills, Pajares & Herron, 2007; Pajares, 1996; Schunk & Zimmerman, 2007). In the context of this study, self-efficacy is a term that describes the level of belief and confidence learners hold in their ability to effectively complete a task or accomplish a goal (Bandura, 1986, 1997; Dewitz & Walsh, 2002; Mills & Heron, 2007; Pajares, 1996; Salomone, 2003; Schunk & Zimmerman, 2007).

In short, self-efficacy reflects how a person feels, thinks and behaves (Spruill, 2011). Spruill (2011) further claims that perceived self-efficacy is an important concept to consider in the realm of education because it provides clues to the attitudes learners have regarding their academic abilities. Equivalent findings are drawn from the work of Bandura (1986, 1997) who concludes that perceived self-efficacy is especially important, since actions generally determine life outcomes.

Bandura (1993) argues that learners set higher goals and are more committed to achieving those goals when they exhibit high levels of self-efficacy. In the same way DeWitz and Walsh (2002)

suggest that when learners are presented with tasks or goals, their self-efficacy level depends upon their personal feelings about completing the task, their persistence level and how well they performed similar tasks in the past. Thus, a learner with a high self-efficacy envisions success while a learner with low self-efficacy has a vision of failure and possible roadblocks besetting success (Spruill, 2011). Evidently from literature, resilient learners have more self-efficacy than non-resilient learners. According to Bandura (1997), such an outlook causes difficulty in achieving success because learners waste energy battling self-doubt or low self-efficacy. However, both ability and skill are not static characteristics or qualities bestowed upon a select few at birth. Thus it is important that learners possess a healthy sense of self-efficacy and belief in their abilities and skills to feel confident in using them in the classroom (Bandura, 1998; 1993).

Generally, if learners believe their abilities and skills are inferior to what will be needed to successfully complete a task or think within a situation they will avoid the challenge (Spruill, 2011). Literature points out that underestimation of abilities come at a price of missing opportunities and constantly being steeped in self-doubt (Bandura, 1986; Pajares, 1996). Bandura (1986) concludes that possessing a healthy perception of one's abilities fosters self-development of skills and opens the mind to opportunities and choices that are within the realm of accomplishment with regard to actions and failure goals. Research maintains that learners with high self-efficacy in particular disciplines or subjects tend to have higher expectations for achievement and meet those goals better than learners with low self-efficacy (DeWitz & Walsh, 2002). Learners glean information about their academic abilities through grading, teacher evaluations, and comparisons to their classmates' achievement (Bandura, 1993; Spruill, 2011). Equivalent findings are drawn from the work of Spruill (2011) that learners with positive academic self-efficacy are more social and more acceptable to the peers than those with low

levels of academic efficacy. Furthermore, learners with low functioning social and academic efficacy are more likely to seek out success (Bandura, 1993). This is well illustrated by a saying in English that “birds of the same feathers flock together” (unknown author).

Bandura (1986) also notes that when learners are faced with challenging situations in their environment they rely on their sense of self-efficacy in order to cope and succeed. Learners feel they have control of their environment when the strength of their self-efficacy can cause change within the environment through effort, perseverance, and intelligent use of resources i.e. text books, peers and teachers (Spruill, 2011). Bandura (1986, 1993) concurs that learners feel more in control when the environment can be modified to supply options and assist in strengthening self-efficacy. Thus schools and communities should strive to provide environments that are most effective at building positive self-efficacy that will influence academic achievement and do not focus on competitive comparisons but emphasise a personal assessment of progress throughout the year (Bandura, 1993; Spruill, 2011).

2.15 Self-Efficacy and Academic Performance

According to the conceptual model of Gillespie, Chaboyer and Walls (2007), self-efficacy is one of the defining attributes of resilience. It may be defined as the belief in one’s abilities to organise and execute the courses of actions required to produce given attainments (Bandura, 1997). Therefore, it is a core component in social cognitive theory and reflects human agency in the triadic reciprocal causality between behaviour, internal personal factors and the external environment (Bandura, 1986). He (2014) suggests that in terms of effect, self-efficacy can influence actions such as how much effort people will expend, how long they will persist in the face of obstacles and aversive experience. Research claims that the stronger the efficacy or mastery expectations, the more active the efforts (Bandura, 1977) and the influence is

conversely true, i.e., people who perform a task well tend to feel more efficacious about continuing similar performance (Schunk & Pajares, 2004).

Literature on the causal contribution of efficacy beliefs reveals that perceived self-efficacy beliefs contribute independently to intellectual performance (Bouffard-Bouchard, Parent, & Larivee, 1991; Collins, 1982) and is a better prediction of intellectual performance than skill alone (Schunk, & Zimmerman, 2007). In the study by Stevens, Olivarez, Lan and Tallent-Runnels (2004) 358 ninth and tenth graders were evaluated on self-efficacy and motivational orientation across Hispanic and Caucasian communities to predict Mathematics achievement and other related variables. Their findings showed that self-efficacy predicted motivational orientation and mathematics performance with a stronger relationship between prior mathematics performance and self-efficacy for the Hispanic learners than for the Caucasian learners. Collins (1982) also found that within levels of mathematical abilities (i.e. low, medium and high) perceived mathematical self-efficacy predicted children's performance and their academic behaviours as well. At each ability level, children with strong self-efficacy performed better than the children at the same ability level who had self-doubt. Pajares and Zeldin (1999) analysed the personal life stories of women with mathematics-related careers and examined the influence of verbal persuasions and invitations on their academic performance. Amongst the three themes that emerged were that self-efficacy beliefs foster resilience to academic and social obstacles (Collins, 1982; He, 2014). Research on learners' academic performance indicate that mathematics self-efficacy predicts learners' mathematics performance both within and across countries (Liu, 2009; Williams & Williams, 2010) and between ethnic groups (Stevens et al., 2004).

2.16 Peers

Peers are a significant factor in learners' academic achievement and persistence (Astin, 1993; Pascarella & Terenzini, 2005). Astin (1993) states that peers provide the greatest influence on the development of learners. Research reveals that when studied in context with parental influence, peer influence has been shown to have more impact than school influence on the persistence of learners (Bank, Slavings & Biddle, 1990; Pascarella & Terenzini, 2005). For example, rejection by peers can lead learners toward unproductive behaviours in the classroom that negatively affect academic achievement (Spruill, 2011). Therefore, learners navigate daily through situations where some peers reject all things academic or specific subjects and other peers value the importance of education (Spruill, 2011). This can have an unsteady effect on social efficacy (Bandura et al., 1996).

Peer influence can be both psychological (individual) and sociological (group). The psychological influence refers to a learner seeking to form an identity through affiliation with those who share similar beliefs (Spruill, 2011). A sociological peer influence suggests that the group has the power to determine who attains membership, and once within that group, personal decisions can be influenced by a need to conform to group norms and values rather than those of the individual (Astin, 1993; Pascarella & Terenzini, 2005). Astin and Panos (1969) observed that peer groups tend to promote homogeneity. Research cautions that although peer influence can positively affect the development of academic skills (Cabrera, Nora, Terenzini, Pascarella & Hagedon, 1999; Whit, Edson, Pascarella, Nora, & Terenzini, 1999), not all interactions and influences by peers have positive outcomes; peers not focused on academic success can prove to be a detriment to the achievement and persistence of a learner (Pascarella & Terenzini, 2005).

Review of literature show that peer relationships are a significant contributor to understanding adolescent development (Brown, Clasen, & Eicher, 1986; O'Brien & Bierman, 1988; Steinberg & Silverberg, 1986). Among the studies finding that learners benefited from being around high-achieving peers are Ammermueller and Pischke (2009); Hoxby (2000); Hoxby and Weingarth (2006), Graham (2008); Groux and Maurm (2006); McEwan (2003); Sacerdote (2001); and Zimmerman (2003). Moreover, a number of learners see some of their peers as role models (Korir & Kipkemboi, 2014). Thus learners whose friends engage in negative activities such as use of drugs, sneaking out of school and being absent from school are likely to have lower academic performance. Korir and Kipkemboi (2014) suggest that learners should be encouraged to choose their friends wisely as some have negative influence on their academic performance, especially those who sneak out of school, use drugs and those who do not attend school regularly. The researcher would like to find out whether Namibian learners assist in terms of peer tutoring, one another in the learning of mathematics.

2.17 Theoretical Framework

2.17.1 The Theory of Resilience

The literature reveals that resilience has become a focus of numerous inquiries aimed at identifying strengths necessary for successfully overcoming adversity (Herrero, 2014). What is more, there exist varied definitions of resilience in the literature. The American Psychological Association (APA, 2010) defines resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats and even significant sources of stress such as family and relationship problems, serious health problems, or workplace and financial stresses. As stated earlier by Masten, Best and Garmezy (1990) resilience can be defined as “the process of capacity for, or outcome of successful adaptation despite challenging or threatening circumstances” (p. 426). Neenan (2009) also describes resilience as “a set of flexible cognitive,

behavioural and emotional responses to acute or chronic adversities which can be unusual or common place” (p.17). Similarly, some authors suggest that resilience is the flexibility in response to changing demands and the ability to bounce back from difficult experiences (Tugade, Fredrickson, & Feldman-Barret, 2004). These definitions are similar to those already given earlier in the study.

Bernard (1996) states that the root of resilience theory can be traced back to psychology studies from about 70-80 years ago. Nevertheless, in the last two or three decades this field has become broader and studies on resilience have been addressed by social workers, sociologists, educators, and policy makers, among others (Smiley, 2011). Resilience theory outlines the interventions, protective mechanisms, and coping strategies employed by individuals to surmount obstacles (Nettles & Pleck, 1993). Academic resilience focuses on the latter two-protective mechanisms and coping strategies (Floyd, 1996). Both high-levels of self-efficacy and positive social identity can be factors (Table 2.1, p. 55) contributing to the academic resilience of learners in mathematics (Floyd, 1996). Resilient learners have been shown to possess high levels of self-perceived ability (efficacy) and to rely on others in their social circles for guidance and support (Wade & Okesola, 2002). Without both strategies (self-efficacy and support), learners and students are less able to employ the coping strategies necessary for resilience. Grotberg (1995) identified three sources that people tend to draw from in order to overcome adversities. These are: I have, I am, and I can. Again Grotberg (1995) argues that, for a child to be resilient, he or she needs to have more than one of these strengths. For example, if a child has plenty of self-esteem (I AM), but lacks anyone whom they can turn to for support (I HAVE), or/and does not have the capacity to solve problems (I CAN), they will not be resilient. This finding is in line with other research showing that resilience is the product of a number of mutually enhancing protective factors. Thus resilience is not a

personality attribute only, but the result of many factors which combine to buffer a child against the potentially harmful effects of adversity.

The present study focuses on the successes of individuals in navigating their environments and available resources to cope successfully with difficult situations rather than focusing only on personal traits. To turn to previous literature, there are both internal and external factors to consider when examining resilience. Grotberg (1995) concurs that learners need to become resilient to overcome the many adversities they face or will face in life but they also need the support of adults who know how to promote resilience. She maintains that parents and other caregivers (in schools and communities at large) promote resilience in learners through their words, actions and the environment they provide. The researcher sought to find out how Namibian parents, caregivers and others promoted resilience in learners who are at risk of school failure.

Resilience theory focuses on groups of people who overcome oppressive challenges and the personal characteristics and resources that facilitate this ability to overcome the negative effects of oppression (Heaton, 2013). In fact, resilience theory emphasises the contextual factors and personal resources that a person or a group uses to overcome ongoing stressors rather than framing the struggle in terms of oppression and resistance to oppression (Heaton, 2013).

Briefly, resilience is a theoretical concept that has evolved as a way to describe and analyse success of people and groups with a broad spectrum of challenges that indicate they should fail (Heaton, 2013). Garza, Reyes and Trueba (2004) state that “resilience is defined as the ability to confront and to resolve problems and the capacity to utilize personal or social resources to enhance limited possibilities” (p. 11). Put simply, resilience offers a new perspective from which to view academic achievement; rather than focusing on the shortcoming of learners who

are at risk of failure, the resilience construct attempts to identify the factors that account for success (Heaton, 2013).

Masten (1994) and Rutter (1987) established that the construct and its theoretical base emerged from work in the field of psychology as researchers attempted to understand why large numbers of people especially children, are able to overcome risk factors that are frequently associated with failure. Resilience theory also has roots in psychological research that focuses on personal, family and community level risks to positive life development (Garmezy et al., 1984; Luthar et al., 2000; Masten & Powell, 2003; Rutter, 1985; Werner & Smith, 1992). However, studies interested in explaining academic success, like the present study, adopt a resilience framework to examine education and identify the factors that seem to contribute to the success of learners who are identified as likely to fail (Alva, 1991; Arellano & Padilla, 1996; Benard, 2004; Bonotao, 2011; Brown et al., 2001; Gonzales & Padilla, 1997; He, 2014; Heaton, 2013; Henderson & Millstein, 2003; Herrero, 2014; Perez et al., 2009). Undoubtedly, overall child development contributes to academic outcomes; in the context of this study, it is the more specific notion of academic resilience that is of special interest i.e. academic resilience in mathematics.

Academic resilience focuses on the way the personal, social and environmental resources blunt the potentially negative effects of stress factors on learners (Heaton, 2013). Werner and Smith (1992) explain that while “resilience is a characteristic that varies from person to person, protective factors or mechanisms are more specific and more narrowly defined” (p. 5). Furthermore, they claim that protective factors only become apparent when a person experiences a stressor and is able to have a positive outcome rather than the negative one that would be predicted by existing risk factors. The criteria of the participants of the present study

are informed by such literature. According to Heaton (2013), “having access to these protective factors and accessing them to avoid a negative outcome while experiencing life stress or ongoing conditions of ‘risk’ is resilience” (p.12).

Research into the nature of resilience identified a number of protective factors, or what Rutter (1987), termed ‘protective’ mechanisms (Garmezy, 1985, 1994; Gore & Echenrode, 1994; Rutter, 1987). These key protective factors are said to be located both externally in the social/environmental life space of the child and internally as personal attributes and qualities of the individual (Oswald, Johnson & Howard, 2003). In view of this, the present study focused on both internal and external factors that make some learners relatively immune to and capable of rising above cruel vicissitudes of their family and other circumstances, while other similarly placed learners are negatively affected by similar conditions.

2.17.2 Metatheory of Resilience and Resiliency

Metatheory of resilience and resiliency provides an asset-based framework to examine strength-based factors of successful Grade 10 learners at risk of school failure (Herrero, 2014). In essence, the metatheory of resilience and resiliency provides a framework for identifying the resilient characteristics of individuals, recognizing the process of acquiring those resilient qualities and discovering the motivational force driving individuals toward self-actualisation (Herrero, 2014). Fundamentally Richardson (2002) explains a metatheory of resilience and resiliency as three waves of resiliency inquiry, research aimed at identifying characteristics of people who overcame adversity. Specifically, the first wave of research focused on “phenomenological descriptions of resilient qualities of individuals and support systems that predict social and personal success” (Richardson, 2002, p.312). These findings include resilient qualities and proactive factors that help people “bounce back” from adversity (Richardson, 2002).

The second wave of resilience studies “was a pursuit to discover the process of attaining the identified resilient qualities” (Richardson, 2002, p. 308). Researchers in general aimed at identifying the process of coping with adversity in a way in which resilient qualities and protective factors are identified and strengthened (Herrero, 2014). Lastly, the third wave of inquiry according to Herrero (2014) was a multidisciplinary approach resulting in the conceptualisation of resilience. More specifically, Richardson (2002) states that individuals have a motivational force that drives them to pursue wisdom, self-actualisation and altruism which identifies this motivational force as innate resilience. The work of Lee, Nam, Kim, Kim, Lee, and Lee, (2013) on a meta-analytic study of resilience, found self-efficacy, positive affect, and self-esteem to be strongly connected with academic resilience.

Grade 10 learners in Namibia are faced with numerous challenges and adversities in their daily lives (Alva, 1991). This implies that resilience is critical for academic success especially for those learners who are at-risk of school failure. Also, school counsellors, teachers and parents can utilise the resilience paradigm as a comprehensive model for developing resilience building strategies and interventions to help at risk learners succeed in school and excel in mathematics (He, 2014). Naturally, resilience research such as this study has become crucial for better understanding of resilient characteristics and the process that enhance resilience in individuals in the Namibian context. Therefore, resilience research is vital in the Namibian adolescent population which is comprised of individuals who are vulnerable and who often participate in high risk behaviours.

2.17.3 The Resilience Framework

This study explored both internal and external factors promoting academic resilience in mathematics amongst Grade 10 learners at risk of school failure. However, effective development of these adolescents is nurtured by a number of complex interconnected aspects within the environment (Bronfenbrenner, 1976). According to Kumpfer (1999), the resilience framework is made up of four major constructs (which are: environmental context, personal environment transactional processes, internal resiliency factors, resiliency processes). These are outlined in Figure 2.2

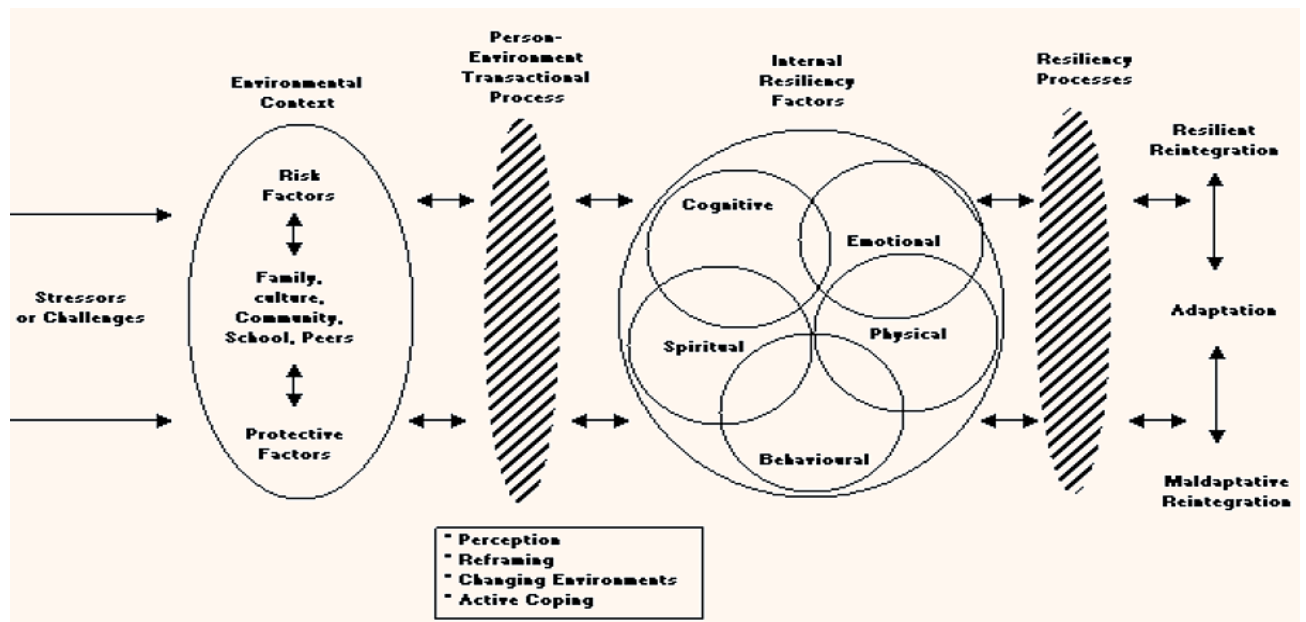


Figure 2.2: Kumpfer's (1999) Resilient Framework adopted from Buthelezi (2007)

Buthelezi (2007) suggests that the resilient framework should be understood as a combination of outcome and process constructs. In particular, this framework incorporates ideas and constructs that have been studied in a number of research studies on resilience (Cicchetti & Garnezy, 1993; Rutter, 1987; Werner & Smith, 1992). Person-environment transactional processes as defined in Kumpfer's (1999) resilient model are critical in understanding resilience. The relationship between external and internal factors will determine the outcome namely, adaptive or maladaptive behaviour of the resilient process (Buthelezi, 2007).

Meanwhile, the external environmental factors involve the family, community, culture, school and peer group. Research reveals that internal resilience is facilitated by environmental factors which integrate spiritual, cognitive, social or behavioural physical and emotional or affective competencies (Kumpfer, 1999; Buthelezi, 2007). All these factors are, therefore, essential for the individual to succeed in different developmental tasks, different cultures and different personal environments (Buthelezi, 2007). Clearly this model highlights the relationships that exist in an ecosystem which makes it nearly impossible to separate the individual from the community of which the individual is a part. There is overwhelming support for this stance in Bronfenbrenner's (1979) work, as he adopted the use of the social ecology model or person-process context models to study the relationship of contextual risk and protective factors as well as intervening processes and individual characteristics. These integrations of all dynamic systems in the functioning of the learner are a critical aspect of resilience (He, 2014).

Given its focus, investigating lived experiences of academically resilient Grade 10 learners, this study adopts different resilience models as a conceptual framework. In the context of this study emphasis is placed on school academic performance in mathematics, hence the resiliency wheel model by Henderson and Milstein (1996) is adopted (see Figure 2.3, p. 87), as it is seen as the most appropriate model because it's main focus is on promoting resilience in the school context (Buthelezi, 2007). The study further adopted a social cognitive perspective because its triadic reciprocal causation best addresses the construct of resilience as a process and the interaction between individuals and the adversities they confront (He, 2014). Finally, to answer the fourth research question of the study, Bronfenbrenner's ecological model was used together with the Sillas Casillas (2008) academic resilience model to develop a model that would promote academic resilience in mathematics, relevant to the Namibian context.

The Resiliency Wheel

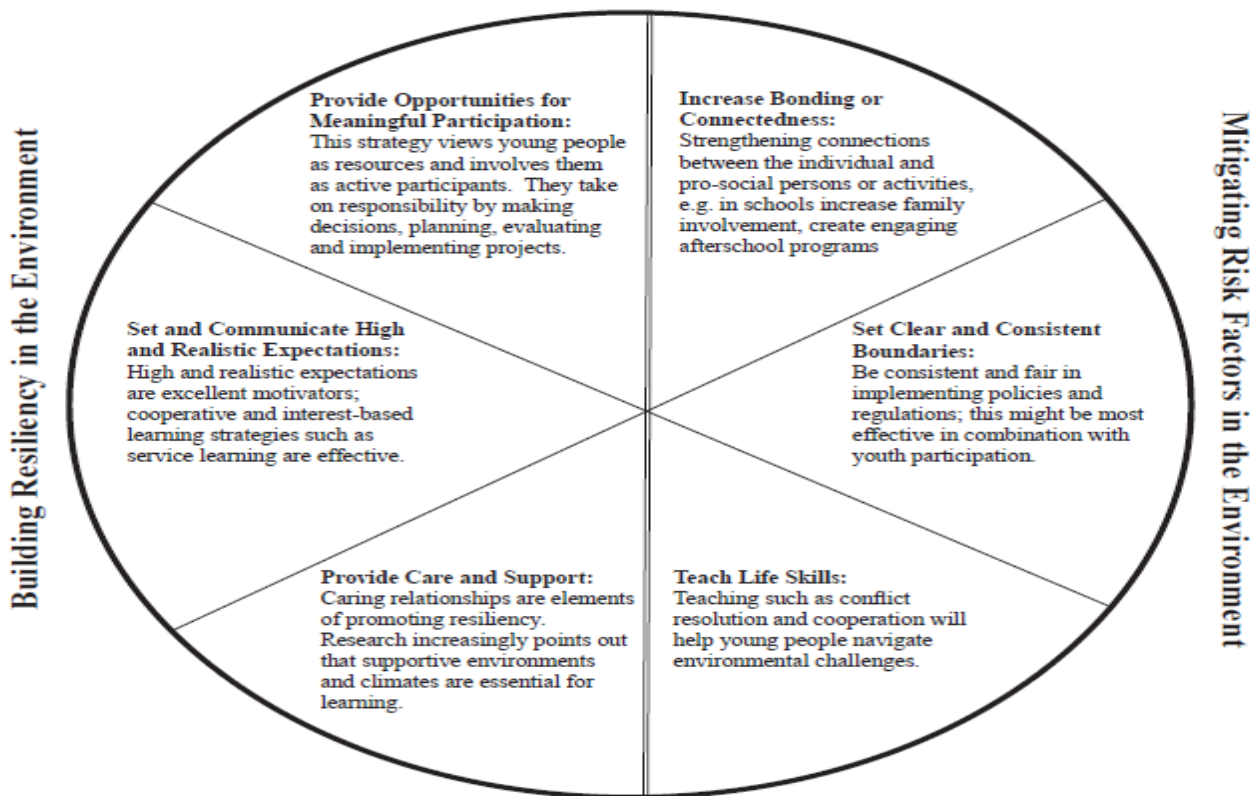


Figure 2.3: Resiliency wheel model adopted from Henderson and Milstein (1996)

The resiliency wheel model developed by Henderson and Milstein (1996) gives a good starting point to analyse possible factors that are interrelated and either enhance or retard resilience in the individual. As Buthelezi (2007) puts it, “resilience does not occur in a vacuum, but certain factors within and outside the individual have to interrelate in a certain manner to create a resilient person” (p. 36). In the same way Kumpher (1999) states that a person is a psychosocial being who interacts with others at a social level, but operates at a psychological level and has physiological aspects that have direct and indirect effects on the individual’s behaviour, Consequently, the school must take into account all these levels that ultimately contribute towards the holistic development of the learner. Buthelezi (2007) also insists that life-skills education is very important and exposure to enriching activities within a conducive environment contributes to learners’ adaptive behaviour.

The resilience wheel model identifies certain aspects of the environment that enhance resilience in an individual. For example, a resilient school is defined as a school that provides a caring and supportive environment where learners feel a sense of belonging and acceptance and their efforts are acknowledged and rewarded. The present study aimed at finding out environmental aspects in the Namibian schools which enhance or retard resilience in mathematics. Simply put, a resilience-promoting school according to Henderson and Milstein (1996) sets and communicates high expectations through positive goals that are obtainable. Literature has further revealed that in such schools, educators show confidence in themselves and in learners to achieve to the best of their ability (Benard, 1997; Buthelezi, 2007). Again, such school environments provide opportunities for meaningful participation where learners believe that they are important and have influence on the decisions being taken, and can make meaningful contribution to the lives of others (Buthelezi, 2007). She concludes that when learners are given opportunities to engage in challenging activities with confidence, these may further nurture their resilience.

While there are positive potential opportunities for growth in the environment, there are also challenges that are potential risk factors. Thus the resiliency wheel model places emphasis on promoting the mitigating factors in the environment that would counteract the risk factors (Buthelezi, 2007). Increasing pro-social bonding is one of the mitigating factors that involve ensuring that there is at least one caring adult in the school to avoid the feeling of isolation (Buthelezi, 2007). That is to say, all educators should strive to provide caring and supportive environments that promote learners' sense of belonging. Authors concur that learners who engage in a number of extra-curricular activities and have more opportunities to interact with other peers, both formally and informally, are most likely to develop positive relations with

their peers at school (Buthelezi, 2007; Nettles et.al, 2000). Such participation creates a fertile ground for the development of positive self-esteem. In addition, the school needs to set clear, consistent boundaries where all stakeholders collaboratively write policies and rules (Benard, 1998). The advantage here is that when learners feel that they have contributed and have a say in policies that govern them, they are more likely to abide by those policies (Henderson & Milstein, 1996). Similarly, Neshila et al. (2015) also argue that inviting learners to help create the classroom rules, curriculum and school policies ensures ownership and a sense of belonging since they are given a voice in the very fabric of classroom life.

Since learners grow through a number of stages of development, each characterised by different challenges it is relevant for on-going research on academic resilience to capture the concept of resilience. Buthelezi (2007) notes that there is a need for ongoing instruction for learners on how to negotiate the different stages successfully as they grow. Schools need to create opportunities for teaching life skills relevant to the different developmental stages and to the cultural and social demands of learners in their school (Bosworth & Earthman, 2002; Thomsen, 2002). According to Buthelezi (2007), “this helps to limit the number of potential problems as adolescents grow into adulthood” (p. 37).

Based on the reviews of resilience and academic resilience literature, a social cognitive perspective was thought to be of relevance to and deemed to be part of the framework of this study because it addresses the construct of resilience as a process and the interaction between individuals and the adversities they confront (Bandura, 1997; He, 2014). In this interdependent causal structure, human agency operates in the form of internal personal factors including cognitive, affective and biological events while the behavioural and environmental events operate as interacting determinants that influence one another bidirectionally (He, 2014).

Bandura (1997, p. 6) explains that “this reciprocity is not equivalent to equal strength between the three sets of interacting determinants, nor do the mutual influences and their reciprocal effects occur simultaneously as a holistic entity.” Therefore, the influence of the determinants is relative and will vary across contexts, whereas the cause-effect sequence implies that there are time lags between such influence and its effect (He, 2014) as illustrated in Figure 2.4. Simply put, the relationship of the determinants of resilience is dependent on the context and time.

The Reciprocal Causation Model

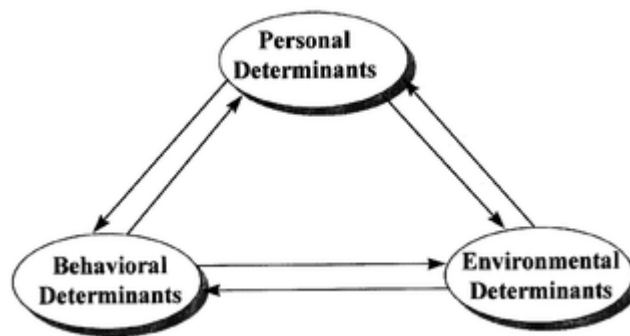


Figure 2. 4: The relationships between behavioural, personal, and environmental determinants of resilience adopted from Bandura (1986)

From the social cognitive perspective, the Grade 10 learners’ socioeconomic status comprises the external environment for them and their academic resilience attributes (i.e. self-efficacy, locus of control, perseverance, etc.) operate as the internal personal factors with the behaviour manifested as their performance in mathematics. According to the social cognitive theory perspective, learners’ low SES exerts influences on both their mathematics performance and resilience attributes. This has been reviewed earlier and it has been shown that learners’ SES has been a persistent predictor of their academic performance and their responses to the adverse environments vary in terms of personal cognitive, affective, and biological factors as well as their manifested mathematics performance (He, 2014). For example, resilient youth have been

reported in a longitudinal study as dramatically different from maladaptive youth in psychological well-being as well as competence (Masten, Hubbard, Gest, Tellegen, Gatmezy, & Ramirez, 1999). Also, He (2014) states that most of the literature on resilience provides evidence that resilient learners are able to achieve better performance than they would have normally done in an adverse context. Similarly the Grade 10 learners' academic resilience and their mathematics performance influence their SES i.e. poor performance in mathematics limits their access to lucrative careers in future, though not necessarily immediately. For example, Schoon, Parsons, and Sacker (2004) found that positive secondary school adjustment is a more important predictor of successful adult adjustment for the socially disadvantaged than for their more privileged peers.

He (2014) cautions that to understand academic resilience as a dynamic and complex process, it is important to notice that the three defining attributes under the triadic reciprocal causality are not static. By examining the Grade 10 learners' academic resilience in mathematics, the current study was intended to explore in terms of cognitive, motivational and behavioural aspects the lived experiences of the lives of learners who are faced with challenging adversities in their lives. In other words; what are the factors that enabled some of the Grade 10 learners to overcome major adversities in their lives such as low socioeconomic status, exposure to violence and yet still achieve success in school subjects such as mathematics?

2.17.4 Bronfenbrenner Ecological Systems Model

On the whole, a child does not grow in a vacuum, but is connected to the people in his/her environment. This implies that the environment in which the child grows and develops is very important and plays a crucial role in his/her life. Cited in Williams (2011), Bronfenbrenner maintains that the child lives through and develops in multiple contexts, each with the potential

to independently, or in interaction with other contexts, influence the ways in which development occurs. To all intents and purposes, homes, neighbourhoods and schools are some of the most important contexts for children. The ecological framework was used to capture the diverse range of influential factors in learners' lives. Furthermore, this model was used to determine the extent to which the home, school, and community climate promote resilience in mathematics amongst at risk Grade 10 learners.

The Silas Casillas (2008) academic resilience model (see figure 2.1) categorises the internal and external factors into four main categories: personal, family, school and community. The personal dimension includes individual characteristics such as effort or motivation. The family dimension includes consistency in parenting, role models, being supportive and available when needed, providing a harmonious living environment, having strong beliefs and standard of behaviour, and celebrating and valuing important life stages, such as birthdays (McCubbin, Thompson, Pirner, & McCubbin, 1988). Whereas the school dimension places emphasis on caring, attentive and stable environments which are success-oriented in their predisposition and which acknowledge achievements including sporting, musical and artistic, as well as academic (Oswald, Johnson, & Howard, 2003), several studies established that communities with well-developed social networks for their learners, and consistent social and cultural norms, foster the development of resilience and academic outcomes (see e.g., Bernard, 1996; Levitt, Guacci-Franco, & Levitt, 1993; Wang, & Kovach, 1996; WestEd, 2000). The researcher wished to find out how the personal, family, school, and community factors experienced by at risk Grade 10 learners may have contributed to their resilience, especially in learning mathematics in the Namibian context by using the resilience model of Silas Casillas.

2.17.4.1 Personal Dimension

This is the most important dimension of the academic resilience model, as it is the only one that is essential for the process of resilience. That is, even if the other three dimensions present favourable conditions, academic resilience would not work without the manifested determination of the individual learner (Sandoval-Hernandez & Cortez, 2012). Furthermore, it explains and sometimes influences the family dimension of resilience. Grotberg (1995) identifies two features of resilience under the personal model as 'I am' and 'I can' respectively. The 'I am' factors are the person's internal, personal strengths such as emotions, attitudes, beliefs, self-confidence and self-determination. The 'I can' factors are associated with the person's social and interpersonal skills (communication and problem-solving skills). That is, people learn these skills by interacting with others and from those who teach or guide them. As shown by Silas Casillas' model of academic resilience, the personal dimension includes individual characteristics such as effort or motivation. This is in support of Gilgun's (1999) stance that human agency and the will to do or become somebody has a major or perhaps a central role in resilience. The current study aimed at gaining an understanding of how at risk Grade 10 learners view academic resilience in mathematics.

2.17.4.2 Family Dimension

According to Solo (1997), families and teachers who have high expectations for learners to succeed in school are not usually disappointed. Furthermore, encouraging learners to work hard contributes to success in school. When families and teachers effectively enable the learner to realise that he/she must struggle to overcome the effects of, for example, poverty and exposure to substance abuse, and crime in their societies, the learner has a better chance of succeeding (Mayberry, 2003). Research by Krovetz (1999) identified three key factors that are needed within the family, school and community to help at risk learners bounce back from their

adversities. These include a caring environment, positive expectations, and participation on behalf of the learners by the family members.

Werner and Smith (1988) and others (e.g. Bernard, 1991; Floyd, 1996; Kozol, 1997) identified a range of important roles the family can play in providing protective assets. Some of these are consistency in parenting, being role models, being supportive and available when needed, providing a harmonious living environment, having strong beliefs and standard of behaviour, and celebrating and valuing important life stages, such as birthdays (McCubbin *et al.*, 1988). The researcher aimed to find out if these factors were relevant in the case of Grade 10 Namibian learners who were at risk of failure but had resilient academic outcomes in mathematics.

2.17.4.3 School Dimension

Collier (1995) notes that the problems experienced by learners at-risk may, in many cases, have their roots in lack of appropriate educational experiences in the early school years. Therefore, the education system has the greatest potential for successful intervention. The resilience theory is based on defining the protective factors within the family, school and community in which the learner functions. Research has proven that not all learners from disadvantaged backgrounds do poorly in school (Sandoval-Hernandez, 2013). In addition, some of them do extremely well; sometimes better than learners who are considered to be from the so called well-off backgrounds which is possible when schools establish enabling environments for at-risk learners.

Teachers have the role of fulfilling the basic needs such as: love, care and a sense of belonging to school for all learners in the learning situation, so that the learners can fully benefit from the educational experiences provided by the school. This would motivate the learners to maximise their efforts towards enjoying learning for the sake of learning (Mayberry, 2003). Studies by

Rutter et al. (1997) and Werner and Smith (1988) recognise the significant contributions made by schools and teachers in offering external protective factors. Such schools are characterised as being caring, attentive and stable environments which are success-oriented in their predisposition and which acknowledge achievements including sport, music and artistic expression, as well as academic pursuits (Oswald et al., 2003). Given this gap in resilience research in the Namibian context, the present study sought to identify school factors experienced by at-risk Grade 10 learners in a way that contributed to their resilience, especially in learning mathematics.

2.17.4.4 Community Dimension

Naturally the community has a role in acting as a source of protective assets, especially for children in disadvantaged areas where pressure from peer groups, and the social milieu in general, may pose potential risk factors (Bernard, 1991). Hence the notion of the school as a fortress against the community should be replaced with that of the school as a bridge into the community (Kozol, 1997). However, this requires strengthening social, health and other community services to provide a strong supportive social framework for fostering resilience. Equally important is the role of peers in providing support, care and attachment needs (Myrick, 1997). Several studies established that communities with well-developed social networks for their learners, and consistent social and cultural norms, do foster the development of resilience and academic outcomes (see e.g., Bernard, 1996; Levitt et al., 1993; Wang, & Kovach, 1996; Wang, et.al, 1994; WestEd, 2000). The question of interest for the researcher of this study was, how did the neighbourhood influence the academic resilience among Namibian Grade 10 learners who were at risk of failure?

2.18 Summary

Despite the vast body of research on resilience, there is little agreement by scholars on a single definition of resilience. In fact, they define the construct of resilience in a multitude of ways (Carle & Cassin, 2004). To exemplify this, Richardson, Neiger, Jensen, and Kumpfer (1990) contended that resilience is “the process of coping with disruptive, stressful, or challenging life events in a way that provides that individual with additional protective and coping skills than prior to the disruption that results from the event” (p. 34). Similarly, Higgins (1994) described resilience as the “process of self-righting or growth” (p.1), while Wolin and Wolin (1993) defined resilience as the “capacity to bounce back, to withstand hardship, and to repair yourself” (p. 5). Werner and Smith (1992) also explained how resilience has come to describe a person who has a good record of positive adaptation in the face of stress or disruptive change. Consequently Werner and Smith (1992) purported that a resilient child is one “who loves well, works well, plays well, and expects well” (p. 192). Gordon and Song (1994) on the other hand, argue that the main difficulty of defining resilience may well lie in the fact that it is not a single construct. Despite differences in terminology, Masten (1994) asserts that resilience must be understood as a process and be viewed as an interplay between certain characteristics of the individual and the broader environment. Clearly the concept of resilience can be variously defined and continues to evolve. Nonetheless, the basic premise of the concept of resilience is far reaching, and its promise as a human behaviour and practice concept has yet to be realised (Unger, 2005).

As evident in the body of resilience literature, resilience is commonly explained and studied in the context of two dimensional constructs concerning the exposure to adversity and the positive adjustment to outcomes of that adversity (Luther & Cicchetti, 2000). While the construct of resilience is examined across various studies and scholarly articles, there is little consensus as to how researchers define adversity, let alone what defines positive adjustment outcomes. With

respect to the school setting, researchers often use school achievement or results from the state's testing as a measure of positive adjustment outcomes (Jew, Green & Kroger, 1999). Masten (1994) further established that resilience refers to (1) people from a high-risk group who have better outcomes than expected; (2) good adaptations despite stressful experiences; and (3) recovery from trauma. Garmezy (1993) asserted that the study of resilience has focused on answering two major questions: (1) what are the characteristics of at-risk children, families, and environments that predispose children to maladjustment following exposure to adversity? (2) What are the characteristics of protective factors that shield children from such maladjustment?

Implicit in the concept of resilience as a dynamic process is the understanding that resilience can grow or decline over time depending on the interactions taking place between an individual and their environment and between risk and protective factors in an individual's life (Borman & Rachuba, 2001; Werner & Smith, 1992). However, there is still no definitive set of factors that constitute risk or protective factors in the resilience literature (Hoge, Austin, & Pollack, 2007). These factors could be any variables shown to increase or decrease the likelihood of a variety of positive or negative outcomes. Risk factors are often defined as environmental factors that originate in childhood and are sometimes the opposites of protective factors (e.g. strong social skills vs poor social skills; secure attachment vs insecure attachment). However, Hoge et al. (2007) stressed that resilience is more than the "flip side" of risk factors (p. 142). As indicated in this literature review, resilience requires continues research as it is dependent on time, context, and the individual being studied. Resilience research has identified a multitude of protective factors, with some of the most prominent being a secure attachment style and a healthy relationship with an adult during childhood, temperament (McAdam-Crisp, 2006) and a sense of coherence (Hart, Wilson, & Hittener, 2006). Because of the various systems involved in determining resilience, Kim-Cohen (2007) argued that it is important to

study resilience at levels ranging from molecular to the behavioural to the cultural; research on all these levels of analysis is needed to increase educators' understanding of resilience.

In conclusion, resilience lies in the eye of the beholder as the various layers and contexts in which resilience is studied are filtered through the lens of the researcher. Thus the attempts to predict and control for resilience are complex because every individual's journey is unique (Unger, 2005). According to Kanevsky, Corke, and Frangkiser (2012) the research suggest that the field of resilience can be expanded if told through the voices of those deemed resilient learners.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the research methods that were used in the study to collect and analyse data. It gives details on the population, sampling procedures and the sample, research instruments and data collection methods as well as a brief description on analysis of data.

3.2 Research Design and Methods

The research design of this study is interpretive by nature and a qualitative method (phenomenology) was used to collect and analyse data. This study is qualitative in the sense that its main goal is to explore the experiences of resilience amongst learners at risk of school failure, it employed the phenomenological methods of creating and analysing data in order to explore this phenomenon of academic resilience. According to Selinger and Shohamy (1989) qualitative research provides descriptions of phenomena that occur naturally, with no intervention of an experiment or treatment. Simply put, this was a phenomenological study aimed at describing the lived experiences of participants (Creswell, 2007). In this case, the researcher's interest was in the lived experiences of Grade 10 learners in Khomas education region who display some degree of academic resilience in mathematics. This description consisted of "what" the learners experience and "how" they experienced it in such a way that it enables them to succeed academically (Moustakas, 1994). Therefore, the researcher's epistemological position with regard to the study is as follows: data are contained within the perspectives of people that experienced academic resilience in Mathematics, thus the researcher engaged with participants in collecting data. The Present study of learners' lived experiences was based on the philosophical assumption that these experiences are conscious ones (Van Manen, 1990) and the development of descriptions of these experiences are not necessarily explanations or analyses (Moustakas, 1994). For the purpose of this study, reality

of an object is only perceived within the meaning of the experience to an individual (Creswell, 2007). Subsequently, the focus of this study was to understand the meaning of resilience as experienced by Grade 10 learners who are considered to be at risk of school failure in mathematics.

3.3 Selection and Background information of Participants

Mixed purposive sampling was used to identify information-rich Grade 10 learners at risk of school failure whose responses would be used to answer the research questions of the study (Patton, 2002). This involves identifying and selecting individuals or groups of individuals who are especially knowledgeable about or experienced with a phenomenon of interest (Cresswell & Plano Clark 2011). In short the focus of the study was on Grade 10 learners identified on the basis of the hardships (low SES) they experienced and their academic achievement in mathematics (A symbol or B) in Junior Secondary Certificate (JSC) national examinations thus criterion sampling was also utilised. According to Creswell (2007), selecting sample participants because they meet the same specific criteria as alluded to earlier in this study, is known as criterion sampling. Furthermore, the research participants were identified with the help of subject teachers, life skills teachers and the regional counsellors. Since the target population was difficult to locate, the sample comprised of learners from the same school since only one school responded to the research request and this symbolises the use of convenience sampling (Patton, 2002). In addition to knowledge and experience, Benard (2004) and Spradley (1979) note the importance of availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner.

As selection criteria, the study participants should have obtained a B grade or better in mathematics in the national Grade 10 formal examinations in 2014 and were considered as at-risk learners (see Table 3.1 below). Since Boyd (2001) regards a sample of two to ten participants as sufficient to reach saturation for a phenomenological study; a sample size of

eight research participants was achieved by asking participants, teachers and counsellors to suggest someone else who achieved symbol B or better in mathematics in Grade 10 national examination and was considered as an at-risk learner.

Pseudonyms	GRADE 10 MATH SYMBOL	LOCATION NAME WHEN IN GRADE 10
David	B	HAVANA
Titus	A	GOREANGAB
Maria	A	GOREANGAB
Aina	A	FREEDOM LAND
Mercia	A	HAKAHANA
Selma	B	HAKAHANA
Lineekela	A	OKURYANGAVA
Jessica	B	GOREANGAB

Table 3.1: Academic Achievement in Mathematics

3.4 Research Instruments and Methods

The selected learners participated in individual unstructured in-depth phenomenological interviews. Open-ended questions (Appendix 1-3) were asked to give participants an opportunity to respond in their own words and express their own personal perspectives (Patton, 2002). The questions were directed to the participant's experiences, feelings, beliefs and convictions about the theme in question (Welman & Kruger, 1999). According to Seidman (1998) the role of human interviewer as an instrument is that it is intelligent, adaptable, flexible, and able to respond to situations with skill, tact, and understanding. Furthermore, this type of interview was appropriate because it was highly focused so that interview time was used efficiently and it facilitated data analysis by making responses easy to find and compare. The

interview contained question items that were mainly focused on what enables the participants to perform academically despite the difficulties they experience in life, which could have negatively affected their learning and hence performance in Mathematics.

The researcher interviewed the selected eight learners individually using a three phase approach (Seidman, 1998). The unstructured open-ended interview in the first phase focused on the context of the participant's experience with resilience. In the second phase the participants were asked to describe details of their lived experiences in the context. In the third phase participants were encouraged to reflect on the meaning of their resilient experiences. Each phase of the interview lasted for at least thirty minutes. The three-phase interview was chosen because it incorporates features that enhance the accomplishment of validity (Seidman, 1998). The process involves a series of interviews to check for internal consistency; by interviewing a number of participants we can connect their experiences and check the comments of one participant against those of another and thus experience the process as a researcher (Seidman, 1998; 2013).

3.5 Data Collection Procedure

This study explored the lived experiences of learners at risk of school failure, who, despite the adverse conditions they live in, still manage to succeed academically in mathematics and hence be considered resilient. A phenomenology approach was used to enable the participants to share their lived experiences in order to better understand how they have developed resilience over time and how this contributed to their academic success in mathematics. According to Groenwald (2004), the phenomenology approach allows for the data to emerge because it involves capturing rich descriptions of phenomena and their settings (Kensit, 2000).

Prior to the collection of data, the researcher had an information session with learners as the research participants to explain the nature of the study. Data were collected and tape recorded; from the learners who had experienced academic resilience in mathematics by means of three phased in-depth interview. In addition to the prepared open-ended questions, the participants were asked two main general questions, namely 1. What have you experienced in terms of academic resilience/achievement in mathematics? And 2. What contexts or situations have typically influenced or affected your experiences of academic achievement in mathematics? According to Creswell (2007), questions of this kind are essential because they focus attention on gathering data that lead to a textural and structural description of the experiences, and ultimately provide an understanding of the common experiences of the participants.

3.6 Pilot Study

Firstly, it should be noted that the term pilot study is used in two different ways in social science. It can refer to so called feasibility studies which are small scale version(s) or trial run(s), done in preparation of the major study (Polit, Beck & Hungler, 2001). In this context, a pilot study refers to pre-testing of the interview guide as a research instrument for ensuring validity and reliability.

Owing to the nature of the research instrument (three-phased interview), the researcher experienced the process herself first by engaging in a practice exercise as suggested by Seidman (2013). The researcher teamed up with a peer and they interviewed one another on their job experiences. The three interview structure was used to get the researcher acquainted with the technique. The first interview focused on how the peer came to get her present job, and to find out as much as possible about the context of her life that led to her present employment status.

In the second interview, the researcher asked her peer to recount as many details as possible of her job experience. In the third interview, the researcher asked her peer what her work or experience as a lecturer means to her. Next the researcher switched roles with her peer to be interviewed in turn. The aim of this exercise was for the researcher to experience interviewing and being interviewed to enhance the researcher's understanding and skills of the research process. It was a challenge to keep the interview appointments and the interviews seemed to go on and on; they were too long.

Following the development of the actual interview guide of the study, it was piloted with four (4) learners from a certain secondary school with similar characteristics as the sample to assess the reliability of the research instrument. Lessons from this site exercise assisted in a few changes to be made to the interview guide such as the re-wording of a few questions that were not clear to the learners and adding probing questions to those that yielded answers that required further explanation. The main advantages of conducting a pilot study is that it provides an advance warning about where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated (Teijlingen & Hundley, 2001). As De Vaus (1993, p. 54) puts it "Do not take the risk. Pilot test first."

3.7 Data Analysis

Phenomenology data analysis involves such processes as coding, categorising and making sense of the essential meanings of the phenomenon (Kleiman, 2004). In analysing the data; the researcher read each interview transcript in its entirety in order to get a global sense of the whole. Next she read the interview transcript a second time - this time more slowly - in order to divide the data into meaningful sections or units. The meaningful sections/units identified as having a similar focus or content were integrated to make sense of them. Followed by

consolidation of transformed meanings into a general description of the experience – this include descriptions of the essential meanings justified by reference to the raw data (Kleiman, 2004).

The researcher used Interpretive Phenomenological Analysis (IPA), which involves pattern recognition, and content analysis to identify core consistencies and meanings (Patton, 2002). Content analysis was also used to capture meaning from the collected data, highlight significant statements, sentences or quotes that provide an understanding of how the participants experience that which makes them academically resilient. As cautioned by Benz and Shapiro (1998) and Kensit (2000), the researcher must allow data to emerge; doing a phenomenology study means capturing rich descriptions of phenomena and their settings. Each audio-recorded interview was transcribed to find meaning. Transcription (Appendix 4-6) was done during the preliminary stage of thematic analysis as recommended by Braun and Clarke (2006). The researcher then returned the interview transcripts to the learners for validation of captured data. Next the researcher developed clusters of meaning from the significant statements into themes which were then used to write a description of what the participants experienced and the context or setting that influenced how they experienced academic resilience in mathematics. Finally the researcher wrote a composite description that presents the meaning of academic resilience and focused on the unique experiences of the participants.

3.8 Research Ethics

After obtaining the ethical clearance certificate from the University of Namibia (UNAM)'s Research and Publications Office, a written letter was sent to the Ministry of Education in order to seek permission to involve school learners in the study. Once permission was granted from the Ministry of Education, an information letter was forwarded to the Director of Education in

the Khomas Region where the study was conducted. The school principal was also given information letters with a copy of the permission from the Director of Education, so that they could also grant the researcher permission to carry out the study at their school.

The research participants were informed about the nature and the purpose of the study before seeking their informed consent to participate in the study. They were informed both verbally and in writing that their participation was voluntary and they had the right to withdraw from the study without any penalty, should they feel unwilling to proceed with the study at any point. In addition, the researcher explained to the participants that the findings of the study would be reported without revealing their identities.

The interviews of this study were audio recorded after school was out so as not to disrupt the school lessons. Before the recordings were made, participants were given an opportunity to agree, in writing, to having their voices recorded for the purpose of this study. Another letter was sent to the parents to ask consent for their children to be part of the study, in the cases of learners under the age of 18 years.

3.9 Summary

In this chapter the methods used to collect and analyse data were described. The population comprised all Grade 10 learners who obtained grade A or B in mathematics national Grade 10 examination in the Khomas Region. Purposive sampling was used to select a sample of eight (8) research participants. Data was collected using a three phased in-depth phenomenological interview. The interviews were audio-recorded, transcribed and analysed to make meaning of the learners' experience of academic resilience in mathematics. The following chapter will present the findings of the study and its interpretation.

CHAPTER 4: FINDINGS AND DISCUSSION OF RESULTS

4.1 Introduction

In this chapter the various data collected about participants' experience of academic resilience in mathematics are presented and discussed as it emerges from 24 in-depth interviews. First of all, the background information of the participants is highlighted. Secondly, some results of participants' lived experience of adverse conditions are presented with a focus on how the individuals have developed resilience in such conditions. Thirdly, the reflections and meaning that the participants attached to their resilient experiences is presented. While providing descriptive accounts of participants' lived experience of resilience, direct quotes from the interviews are shared, in order to make sense of the participants' experience and to create room for multiple interpretations by the reader. The key findings is analysed in this chapter, and final concluding remarks are presented in chapter five. The chapter concludes with a composite description of the essence of the phenomenon of academic resilience in mathematics as suggested by the data.

4.2 Background Information of the Research Participants

Eight school learners, six females and two males, who lived in different home settings but were considered to be resilient, participated in the study. Each participant passed Grade 10 and has a track record of good performance in mathematics, despite the hardships they go through in their lives. The study focuses on at risk learners from poverty stricken families who, according to Borman and Rachuba (2001), may be exposed to greater risks and fewer resilience promoting conditions. These are learners aged 16-17 years, attending government schools and residing in informal settlements (e.g Havanna, Freedomland, and Goreagab) in Windhoek, the capital city

of Namibia, and are excelling in mathematics (see Table 3.1, p. 101). The description of the lived experiences of each of the participants is presented in the sections that follow.

4.2.1 Jessica

Jessica is a girl from a single-parent family consisting of nine siblings living in Goreagab. Born to uneducated parents, she lives with her father and does not have a strong relationship with her mother. Jessica lives in a poverty-stricken neighbourhood in which families operate bars and cuca-shops to make a living. In addition to that, her neighbourhood lacks role models and hence does not influence her learning of mathematics positively. During our talks it became clear that Jessica does not receive any parental support with her mathematics school work. In her words: “My family members are not good in mathematics ... I just study on my own.” Jessica’s early experiences of learning mathematics can best be described as “unfavourable”. According to her, her mathematics teacher at primary school “was strict and did not pay any attention to [her]; in return [she] did not like mathematics”. These results are given weight by Bronfenbrenner’s analysis (in Gershoff & Aber, 2006) that a child lives through and develops in multiple contexts, which influence the ways in which development and learning occur. However, as it becomes clear in her sharing later, the turning point in Jessica’s experience of learning mathematics came in Grade 6, with a new teacher who led her to discover her passion for mathematics even though none of her peers liked mathematics.

4.2.2 David (Da)

David lives with his single mother, in an informal settlement part in Windhoek called Havanna together with his five siblings and cousins. Little was said about his father, as he has no relationship with him as he last saw him when he was 3 years of age. David’s family runs a bar at their house, which makes learning mathematics at home a challenge for him due to the loud music at the bar. His family background with regard to excelling in mathematics can best be described as not inspiring. One family member has failed Grade 12 and another has dropped

out of school at an early age. According to David, his family does not positively influence his performance in mathematics. In his three interviews, he states that teachers help him to excel in mathematics and are his sole support system.

Relying on his teachers' support with learning mathematics is in line with the findings of Grotberg (1995) that emphasise the need to have someone whom the learners can turn to for support. In David's case, his peers do not assist with mathematics schoolwork, as most of them view mathematics as a hard or complex subject matter. By talking to David, it became clear that he has been enjoying mathematics since Grade 3 and he believes that a good grade in mathematics boosts his confidence, as it may mean that he is smart. This is how he puts it: "...I felt proud and very good when I passed math for the first time...I felt that I was the smartest person in class." Desperate for some form of external motivation, David asked his mother to buy him a gift when he passed Grade 10, which he never received despite passing the Grade 10 national examinations. In his words: "my academic performance in mathematics in Grade 10 was excellent."

4.2.3 Mercia (Me)

Mercia is an orphan who first lived with her father since she was very young and now lives with her auntie in Hakahana after her mother's death. She does not know anything about her late mother's educational background but her father reached at least Grade 8 at secondary school and is employed as a general worker. Although Mercia has four (4) siblings, they are so dispersed across Namibia that they rarely meet. In fact she does not know where one of her brothers lives. Mercia did not have a relationship with her late mother and she is not close to her siblings. She maintained that she is still close to her father, despite the fact that they do not meet on a regular basis. Mercia's aunt does not support her learning of Mathematics but instead

abuses her verbally. According to Mercia, self-determination and encouragement helped her not to lose hope and be hurt by the negative words of her aunt. Hence, she keeps her focus on her studies.

According to Wade and Okesola (2002) Mercia's characteristics reveals how resilient learners seem to possess high levels of self-perceived ability (efficacy) and to rely on others in their social circles for guidance and support. This is how Mercia puts it: "... you know, auntie does everything for me that I ask her to do, but there is no love or support..." Mercia describes her home atmosphere as a challenge for her learning of Mathematics given her aunt who constantly scolds her and says negative things, thus she prefer studying mathematics at school rather than at home. Beardslee (1997) termed this kind of behaviour as resistance which is a form of adaptive distancing and refusal to accept negative messages about one's self- as another powerful construct of autonomy. In Mercia's words: "...I always encourage myself at home or wherever to positively take all negative things this person says to strengthen me."

4.2.4 Maria (Ma)

Maria is a cheerful girl to talk to. She lost her mother at a young age of three years. She lives with her father and step mother and her 9 siblings in Goreangab. Her father is not educated, he only went as far as Grade 1 at a primary school. Maria describes a close relationship with both her father and stepmother. She feels that she does not have enough time to do her mathematics activity, because she has to look after her five year old cousin does the household chores and her other school work. As she puts it; "it is not easy but I have to make time for my education and I do not really get enough time." With regard to family support, Maria says her source of encouragement and motivation comes from her elder sister, who reminds her of how good she is in mathematics and that she must maintain her high level of achievement in mathematics.

This result seems to agree with the findings of Smith and Fleming (2006) that both verbal and non-verbal family messages communicate to the child the families' expectations and values regarding the importance of education.

In preparation for her national Grade 10 examinations, Maria was living at Goreangab in a house surrounded by shebeens, and because of this she could not concentrate on her mathematics school work. She describes her street as violent with people often fighting, screaming and throwing stones at one another. This is how she puts it: "these people consume alcohol and get drunk; they cannot even stand on their own feet. There are shebeens everywhere; so they drink and then they start arguments that lead to fights. This happens during the day and evening."

Talking to Maria, it became obvious that during her early learning experience of mathematics she struggled to understand mathematics. Her friends also hated mathematics. However all was not lost because in Grade 5 she started to love mathematics as a subject, and in Grade 10 she developed a greater passion for mathematics. She says, "My Grade 10 mathematics teacher taught me how to love mathematics. From there everything changed and now I am really in love with mathematics."

4.2.5 Lineekela (Li)

Lineekela is a girl with high level of confidence. She was raised by her sister for most of her early years (from a toddler to 16 years old). Although Lineekela has 13 siblings, only four of them live in Windhoek and the rest of them live in the Northern parts of Namibia. According to her, her parents never attended school. Lineekela does not have a close relationship with her parents, but now that her mother has come to live with them in Windhoek, she started developing a relationship with her. She feels that the neighbourhood is not conducive for learning mathematics because it plays loud music and is populated by drunken people who tend

to talk loud. According to her this is not a problem to her learning of mathematics as she can learn equally well in the presence of noise. She emphasised: “there is noise from the jukeboxes and the people drinking [traditionally brewed beer] ... but I can learn mathematics although the area is noisy”, she says. Lineekela’s form of encouragement comes from her sister who reminds her of her present living conditions and that she must work hard for a better future. Her sister reminds her: “you must look where you come from and work hard so that you can have a better future.” This finding agrees with the study by Mayberry (2003) that revealed that when families and teachers effectively enable the learners to realise that they must struggle to overcome the effects of poverty and exposure to substance abuse, and crime in their societies, the learner has a better chance of succeeding.

Lineekela indicated that when she was preparing for the national examinations she felt disturbed by her sister’s little baby who used to cry often. But that did not discourage her from studying; instead she opted to go study outside the house. This is in line with Shannon’s et al. (2007) definition of resilience as the adaptive interactive process between a person and his/her environment.

Lineekela has very few friends and credits her good grades in mathematics to the opportunity she had to explain mathematics to her school friends, a role she also performs for her siblings who do not like mathematics. This finding seems to be agreeing with the study of Myrick (1997) who recognized the importance of the role of peers in providing support, care and attachment needs. Fortunately for Lineekela she has a neighbour who is good in mathematics and she would go to him for assistance with her school work. Her experience of learning mathematics became meaningful to her in Grade 7, as a result of having a good mathematics teacher who explains well and from that day on she started loving mathematics.

4.2.6 Titus (Ti)

Titus is a boy who lost his father at a tender age of two years. He lives with his mother in Goreangab. His mother only completed Grade 12 but never attended any tertiary institution. According to Titus, his mother “is ... not well educated.” She is a domestic worker who comes late from work. In the meantime, he is left to do house chores while his mother is at work. . Although Titus is the only child from his mother, he has 4 siblings from his late father that are not living with them. He recounted that it is not easy for him to learn mathematics at home because they run a small bar with a juke box at home. In fact, there are many bars in the surrounding of his house. As a result of the noise, Titus had to find another place where he can do his mathematics work undisturbed by loud music. This makes it difficult for him to learn mathematics because of the loud music playing till late hours at nearby bars including the one in his house. In addition, his friends are not supportive as they prefer playing soccer to studying mathematics. Hence, school became his fortress.

Titus is grateful for the support he receives in mathematics from his cousin studying at an institution of higher learning. Furthermore, his mother encourages him to perform well in mathematics as it is a key subject to many prosperous study careers. This observation coincides with Grotberg's (1995) suggestion that parents and other care givers (in schools and community at large) promote [or inhibit] resilience in learners through their words, actions and the environment they provide.

Titus always had passion for mathematics since Grade 1 because he likes working with numbers and counting. This result agree with the study by Collier (1995) which observed the problems experienced by learners at-risk may, in many cases, have their roots in failure to provide appropriate educational experiences in the early school years. However, when Titus reached Grades 8 and 9 he was not performing well in mathematics, but that changed in Grade 10 when he got a different mathematics teacher that explained mathematics to him very well.

His good performance in mathematics won him his peers' trust and confidence. "My friends said ... ooh, you are a genius", he says referring to the status connected to excellence in mathematics by his peers.

4.2.7 Aina (Ai)

Aina is a girl living with both her mother and father as well as her little brother in an informal settlement called Freedom Land. Her parents attained secondary education. Aina says that her parents are not good in mathematics and therefore they do not positively influence her achievement in mathematics. Furthermore, she describes her home background as not a learner-friendly one because of "noise and lack of space to study." She is grateful for the school that offers her a chair and a table to learn mathematics and do her school work. Aina stresses that, "...the school has a better atmosphere to study in because it is peaceful, quiet and learner-friendly. It has the great support of a table and chair."

Aina values her good relationship with friends at school because they study together as a group and assist one another with school work. This corresponds to the findings by Grotberg (1995) who observes that learners' social and interpersonal skills (communication and problem solving skills) are learnt by interacting with others and from those who teach them. She describes her friends as learners who like mathematics and are eager to learn. In learning mathematics at primary school Aina felt the subject was fun mainly because her mathematics teacher was passionate about the subject. This is how she puts it: "... he was passionate about the subject and he was always happy whenever he was teaching." In addition to that, Aina acknowledges the hard work of her other two Mathematics teachers who went an extra mile to make them understand by code switching [to her mother tongue] for the benefit of the learners' comprehension of the subject matter.

4.2.8 Selma (Se)

Selma is a girl who lives with both her mother and father. Her parents attained Grade 12. She has a stronger relationship with her father than that with her mother. She says, “I am not really close to my mother”. When I was growing up I was closer to my dad so I don’t really have a strong relationship with my mom.” Selma perceives her father as her role model and he is the one who contributed to her high achievement in mathematics by his mere presence. Studies by Werner and Smith (1988) and others (e.g., Bernard, 1991; Floyd, 1996; Kozol, 1997) identified a range of important roles a family can play in providing protective assets such as consistency in parenting role models, being supportive and available when needed, etc.

Selma feels that poverty has a negative influence on her learning of mathematics because it limits her learning in terms of having space to learn her mathematics activity. Similarly to other participants’ neighbourhood, her house is surrounded by bars that play loud music; creating a noisy atmosphere that is not conducive for learning. She describes her home background: “coming from a poor background, my house is a very tiny house and there is not enough space where you can sit and go through your mathematics. The neighbours have shebeens. I live in an atmosphere where people always make noise and are always loud, it does not just work out.”

Selma explains that she has many friends at school who share the same interests with her and who, like her, have a positive attitude towards learning mathematics. She started performing well in mathematics at Grade 6, when she was placed in a class of learners who excelled in mathematics. She managed to outsmart the entire class once, and from there she strives to achieve more in mathematics. Selma believes that excelling in mathematics is heavily depended on the mathematics teacher, turn-around teachers who bring laughter in a mathematics class and teaches for every learner in the class to understand mathematics. “I think it has to do with who is teaching you mathematics”, narrates Selma.

These brief summaries of the participants' backgrounds are further illuminated by their accounts of their experience of resilience during the three interview phases. The following sections present the three interview phases under relevant themes gleaming from the participants' experiences and representing their characteristics.

4.3 Phase 1: Focused Life History

The main aim of this interview phase (Appendix 1, p. 279) was to encourage the participants to reconstruct their early experiences of learning mathematics in their families, at school, with friends, and in the neighbourhood in order to answer the four research questions of this study regarding the learners' resilient experiences. By so doing, the research participants placed their experience of mathematics resilience in the context of their lives. As suggested by Van Manen (1990) phenomenology, because it is the study of lived experience, is the attempt to enrich lived experience by mining its meaning. Therefore, in the context of this study, the purpose was to mine the meaning of the participants' experience of resilience in mathematics. The following themes emerged from the interview of the participants. The responses were taken from each individual transcript and gathered in excerpts under relevant themes and research questions. The themes that emerged from the participants' interviews are presented in the section that follows. These are: parents' level of education, parent- child relationships, family role models in mathematics, parent/family support, home influences on learning mathematics, neighbourhood influence on learning mathematics, peer relations, experiences of learning mathematics, and attitude towards mathematics learning.

Theme 1.1: Parents' Level of Education

The first items in phase 1 of the interview focused on the parents' level of education and hence their ability to assist their children with mathematics school work. Excerpt 1.1 below

summarises the parents' level of education as indicated by each participant in their individual interviews¹.

R:	What level of Education do your parents have?
Je:	My dad stopped in Grade 3.
Da:	My mother ended in Grade 10, she failed Grade 10.
Me:	And my dad only went until Grade 8.
Ma:	My dad only went to school till Grade 1.
Li:	My parents did not go to school...
Ti:	Mother went up to Grade 12; she is educated but not well educated
Se:	My parents ...they did not go to tertiary education institutions, they only ended in high school.
Ai:	My mom ended in Grade 10 and my dad in Grade 12.

Excerpt 1. 1: Parents' Level of Education

The findings in the excerpt show that for many of the research participants, their parents were not well educated and their education attainment ranges from not attending school at all to Grade 12; and consequently this might place learners at risk of school failure because their parents are unable to assist them with learning mathematics. These results are in line with Schoon et al. (2004) findings that socioeconomic adversity is a significant risk factor for educational failure as it influences consequent adjustment in work and health related outcomes. In most cases parents reached primary school level and only a few made it to secondary school, but none have attended tertiary institutions such as college or university. Consequently these parents were unable to provide support to their children with regard to learning of mathematics. In a nutshell, low parental education emerged as a psychosocial stressor which presented a significant challenge to the learners (Perez et al., 2009).

¹ In reference to transcript excerpts, R is used to indicate the researcher's question and the interviewee's first two letters of their pseudonyms is used to indicate their responses.

Theme 1.2: Parent-child Relationships

R: How is your relationship with your parents?

Je: My mother and I are really not that close because she is married and lives with her husband and I live with my dad. My relationship with my dad is okay and we are close.

Da: It is a very good relationship.

Me: I do not live with my dad because he lives somewhere else. I live with my aunt. However, I am very close to him, although we do not meet very often

Ma: My relationship with both parents is good; but I am closer to my dad more-than to my step mother.

Li: She [mother] is here now so yeah, we are close.

Ti: My mother is very good, so we get along very well.

Ai: I am closer to both my parents.

Excerpt 1. 2 : Parent-child Relationships

Excerpt 1.2 above, shows that five of the eight participants have good relationships with their mothers and three participants reported good relationships with both parents. Thus findings revealed that participants have positive relationships with caring adults, which are considered as potential promotive and protective factors of resilience in children and youth (Masten & Obradovic, 2006). These results show that most of the participants had healthy relationships with a parent or/and other family members. Resnick, et al. (1997) and Wehlage et al. (1989) are not alone in adopting the view that learners who express strong social bonds with adults, and peers, prove less likely to disengage from school and more likely to participate in the life of the school and achieve. As highlighted in the previous sections, many of the participants are orphans or vulnerable children and may therefore refer to relationships with only one parent.

Theme 1.3: Family Role Models in Mathematics

The following excerpt, Excerpt 1.3 provides information on the participants' family record with regard to learning mathematics.

R:	Do you have members in the family who are very good in mathematics?
Je:	My family members are not really good in mathematics, thus for me I just study on my own.
Da:	I do not think so, in our house, it is only me and my sister who went up to Grade 11 and the others are: one failed Grade 12, one is in Grade 7 and the others are just between Grade 2 and 3. One elder sibling dropped out of school long time ago. My mother went as far as Grade 10 and she failed it.
Ma:	My elder sister, motivates me, she tells me to keep on going because she is very smart but not that good in mathematics.
Li:	I have two step-sisters; they are good in mathematics. I do not live with them; but sometimes I seek help from them.
Ti:	Yes, I have a cousin at Namibian University of Science and Technology (NUST) in second year who assists me in mathematics. Furthermore my mother encourages me to do well in mathematics.
Se:	I think my father was really good at mathematics.

Excerpt 1. 3: Family Role Models in Mathematics

These results show that more than half of the participants they did not have relatives who are good in mathematics. For example Jessica had to study on her own since her family members were not good in mathematics. In fact some participants stated that they lived with a parent who failed Grade 10 or a sibling who failed Grade 12 or even family members who dropped out of school. This lack of family role models in mathematics was yet another challenge these learners had to overcome in order to perform well in mathematics. On the other hand, it is worth noting that some participants, as was the case for Titus and Selma, recounted that they had at least a cousin or a sibling who was good in mathematics. Thus family role models play an important role in providing protective assets for resilient youth (Werner & Smith, 1988).

Theme 1.4: Parental/Family Support

Findings presented in Excerpt 1.4 below give details of the participants' experiences with regard to parental/family support with mathematics school work or lack thereof.

<p>R: How did your family influence your achievement in mathematics?</p> <p>Je: My family members are not good in maths, as for me I just study on my own.</p> <p>Da: None, but just by myself.</p> <p>Me: I do not get any parental support with my learning.</p> <p>Ma: My father motivates me well, he is a religious man and he tells me to always pray. When I do not understand something, I ask God for help.</p> <p>Li: My sister encourages me. She always reminds me to think about where I come from and work hard for better future. I have two step – sisters, who are also good in mathematics.</p> <p>Ti: I have a cousin studying at NUST who assists me in mathematics. My mother encourages me to do well in mathematics.</p> <p>Ai: They are not really good in Math, so they did not influence me.</p> <p>Se: Okay, I will say that one of the very people who contributed to my achievement was my dad, I look up to my dad and because of that I always aim to make him proud. He is always there for every step I take. As I said before, I am not really closer to my siblings and the entire family. The only person who was basically good at mathematics was my dad.</p>

Excerpt 1. 4: Parental/Family Support

Evidently many of the participants recounted that they did not receive parental/family support with their mathematics activity. In fact more than half of the participants maintain that their parents/family did not influence their learning of mathematics positively. For a few of the participants who received parental support, it was in the form of words of encouragement but not assistance with academic work. Resilient learners often lack parents who possess the necessary academic knowledge to directly assist and support them; resilient learners often have to depend on teachers and peers to play this essential role (Crosnoe & Elder, 2004; Sanchez, Reyes, & Singh, 2006). However, even given this reality, Mercia's complete lack of connection

and support with regard to her family is rare. This evidence shows autonomy as defined by Berlin and Davis (as cited in Benard, 1993) –as the ability to separate oneself from a dysfunctional family environment.

Theme 1.5: Home Influence on Learning Mathematics

Excerpt 1.5 gives a brief summary on the atmosphere in which the participant is/was learning their mathematics. The stressors/challenges experienced by participants are presented in this excerpt.

R: What is/was the atmosphere at home regarding learning mathematics? Is/was it easy for you to study mathematics?

Je: Well, at home it's not really easy to do homework especially in the afternoon because it's always noisy. Around 2h00 o'clock mid-night that is the time I study I also go study at the library.

Da: Maybe in the night when people are asleep, it's okay. During the day people are just walking around, drinking and playing music (jukebox), there is a bar in our house.

Me: at home, I live with my aunt who always look for something to scold me about. Every time my aunt says something offensive to me. Last year, if I studied while her daughter did not, she would go on like: "why are you the only one studying?" She also had a problem with me going to school if her daughter was not going to school. So I always encouraged myself at home [so that] I take positively whatever negative things this person says. I took it as a way to strengthen myself in life. I took negative things positively. However, my dad was not really involved.

Ma: It is not really easy but I have to make time for my education. During the day, I usually come back from school around four o'clock. It takes me about an hour to get home, which would be 5 o'clock, from there I look after my little cousin, I cook, and I bath before I relax. In addition, I clean the house and do the household chores. The time I get to study or to do my mathematics is in the evening.

Li: When my sister was around with her baby, I used to go study and do my mathematics outside because the baby cried a lot.

Ti: It is not easy for me to learn mathematics at home because we have a lot of bars next to our house and in our house we also have little business. We have a jukebox, so I cannot study very well in the house.

Ai: My home background is not one of those that one would dream of. In fact, one can say that it is not a learner friendly environment. I have to learn mathematics in an environment known for its noise and lack of space to study. However, with the school circumstances it is a better sphere to study. It is peaceful, quiet and study friendly. There is great support with tables and chairs which made it even more study friendly. At school, there is always somebody to help you with learning your mathematics.

Excerpt 1. 5: Home Influences on Learning Mathematics

As can be seen in the excerpt above, most of the participants' learning mathematics was a challenge, given the loud music and noise which was reported as a constant disturber in their

home environment emanating from the surrounding bars. Again, lack of space to learn mathematics at home was also a challenge to some of the participants. For one respondent, a family member scolds her when studying and demotivates her with negative comments. However, Me has learnt to overlook all the negative factors and focus on her school work. Worth noting here is that participants had to cope with multi-tasking between their school work and house chores; engage in decision making, exercise self-control and prudence in their determination to excel in mathematics.

One participant recounted that doing mathematics work at school was best because at school there was support in terms of a chair and table and peers that can help with their mathematics work, unlike at home where they do not receive learning support. It is therefore profound that Ai found support for resilience in chairs and tables that other learners takes for granted.

Theme 1.6: Neighbourhood Influence on Learning Mathematics

The following excerpt, Excerpt 1.6, describes the neighbourhood influence on learning mathematics for each individual participant.

R: How did your neighbourhood influence, if in any way, your learning of mathematics?

Je: My neighbourhood do[es] not influence me. They just cannot hold [accept] it that it is only my family members that do something in school, while the kids in the neighbourhood have dropped out of school and some fall pregnant.

Da: They did not influence me, just my teachers.

Me: My environment is actually not bad, it is very quiet.

Ma: Our house is surrounded by sheebens, on both sides. There is noise everywhere. There are small kids in the house [to the extent that] you cannot really concentrate on what you are doing. They [children] scream and jump on top of you. My neighbourhood, no, no, no. There are fights in the street. People throw each other with stones, and break bottles in the street. We witness fights in front of our house. These people consume alcohol and get very drunk. Sometimes they cannot even stand on their feet. There are shebeens everywhere. They drink and start arguments which lead to fights. This happens most of the time.

Li: The area is too noisy because of the jukeboxes, but that does not stop me from studying mathematics.

Ti: My community makes it difficult for me to learn Mathematics. When we wrote the final exam, it was towards the end of the month, so a lot of people were in the bars drinking and playing jukebox (loud music). I could not concentrate. When I tried to study after school, my friends used to come and get me to go play soccer. It was tough for me to study at home.

Ai: I find it hard to learn at home because there is always disturbance(s). When I need help, there is nobody that can assist me. I prefer to stay at school to study, because there is either a teacher or a friend to assist me.

Se: We have shebeens, and noisy atmospheres. People are always loud. It just does not work out.

Excerpt 1. 6: Neighbourhood Influence on Learning Mathematics

These data indicate that some of the participants felt that their neighbourhoods were not favourable to learning mathematics as violence and alcohol abuse were the order of the day on

their streets. For one participant (Maria) the home atmosphere and the neighbourhood presented a context which is hostile, dangerous, destructive, a hive of hopelessness, unfriendly, congested and suffocating in which she had to learn mathematics. Thus a participant like Maria (Ma), relied on her self-control and high-self-esteem and chose not to drink and succumb to adversity and hardships while others give in and go along with everybody. An important message to note here is that, exposure to violence has a significant impact on the learners' academic performance in mathematics (Banatao, 2011). Simply put, their neighbourhood failed to provide role models for some of the participants. In the face of these challenges participants recounted how they had to rely on their problem solving and coping skills to ensure good academic performance in mathematics. In addition some of the learners opted to learn mathematics at school after school hours, or use the community library. However, some of the participants adapted their study time to early morning hours when bars are closed and the noise has settled down to do their mathematics school work.

Theme 1.7 Peer Relations

The following excerpt, Excerpt 1.7 outlines the peer relations of the participants.

Excerpt 1. 7: Peer Relations

R: **How would you describe your relationship with your peers at home and at school?**

Je: My relationship with my friends at home is okay because we encourage each other to study. We wake each other early mid-night just to study. We go to the library and ask each other questions. Here at school we encourage each other to study and stay after school. We help each other where we don't understand. Sometimes we agree to remain after school but at the end one would say I feel sleepy while others would say I am going to watch this soapy. Most of the times I end up staying alone at school to study.

Da: I think there is one, he is not really a neighbour but lives a bit far. He failed Grade12 and now he is doing NAMCOL. Whenever I have a problem, I go to him. He assists where he can. We [friends] do not really help each other at school. We just laugh together, joke and tease each other.

Me: I actually do not have friends at home. My friends are really people who like school. They are actually people who are determined, committed and make sure they pass. I have good friends. I have one friend who does not really like math but she is determined and works hard.

Ma: At home I do not really have friends because I just stay in the house. At school, I have good relationship with friends. I have very close friends who are not trouble makers. Most of my friends hate mathematics. I am the only one who like mathematics.

Li: At home I do not really have friends. There is few of them who are in the lower grades. At school I have my friends and we use to do math together. I help them a lot and that is why I became their friend. That is also why I perform well.

Ti: My relationship with friends at home is good, only that we just want to play, go to the swimming pool and not to study together. But at school, it is good because we play soccer at the field, tease each other and laugh together. However, there is a time we encourage each other to study and help one another. My relationship with friends at school is better than at home.

Ai: I do have friends at home but we are not very close friends. We always study when we feel like studying. We also help each other when we do not understand something.

Se: Okay, growing up as a child I never liked street friends because I felt that they had this tendency of sitting by the road which was just not my thing. I do not have friends at home. I do not socialize with anybody in my neighbourhood like friends... my close friends are from school. Our relationship is very strong. When I have a problem, in fact, I always approach my best friends. They are two and are both in Grade 11. We achieved the same grade in Grade 10 and we are all part of the Learners Representative Council (LRC).

Results seem to indicate that some of the resilient learners have good relationships with friends at home and at school. They tend to value friends at school more than the ones at home. At least two participants have indicated that they had no friends in the neighbourhood. Another way of viewing this evidence is that for school aged children, appropriate indicators of resilience would be academic success and positive relationships with peers and adults (Masten et al., 1995). For some participants, friends are chosen carefully and should have same interests and a positive attitude towards learning of mathematics. For example, Mercia (Me) recounted that she is self-disciplined and therefore chose friends that are disciplined and hard working in school work. This is deemed important because peers provide the greatest influence on the development of learners' academic achievement and persistence (Austin, 1993). However, some of the friends did not like mathematics, but there were those who teamed up and assisted one another with learning mathematics. The support that many of these participants could not get from their parents was now provided by their peers. As such, these learners had to navigate daily through situations where some peers reject all things academic or specific subjects, in this case mathematics that they value as important to their education (Spruill, 2011).

Theme 1.8: Experiences of Learning Mathematics

The following excerpts (Excerpt 1.8.1- Excerpt 1.8.4) presents the participants' experiences of learning mathematics under four subthemes i.e. early experience of learning mathematics, highlights of performance in mathematics at primary school, influence of primary performance in mathematics on secondary school performance in mathematics, and first excellent performance in mathematics:

Subtheme 1.8.1: Early Experience of Learning Mathematics

In Excerpt 1.8.1 the participants' early learning experiences of mathematics specifically at primary school are presented.

R: How did you experience learning mathematics in the beginning and how did this change over time?

Je: Well, for me at first I did not like maths. I am a type of person who need attention from the teacher in order to pass a subject. At first, our teacher was very strict at primary so I did not like maths. I did not like numbers or even studying maths. But when we got a new teacher, she paid much attention to me in the class. All the praising I got made me love math. Now I love math, although I did not like it at the beginning.

Ai: I found it fun at primary (school) because we had an excellent teacher. He used to explain well to make us understand how to deal with equations. He had the passion of teaching and was passionate about the subject. He was always happy with whenever he was teaching.

Da: At primary school during that time, when you know maths you were the smartest in the class. I always wanted to be in the smart people's group. When I studied maths I just felt good. There is no improvement in mathematics performance at secondary school; I think I went down, because in high school you meet different kinds of friends, who like joking, playing around and playing soccer. Maybe if you get time to study these days is when you are writing a test and when you are writing exam that is all now, that's why my marks went down a bit.

Ma: The time I was in Grade 1, I really had difficulties, I did not know and understand the signs because to me they looked alike. Signs such as division and minus, they looked alike. Whereas the multiplication and plus sign they looked alike. I used to write them the same way. From Grade 5 on ward, I loved mathematics because I had a good math teachers, who helped me to understand. I loved the subject, until Grade 8 and Grade 9. When I came to high school, I hated the subject because I felt that the teacher did not introduce topics such as algebra, properly. I hated mathematics until Grade 10. When we got another teacher who taught me how to love mathematics, everything changed. Now I am really, really in love with mathematics. [How did this change come about?] I really don't know. I just paid attention, paid more attention to the subject. . . ., because I knew that this is the only subject that can make me different from the rest [of the learners]. All the other learners were performing well except in mathematics, so I decided okay, I should pay attention to this subject because it will make me look different from the rest. If I am good in mathematics then I will be like at the top of my class even if I am not really good in the rest of the subjects. According to my experience, a good mathematics teacher is the one that knows how to take the maths in the text book compares it to real life experiences like what my teacher does.

Me: I think in Grade 6, I remember, before Grade 6, if our teacher gives us a test, I would mostly fail or get 60%. My aim was to get an A. But I never got it. Until the day I came in Grade 6, I remember, we failed, I failed my math test and we were beaten that day in the class you know I cried. From that day, he beat those who failed. The following test we wrote, I did better and the teacher congratulated me. Ever since that day, I have been doing well in math you know. In Grade 8, my passion was math and accounting compared to the other subjects.

Excerpt 1.8. 1: Early Experience of Learning Mathematics

Evidently from Excerpt 1.8.1 above, the journey of learning mathematics varied from one participant to another, some felt learning mathematics at primary school was fun but others had challenges in learning mathematics. For example, Je did not like mathematics because she had a strict teacher, but things turned around with a new teacher who gave her attention and praised her efforts in studying mathematics. Likewise, Ma had specific learning difficulty in mathematics. She struggled to differentiate between the four basic operation signs. However, owing to the efforts of a good teacher in Grade 5, she learnt to love mathematics.

For the participants who had positive early learning experiences with mathematics such as Ai and Da, they credited their achievements to good teachers who were passionate about teaching mathematics, good listeners and teachers who were able to relate the subject content to learners' everyday life experiences. These results are given weight by Wright (2013), who explained that instructions are relevant when presented in meaningful chunks, and relate to real-world situations, while prompting reasoning and joyful learning. For one participant Me, she managed to turn failure into passion for mathematics via unconventional means. She explained that her teacher applied corporal punishment because she had failed a mathematics test. However, she studied hard for the next test to avoid punishment and was praised by the teacher for her great achievement. Henceforth, she became passionate about mathematics. Teachers' attributes such as attentiveness to learners' learning needs and encouragement impacted positively on learners' participation and performance in mathematics at primary school. In addition, the mode of teaching and corporal punishment help boost learners' performance in mathematics.

Subtheme 1.8.2: Highlights of Performance in Mathematics at Primary School

The following Excerpt 1.8.2 described the participants' turning point in learning mathematics. [Link to research question.](#)

R: At what point did you start performing well in mathematics? How did that happen?

Ai: At primary when I was in grades 5-7 and then I kind of dropped when I came to high school. In grade 10, I became the best. I used to do a lot of practicals and whenever the teacher was teaching, I always focused on what he was teaching, for me to understand.

Da: Grade 3, because I just decided to work harder. I always wanted to be in the smart people's group, thus I started performing well in Math.

Li: Grade 7, I used to have a good teacher who explained well and I used to go ask other people for help. I am a person who likes asking so I go to people and I ask for help.

Se: I started being really good in math when I was in Grade 6. I was in a class of so many learners who were good in math. I was the shy type who never wanted to answer math questions in class. I just kept it to myself until when I got to Grade 6 that is when I realized, I am actually good at math. Although, there were so many people good in math in my class I still managed to stand out.

Excerpt 1.8. 2: Highlights of Performance in Mathematics at Primary School

Results presented in Excerpt 1.8.2 indicate that participants started performing well in mathematics at primary school which was possible through hard work and teachers' efforts. For example, Ai reported that she performed well in mathematics at primary school because she worked hard and did regular practice on mathematics school work coupled with focused attention during mathematics lessons. In the case of Da, he started performing well in mathematics as early as Grade 3 by being self-determined to study hard his mathematics. On the one hand, Li's performance came about because she had a good mathematics teacher who could explain the subject well. She also relied on her ability to seek help with learning mathematics. On the other hand, one participant Se, recounted that due to low self-esteem she did not participate in mathematics lessons. However, in Grade 6 she was assured of her mathematics capabilities when she outperformed her peers who were perceived as good performers in mathematics. To sum up participants achieved good grades in mathematics

through hard work, being in possession of a high self-esteem, seeking for learning support and being self-determined to succeed in mathematics and relying on good mathematics teachers.

Subtheme 1.8.3: Influence of Primary Performance in Mathematics on Secondary School Performance in Mathematics

Excerpt 1.8.3 captured the participants' performance in mathematics at primary school and their views on how it influenced their performance in mathematics at secondary school.

R: What were your experiences as a young child learning mathematics? How did that experience influence your performance at secondary?

Ti: Since Grade 1, I have been good in Mathematics. The teacher that I had in Grade 1, was good. She taught me very well, so it influenced my other Grades very well, because you know, Math comes from level to level, so whenever I go to the next level, whenever I see something at another level I already start imagining how to solve it. So, that influenced me very well. I already knew how to do such things, you know they are similar concepts only different levels.

Ma: I think my experience at primary school really did not change anything because when I came to secondary school, everything was different. At primary school I used to love mathematics, when I came to secondary school, in Grade 8, and Grade 9, I started hating the subject. I did not understand the new concepts which were very confusing, so my experience I left it behind and then I moved on to something new.

Me: Yeah, actually when I came to Grade 7, my math teacher was different. He was a teacher who teaches you to know something. He really gave me the appetite for learning mathematics and [got] me that interest in math. He was a person who was willing to help anyone. He gave me the passion of loving math, because math was not my thing at all. When I was at high school, our math teacher was not really good. But you know, my primary teacher taught me maths. He made math interesting and when I came to high school, I did not give up on that. Even though he was not a good teacher, I tried by all means to study by my own. I was not willing to fail math, for anything.

Je: Well, as for me I think they complement each other because what we're doing at [school] is just a continuation. Sometimes, if you did not pay attention to what you were being taught at primary school, it can be difficult for you to master it at high school. The two are building on each other.

Da: When I came to high school, I forgot everything about [things I learnt at] primary [school]. I thought about Math because I am good at it. I concentrated more on it compared to other subjects although I also concentrated on them. I concentrated most in Maths.

Excerpt 1.8. 3: Influence of Primary Performance in Mathematics on Secondary School Performance in Mathematics

Findings presented in Excerpt 1.8.3 above show that participants' experience of learning mathematics at a young age varied from good experiences that cultivated love for learning mathematics to teachers' use of appropriate teaching methods. For example Ti and Me had good experiences of learning mathematics at primary school. In fact Me reported that her

mathematics teacher taught with emphasis on understanding the subject content and as a result it increased her “appetite” or desire and interest for learning, mathematics.

Furthermore, results indicate that Ma, was not helped by the teachers to make a connection between mathematics concepts at different levels of her schooling. As a result, Ma hated mathematics because the teacher failed to make her understand the subject. She felt that her experience of learning mathematics in past grades was left behind and she had to move on. But Ti and Je were able to make connections between concepts at different levels that Ma could not make. Consequently Ti and Je felt that their experiences of learning mathematics in past grades had positively influenced their learning of mathematics in higher grades at secondary school. For example Me recounted that she relied on her early experience of learning mathematics and her love for mathematics when she had a bad mathematics teacher at secondary school. She was so determined to continue her good performance in mathematics: She stressed: *“I was not willing to fail maths, for any [reason] [Mercia, Interview 27 April 2015].* Clearly schools that serve children of poverty do introduce risk factors by failing to provide a supportive school climate or by delivering inadequate educational resources (Borman & Rachuba, 2001). Furthermore teacher’s attitude towards the learners and the learners’ performance in the subject greatly influences their academic resilience. Owing to great teachers and personal attributes such as perseverance and determination, two participants learned to love mathematics again.

Subtheme 1.8.4: First Excellent Performance in Mathematics:

Participants’ first excellent performance in mathematics are described in Excerpt 1.8.4

R: Can you describe the moment when you first academically excelled in mathematics?

Se: I think that was when I got to high school in Grade 8 that is when I realised that I am good at mathematics. In Grade 8, I got an award, a mathematics award. My school gave only awards to learners that had achieved an A in a subject. So, when I was in Grade 8, I got a certificate with an A in mathematics. It was an amazing moment because you know, usually you would find that in primary school it wasn't always you to get that special award, but when you finally get it, you feel "yes" I have finally achieved a certain grade in a subject that I love doing.

Ma: When I realized that I was becoming better at mathematics, I boasted to my friends and showed them: "look I got this", "look at my report", "look at this" "I got an A, what do you think"? I jumped around, went to the teachers, and told them "Miss I got an A". I went to my parents, my aunt and everyone until they knew I got an A in mathematics. I was so happy. Last year when I got 91% in mathematics, there I realized that, no this is what I want to be getting for the rest of my life. "This is what I want; this is all I want" so I must just keep it up. I was good, and this is what I like because I am very competitive. I like to be at the top, so if I cannot be at the top in the rest of the subjects, this mathematics is where my future lies. This is what I want.

Ti: I felt very good, because all the tests we wrote [in Grade 10] during the first term I got either excellent (100%) or I lost just 1 mark. My friends said "oohh! You are a genius" which made me feel also good.

Li: In Grade 8, I got 97% in math and I was very happy. I was very happy and excited. Firstly, the day I got my report I told my friends and then I went home and I told my sister. After few minutes I called my mother.

Da: I felt proud when I passed Math for the first time in Grade 3, I felt very good; I felt like tah! I am the smartest person in class. We were given a test out of 20 and then all those people who got 18 out of 20 and went to another table and then those with 17 down to 12 went to another table and 11 downwards to another table. When you are at the table were people got the lowest, you don't feel good. When you pass tests and you are at the smart peoples' table you feel

Excerpt 1.8. 4: First Excellent Performance in Mathematics

Evidently from data presented in Excerpt 1.8.4, the participants loved and value their good academic performance in mathematics. Again positive attitude was also mentioned as a facilitator towards excelling in mathematics. For many of these learners, mathematics was their favourite subject. In addition, to that the majority of the participants described how they got excited when they first excelled in mathematics work and maintained that solving mathematical

problems is rewarding and gives you a higher status above your peers. For example Ma, Da, and Ti felt very proud of their high achievement in mathematics because it won them their peers' approval. Similar to the finding of He's (2014) study, high levels of self-efficacy and coping skills has greatly influenced learners' performance in mathematics.

Theme 1.9: Attitude towards Mathematics Learning

Excerpt 1.9 below gives details of the participants' experiences when working on mathematical problems or attending mathematics class.

R: What is it like for you to go to class and to do mathematics school work?

Da: I am not like those other people who, when they are given homework about mathematics they get worried about how to go about the mathematics works. I always feel like if you are given a question, there always must be an answer to that question. The teacher cannot give you a question that cannot be answered. I always feel that there is a [solution] to any problem in Math, so I just work out until when I see the final answer. I try to get help if it's not the final answer. I just say "don't tell me the answer; I will go work it out again until I get it". If I don't get it then I just go get my correction the following day.

Li: I was always happy. I always used to be the first one [to get in a math classroom] and then I take out my books.

Ma: To me, my maths classes are the most exciting ones, because in Grade 11 we are learning new stuff. I am finding it very interesting, the way we are solving the equations and new stuff, these algebra things, it's just, and for me it's very... I just want to learn new things because I want to keep on learning. I don't want to limit my knowledge. I want to learn. But there are some days that I do not feel like going to the maths class. It makes me feel bad as I would be the only one that is happy in the whole class. Most of the people are not happy like me, so you would wish they would feel the way I feel, but no!

Se: It depends on how the day was, for example, if you had a long day and last period that is when you go to a math class, you would be all tired. May not concentrate. But if you have mathematics in an earlier period I think you would want to go to class because then you are still awake. It also depends on who is giving you mathematics again, for example if you have a math teacher that you like you would be willing to listen to him/her even if it is the last period. If it is the math teacher who is not engaging then you wouldn't possibly want to listen to him/her.

Me: Like for instance, most of the time this year I am actually ahead of the teacher. I would do the other topic that the teacher did not do yet, and that gives me the feeling of okay... let me go to this class, because I understand something. There is a day that I didn't do my homework and I didn't feel like going to the math class. Most of the time I like the math class. I think in math class, that is the only class that I get extremely excited, the other classes, it is just normal. Yeah I think I get excited because I am always ahead of the teacher. Sometimes it is kind of challenging but then when I get the answer right I get excited and I feel happy...

Je: Well as for me, whenever we are going to the Maths class I always thank God. At least we are going to be busy in class and do something. In some classes sometimes we are being taught by doing corrections, but in Maths we are always busy. We are always trying to solve equations and all that. Well as for me I always become happy because I get to do something. It is very active. Well as for me, when I am doing Math all I feel is that, I am going to try it, I mean I always say no matter what, I am going to try this equation. I am going to master it, so yeah that is what I do.

Findings presented in Excerpt 1.9 above, indicate that learners are eager and love to learn mathematics and are excited when doing mathematics work often independently (Buthelezi, 2007). These findings are similar to those in the study of Banatao (2011) that resilient learners are receptive to learning, notice the care and encouragement modelled by adults and develop better relationships for themselves and those around them. Participants have shown to be immune to mathematics anxiety and seem to possess high levels of internal locus control. For these learners mathematics lessons are what they look forward to on a daily basis. In fact, mathematics is viewed as an interesting subject that is challenging and yet stimulating to learn. This is how Ma [Interview 14 April 2015] puts: *“To me, my maths classes are the most exciting ones, because in Grade 11 we are learning new stuff. I am finding it very interesting, the way we are solving the equations and new stuff, these algebra things, it’s just, and for me it’s very... I just want to learn new things because I want to keep on learning.”*

In addition to a positive attitude towards their mathematics school work, these learners are self-directed and determined to excel in mathematics. One participant, Me, described a sense of power of knowledge and how it creates room for wanting to know more and be ahead in the game. For example, she said: *“Like for instance, most of the time this year I am actually ahead of the teacher. I would do the other topic that the teacher did not do yet, and that gives me the feeling of okay, let me go to this class, because I understand something”* [Mercia, Interview 27 April 2015]. This result is supported by the findings of Bandura (1995), that when people experience feelings of success, they believe they have skills to succeed and will be more ready to bounce back from setbacks or failure.

Theme 1.10: Teacher Role Model

The following Excerpt 1.10 indicates the participants’ descriptions of their role models.

R: Did you have any mathematics teacher that stood out as a role model for you in learning mathematics?

Li: We used to have Saturday classes, for some people if they get paid on Friday, Saturday they won't come to class but for him, he made sure that he is there. If Friday was a public holiday he made sure to be around on Saturdays. Even during the holiday classes, he made sure to be around.

Ma: Yeah, my current mathematics teacher. He is really generous, I really don't know if it is the way he speaks, he makes jokes, he "breaks" or mispronounce words intentionally so that the whole class can laugh. He gave me my first A* in mathematics. He is my role model. With him, I just keep on improving, going higher and higher, so yeah. He gives us a lot of examples and exercises. The first three exercises, he does it himself on the board and then he tells us to do three more exercises on our own. He comes to us individually. He marks the books and tells us if he see that you got something wrong. He explains to you, and the moment he sees that you understand, he moves on to the next. He explains to the learners just like that. He gives individual attention to each learner. He thinks mathematics is very easy; it is just a matter of understanding. You don't really need to know everything in mathematics you just need to know how to calculate the formulas, that's what he tells us. "It is an easy subject" he says. It does not have a lot of theory, you don't really need to memorize anything in mathematics. You just need to understand how to do things. It is not like the other subjects where you need to know every, paragraphs written and everything like that. This one just deals with numbers and a few letters, that's all."

Se: Yes, along my way I think I have all together 10 mathematics teachers, out of these 10 there are 2 that stood out for me. My Grade 7 mathematics teacher and my grades 10 and 11 mathematics teachers. The one special thing about these teachers is that they always find ways to make you understand. They also try to make you understand that it's actually not hard when you try an activity over and over again. You figure out how you are supposed to do it. You know, there are these people, you find in class that are so negative saying "no but mathematics is just hard". They would tell you that "mathematics is not hard, you are the one making mathematics hard for yourself, you at least try then maybe something comes right". Okay I think these 2 teachers also were very flexible, they would get out of their way to actually make sure that you understand whatever you do. For example, they are only supposed to speak English in class, when they are teaching mathematics but because you don't understand and they feel that they can make you understand in your native language, they would go to that extend of teaching you in your language [code switching] so that you understand.

Da: My Grade 3 teacher made me realize that mathematics is better than other subjects, because she started the idea of smart people being on one side and the other standard people on the other side. Then I just felt that, I must be the best in mathematics. She was the one who raised my feelings towards mathematics. We liked her a lot because we knew that she would do this for you so that next time you can improve. She knew that you cannot do it, so next time when you fail she [encourage] you a bit so next time you do better.

Excerpt 1.10: Teacher Role Model

All the participants according to Excerpt 1.10 above, indicated that they have one or more teachers whom they viewed as role models. These teachers were described as active, well prepared and fun in their teaching of mathematics and they motivated their learners to learn mathematics. Equivalent findings are drawn from the work of Benard (2004), when learners are nurtured in their environment, encouraged and allowed to develop their basic needs, these experiences promote individual resilience strength such as: problem-solving skills, autonomy, social competence and a sense of purpose. Results indicate that such teachers go the extra mile to support their learners by using code switching in their classrooms and availing their time on weekends. For example, Li, said: *“We used to have Saturday classes, for some people if they get paid on Friday, Saturday they won’t come to class but for him, he made sure that he is there. If Friday was a public holiday he made sure to be around on Saturdays. Even during the holiday classes, he made sure to be around”* [Interview 16 April 2015]

The teachers described in Excerpt 1.10 above are remembered for the individual assistances they gave to the learners and the faith they have in their learners’ abilities to learn mathematics. In the same way Gray, et al. (2003) suggest that children reported with a high level of educational support from their teachers and friends and were more likely to feel encouraged, enjoyed coming to school and being involved in high school activities. Seemingly the participants appreciated the opportunity for peer tutoring and learning through sharing with other learners in the classroom. There is overwhelming support for this stance in Padron, et al., 1999; Solomon, et al., 2000; Solomon, et al., 1997) who argue that when caring teachers and schools provide a curriculum that engages learners in participation and learning while maintaining high expectations, their learners are more apt to demonstrate resilient characteristics. In describing her teacher as her role model, Ma [Interview 14 April 2015] said: *“He comes to us individually, he marks the books and [corrects] us if he see that you got*

something wrong. He explains to you, and the moment he sees that you understand, he moves on to the next.”

Theme 1.11: Academic Strategies Employed

Excerpt 1.11 below explains how the participants prepared for their national mathematics examination.

R: **What kinds of things did you do to prepare yourself for mathematics examination during Grade 10 national examinations given the circumstances you are/were living in?**

Se: I can't study in advance so I love last minute things. When it was time for mathematics exam I made sure that I was going to go through all my formulae so that when I come to the exam, I don't have a black out or anything like that. So, I went through my activities that I did in class. When you do an activity in class you mostly have an answer to it. You had worked it out, I [copied the activity] on a separate paper and tried to work it out. Now I have a problem working it out I go back to the [exercise we did during] class and I ask myself where I actually went wrong. Ah, one thing about me is that since I am less fortunate, I never use to have extra material or whatever for math, so in a case where I do not understand a certain equation, I go to a friend and ask, about "how we supposed to do this, how did we get this answer"? "Why did we get that answer"? So that I make sure that I understand.

Li: I used to go ask my neighbour. I also used booklets to look through and then even old question papers. I used to practice everything that is there, if I didn't understand, then I go to my neighbour for explanations. But before I went to him, I first had to do it then if I realise that ah, I could not do it then I went to him.

Ma: I studied in the evening because I really did not have time during the day.

Da: I studied 2 months earlier before the exams. When the exam is in May, I would study 2 months before May. So I knew, when the exams came I could not panic. I rushed to my books uh um! Because with mathematics, if you start studying late then you won't catch up on anything. There might be some problems that are too difficult for you to solve at that time, so you would try to solve them because if you come the following day, you would forget what you have done."

Ai: I practiced a lot of mathematics and I was also assisted by my friends and teachers. They helped me solve the things that I did not understand. I went to them. I did not have extra materials like everybody else, but that didn't stop me from preparing for my national examination."

Excerpt 1.11: Academic Strategies Employed

Data presented in Excerpt 1.11 above shows that in preparing for the Grade 10 national examinations, the learners relied on the support of their teachers, friends and in some case a neighbour. For example, Ai indicated that her learning experience of mathematics at primary school was positively influenced by a good mathematics teacher, she affirmed that at high school she had the support of the teacher and now friends as well. Results show that resilient learners use their time wisely to prepare for the exam, for example they prepared in advance before examination time except for one participant, who felt that she does better when she prepares at the last minute. This was the case for Ma, she reported that she did not get time during the day to learn mathematics, this is expected given that she lived in a house with small children that made it challenging for her to concentrate on her mathematics school work. Some learners also demonstrated problem solving skills and pointed out the importance of revising with emphasis on topics that were considered challenging to them and they utilised studying in groups which allows for sharing of information and ideas.

The findings discussed above are given weight by Gray et al. (2003) study which established that greater engagement in academic activities, an internal locus of control, efficaciousness in mathematics, a more positive school outlook and more positive self-esteem were characteristics of all low-SES learners who achieved resilient mathematics outcomes. Furthermore, the lucky few used the materials available to them for studying mathematics such as past question papers, exam booklets, etc. For example, Li [Interview 16 April 2015] said: *“I used to go ask my neighbour. I also used booklets to look through and then even old question papers. I used to practice everything that is there, if I didn’t understand, then I go to my neighbour for explanations. But before I went to him, I first had to do it then if I realise that ah, I could not do it then I went to him.”* This finding is supported by Perez et al. (2009) suggested that when faced with challenges of living in poverty, low levels of parental

education, resilient youth draw on available personal and environmental resources. Given the sad reality of the home environments in which they had to study mathematics they opted to study at school for their examination to ensure uninterrupted study time (see Excerpt 1.5, p. 122). In the same way Bandura (1986) found that when learners are faced with challenging situations in their environment they rely on their sense of self-efficacy through effort, perseverance, and intelligent use of resources in order to cope and succeed.

4.4 Phase 2: Details of the Lived Experience

Since the process of collecting data involves a series of interviews to check for internal consistency; by interviewing a number of participants, researchers can connect their experiences and check the comments of one participant against those of another and thus experiencing the process as a researcher (Seidman, 1998; 2013) a second phase of interview (Appendix 2, p. 281) was done. During this phase the participants were encouraged to reconstruct their experience of academic resilience in mathematics in line mainly with the second research question of the study centred around how Grade 10 learners at risk understood and made sense of their academic performance in mathematics. Some of the items in this interview aimed at highlighting the learning styles and learning support that facilitate/promote excellence in mathematics. The emergent themes are presented and discussed below. These are: learning strategies, highlights of learning mathematics, influence on academic performance in mathematics, challenges in learning mathematics, teacher-learner relationship, teacher support, peer relations, ideal learning experiences, learning of mathematics at primary school vs secondary school, expectations of learning mathematics, mathematics teacher expectations, learners' role in learning mathematics, highlights of learning mathematics, good mathematics lesson, learning support available for learning mathematics, school learning support, good learner-teacher relations, and tips for excelling in mathematics.

Theme 2.1: Learning Strategies

Excerpt 2.1 below explains some of the learning strategies that the participants use in mathematics.

R: How do you learn/study mathematics?

- Ai: For you to know mathematics you have to have a pen, a rough book and a calculator because you just cannot study mathematics like biology or something. You have to practice it for you to learn it. Develop a habit of practice makes perfect.
- Da: I take a rough book and the mathematics textbook and then I start working [out] questions. If you memorize the steps for example to work out BODMAS, the step that you used to work out the example in class is not what they are going to ask in the exam they might ask another one. ... you have to take an extra paper and a pen and just practice like when are answering the question you should practice...keep on practicing you don't have to look at the equation and then say (I know how to do this)s, using your brain. You have to use a pen and a paper to calculate, do the calculations.
- Li: I must at least have a paper, a pencil and a calculator and some question papers. Before I look at the answer, I must first do it then I can see where I went wrong on that.
- Ma: I don't study mathematic because I feel like in mathematics there is nothing to read. You cannot read numbers, I just practice, I just try, to do all the exercises that are in the textbook, all the things that we were taught, just to practice about how to do the things on my own and then I take them to my teacher. Sometimes I intent on doing just one exercise but It did not get so exciting, then I end up doing all the exercises, I end up doing everything.
- Me: Most of the times, I practice, I do practical sums, you know, some [learners] just look at the formulas and stuff. But for me actually I had to take... maybe one topic. I would take three exercises and I would complete them on my own. There are exercises that look hard, but then when you know the formulas you would definitely see that this is something easy. I actually practice mathematics.
- Se: I study in a quiet place so that nobody disturbs me. For me, it is too easy to study mathematics, I practice. I study mathematics by taking a rough book, my mathematics textbook and my calculator and start practicing and that is how I study mathematics.
- Ti: Mathematics is not like you are studying Life Science for example, holding your book and you read. To know mathematics, you have to do research on new words/new concepts like the words that you don't understand and then you have to practice they say "practice makes perfect". You have to practice all the exercises; at every opportunity that you get you have to practice mathematics if you are learning mathematics.

Excerpt 2. 1: Learning Strategies

Findings in Excerpt 2.1 evidenced that there is a consensus amongst the participants that the nature of mathematics is complex and vastly different from other academic subjects such as Life science, Biology, etc. Therefore, studying mathematics requires a learning style that is suitable to the subject content. Participants emphasized that mathematic content cannot be memorized, like Ma expressed that *“it is not possible to read numbers.”* Furthermore, the participants pointed out that studying mathematics involves a lot of individual effort and self-directed learning to perform well in mathematics. According to the participants, the key to excelling in mathematics lies in practice, practice and practice even more. For example Ti [Interview 14 May 2015] said: *“Like they say practice makes perfect. You have to practice all the exercises; at every opportunity that you get you have to practice Mathematics if you are learning Mathematics.”* These findings highlight the high level of determination needed to excel in mathematics; Benard (2004) cautions that such individual trait does not cause resilience but is illustrative of the positive developmental outcome of resilience.

Theme 2.2: Highlights of Learning Mathematics

R: Describe your experience of learning and excelling in mathematics?

Ai: I learned that you cannot just learn mathematics overnight or something because for you to know mathematics, you must listen attentively in class, do a lot of practice and seek for help where you don't understand.

Da: Learning mathematics was a challenge, because when you come from grade 1, the mathematics you learned was not the same that you learned in grades 2 and 3. There always had to be something that is added, so it was very challenging. At the same time, it was enjoyable, because if other guys could not do it and then I did it, I just felt a sense of satisfaction.

Je: Well as for me, was not that difficult at all. It has really been good because I love Math. Everything was just okay, even though it was stressing especially when you could not master something.

Li: Studying mathematics, was fun and good ... You get the feeling of just wanting to learn mathematics as the only subject.

Ma: Learning mathematics, I don't think it was that easy. I passed mathematics in Grade 10 because I changed my attitude, the attitude that I had from grades 8 and 9. I hated mathematics. I decided to change my attitude and decided to love the subject. I just had to teach myself how to love the subject because my passion for the subject was going to cause me to pass. I knew that if I kept on hating the subject, no matter how hard I wanted to pass it I couldn't because I would just be like oh! 'Whatever, I don't like this subject at all'.

Se: Well, I never had real difficulties in mathematics. The learning was great. You had that time when you learn something in class and your neighbour did not understand, but because you understood whatever you have learned you are able to pass on the information to the next person. It was always great when a classmate can come up to me saying: "but I don't understand this, can you please help me"? But because I was, you know, there were times when you feel no, but "I am also busy", can we just have it another time? but because it was mathematics you can actually...while you were helping this person out you could also pick up something that this person experienced while learning their mathematics or going through their certain activities.

Ti: Learning Mathematics is very challenging and fun at the same time, because sometimes you know something, but then a different equation for example in algebra can come in a test, but then to solve it you have to use another method, so you have to think about the method. It is challenging and fun at the same time. Because as you are thinking, you know, it is just fun. Thinking about the numbers and adding them together, all that [liked working with numbers].

Excerpt 2. 2: Highlights of Learning Mathematics

Results presented in Excerpt 2.2 above show that for some participants learning mathematics varied from being easy to experiencing challenges and fun at the same time. For Ma, excelling in mathematics was not easy and required a change from a negative attitude to a positive attitude towards the subject. This came as a result of the teachers' failure to help her make connections between mathematical concepts learnt at primary school than at secondary school. Another participant maintained that it was fulfilling to excel in mathematics and have the opportunity to help her peers through cooperative learning as was the case with Se, who maintained that learning mathematics was easy and she indicated earlier in phase one that her learning of mathematics is supported by peers. According to her, doing well in mathematics requires the learners to love working with numbers and be willing to seek help when they do not understand. For instance, Ai [Interview 28 May 2015] said: *"I learned that you cannot just learn mathematics overnight or something because for you to know mathematics, you must listen attentively in class, do a lot of practice and seek for help where you don't understand."* These results are supported by Banatao (2011), learners are resilient when they are receptive to learning, and notice the care and encouragement modelled by adults and develop better relations for themselves and those around them.

Theme 2.3: Influence on Academic Performance in Mathematics

The following excerpt, Excerpt 2.3 outlines the interactions that participants believed to have influenced their academic performance in mathematics.

R: Were there any people who influenced your academic performances in mathematics? How did they influence it?

Ai: Yes Miss. My grades 6-7 and 10 teachers and my friends. How did they influence? My friends influenced me in a good way because when I ask them for help they knew how to explain to me in a better way. My teacher influenced me in a good way because he used to explain more in a better way also. He also told me that whenever I did not understand I could go to him and asked for help.

Je: Well, as for me there was none.

Li: My Grade 7 mathematics teacher, my neighbour and my Grade 10 teacher.

Ma: Yeah! My other mathematics teacher, he did not really teach me. During Grade 9, I was having trouble with mathematics, he just gave us extra classes, so yeah, he also kept telling me that “maths is easy and at your level I know you can do this, you can do this”, I would say “ok, other people believe in me so I should also believe in myself”. My parents including my big sister. My father didn’t really take time to teach me but if he found me doing my math, he would say, “ow, it is very good, it is very good...” When I told him my results yesterday, he said “you did very well so I want you to keep on doing this”. “This is what I want from you because maths is a subject that many people don’t like and many children fail so if you are doing good in mathematics then that means you are very good”.

Se: Well there was actually my mathematics teacher and my best friends. My teacher used to say that “if you don’t understand in class please make a turn to my office after school for me to explain more”. My friends also influenced me in a positive way because they used to help me where I went wrong as they were also good in mathematics.

Ti: Yeah, my friends, there was a time I did not want to study Math, I thought, I knew everything, I knew Math and therefore I could not study. We wrote a test, but then I lost all five marks. I decided from thereon to study, the teacher influenced [encouraged] me to study more. And then my mom always told me that without education you are nothing in life, so you have to study because even to be a domestic worker you will need a degree in the future years to come. So that is how she influenced me. My cousin always told me, he passed mathematics very well, he did it on high level and scored a Grade 2. So I wanted to be like him...

Results in Excerpt 2.3 above, show that, teachers, parents, siblings and friends played an important role in the academic performances in mathematics of the participants. For Ti, he was encouraged by his mother to work hard in his mathematics work by telling him that it will be hard to find a job in future without a degree and as reported earlier his mother was talking from her own experience. Despite the fact that their parents were not/less educated, they influenced their children to excel in mathematics. Having only completed Grade 12, Ti's mother was employed as a domestic worker and Ti described her as educated but not well educated in Phase 1 of his interview. However, Ti was fortunate to have a family member who was good in mathematics, he pointed out that his cousin was good in mathematics and he was motivated to be just like him. Likewise Li was also fortunate as she was able to get learning support in mathematics from her teachers and neighbour. Participants were influenced positively by the people to develop a culture of never giving up even when mathematical problems seemed difficult to understand. Teachers have been reported to have influenced the participants' performance in mathematics by availing themselves for individual assistance in mathematics. Furthermore, Ma recalled that she excelled in mathematics because her teacher had faith in her. As for Se, her peers influenced her academic performance in mathematics positively by assisting her with mathematics activities, thus peer tutoring was identified as a facilitator to learning mathematics. These findings illustrate the effects of family and school working together in providing positive relations for learners which yield learners who are more apt to demonstrate resilient characteristics such as high academic attainments in mathematics (Padron, Waxman, & Huang, 1999; Solomon, et al., 2000).

Theme 2.4: Challenges in Learning Mathematics

The challenges that the participants have experienced/experience while learning mathematics are discussed in Excerpt 2.4 below.

R: What has been the biggest challenge of learning mathematics for you thus far? How have you address this challenge?

Ai: The challenge I experienced was that I struggled to learn or to do mathematics at home and therefore I ended up solving the problem by coming to school.

Da: The biggest challenge in Math was just the surrounding, the community that I live in. I studied at school after classes or studied in the night. I set an alarm when everybody was asleep people could even be awake until midnight. So, I set an alarm and then when people were asleep I studied. When they woke up, I was already done with whatever I was doing.

Je: Well as for me, the challenge that I experienced was when we were preparing for our Mathematics exam. The library was always very full because, senior students were also at the library studying for some of us, we had to study with our books on the shelves. There was noise because yeah some people didn't go there for studying. Some went there maybe to hang around in the library. Sometimes the person comes to you to get a book, so you have to move a way.

Li: There was a topic on money and finance; I was not good at it so I made sure that did it first before I went to other topics.

Ma: The way the subject was introduced to me at high school level, caused my poor performance (in mathematics). It was not really introduced in a way that you would expect for somebody that is coming from primary school, who has never done those new concepts. We were just told to get in the books and do this. From Grade 8 to Grade 9, we did nothing, until we asked another teacher to explain the subject to us. The things that we didn't understand the new teacher helped me change. Basically, he re-introduced everything to us in Grade 10.

Me: I don't think that I was faced with any challenge, except maybe... I do not have any challenges.

Se: Only the home atmosphere, I always went to the after school program and tried to do my activities there because it was more peaceful and friendlier. I was one of the participants from the Katutura Youth Development Program (KYDP). It was actually like an after school program where we did activities ranging from academic and non- academic, so we had Math, English and other activities such as singing; dancing and sports. So it was a program to keep youth off the street when you were not at school.

Ti: My greatest challenge, was when I learnt geometric tasks because that was tough. To calculate the angles was difficult. Those angles confused me. For example, when you are given two angles and you have to find the other one. So that was the most challenging thing in my life of studying mathematics. To address the challenge, I consulted my teacher for the previous year to show me different ways on how to do it and I consulted other learners (peers) in my class that are good, especially one of my friends. So he also helped me to understand.

Excerpt 2. 4: Challenges in Learning Mathematics

Findings in Excerpt 2.4 above indicates that participants found it challenging to do their mathematics work in a community surrounded by bars that makes noise. To overcome unconducive learning home environment, they opted to study after mid-night or study at school after school hours, or used the community library. Worth noting here, is that poor introduction of mathematics content to the learners pose a challenge to the learning. *Se* recounted that being a member of a community youth program gave her the opportunity to do her mathematics school activity that she could not do at home. Challenges related to specific mathematics topics like Money and Finance were allocated more time by learners. For example, *Ti* allocated more study time to challenging topics. Some other learners sought the help of teachers, peers and friends. These findings are consistent with the findings of Nettles et al. (2000) that exposure to violence affects the academic performance of learners but teacher support has a positive impact on their mathematics achievement.

Theme 2.5: Teacher-learner Relationship

Excerpt 2.5 that follows, gives a description of the teacher-learner interactions when teaching and learning mathematics.

R: How would you characterize your relationship with your mathematics teacher?

Ai: Mine is good because for me, he knows how to explain to me. We are different and some learners are fast catchers and I am slow. He knows how to explain to me in a better way.

Da: He is good because I understand what he means whenever he explains something. I don't really like to get in trouble with him.

Je: Well as for me, I can approach him any time, and even though he is in a bad mood or not. I can approach him and he gets very happy when a learner comes to him to ask about school work especially in mathematics.

Li: He was good, but sometimes he knows that you can do it but "ah you, you do not do it or you do not get an A", he wants you to prove him wrong, he is that type of person.

Ma: I just regard him as my elder brother, he is not an old man, he is young, he is very young so we interact very well, sometimes it is just like we are friends, not really like that big person- small child relationship We are just like the same age group, although there is still respect between us. I find it easier to talk to a younger teacher than an elder teacher, because a younger teacher knows the things that are happening...because they were just a few years ago in school too, maybe 6 years ago. But 15 years, so you won't really understand, like comparing the technology that is there and the new things to your years in school. The younger ones are able to relate with us.

Me: In spite of that, being a good mathematics teacher, he was as well a father to all of us. He didn't have any favouritism (who he like) and stuff. You know, he is a person who cares about people (learners). There is even a time where on his birthday, he spend N\$ 200 and something dollars for us to buy something for the whole class. He is really a nice teacher, he is very kind. He knows how to talk to people while some teachers really want to be seen as strict. That teacher really I don't know... this one is a teacher who likes people whether you are naughty or whatever. As long as you keep... the only thing that may upset him is when maybe people (learners) fail. That is the only thing that upset him. He also does not like... he does not care if someone is naughty but he/she passes... The only thing he wants is that people to do well in math. He is a great teacher; apart from being a teacher he shows fatherly love to everyone. No favouritism.

Se: My math teacher is young, so it is very easy for the 2 of us to get along, be it maybe after school when I don't understand and I find him in class, I would say "sir I don't understand this". I can actually go to him without being formal. I can actually say "but sir" not formal, you know. I can approach him any time. The relationship with my math teacher is very good.

Ti: I get along very well with my Mathematics teacher. Even now, whenever he sees me, he says "are you still good in Math?" He asks me that because you know, he loves Math and so he also loves people who love Maths [birds of the same feather flock together].

Excerpt 2. 5: Teacher-learner Relationship

Evidently from Excerpt 2.5 most of the participants had good teacher-learner relations. Teacher availability to assist learners with the subject matter after class was also highlighted as a quality appreciated during teacher- learner interactions. Coupled with teacher's happiness and eagerness to give learning support to individual learners, this practice was reported to encourage learners to consult more with their teachers in mathematics. Participants described their teachers as concerned teachers, that enquire about their performance in mathematics and shares the love of the subject with the learners. In fact, teachers are viewed as "Local Prentices" for some participants they described their mathematics teacher as a great father who shows no favouritism. On the other hand other participants felt like the teacher was like an elder brother, a friend who is easy to talk to whilst maintaining mutual respect. Evidently schools that purposefully foster resilience through caring relationships and meaningful opportunities for participation may lead to higher grades and greater academic achievement amongst learners (Gonzalez an& Padilla, 1997).

Theme 2.6: Teacher Support

The following excerpt, Excerpt 2.6, captures the participants' interactions with teachers during consultations.

R:	How often do you go see your teacher for individual consultation? What is a typical consultation like?
Ai:	Whenever I have a problem. When I go to him I actually ask if he is busy with something so that he can help me. If he is busy, he would tell me to come back later when he is done. And I do go back.
Da:	I only went for assistance to my teacher last term about three times on the same topic.
Je:	Saturday classes for the whole class and I only get the opportunity after the class on Saturday, but not often.
Li:	I believe in a week, I go there twice.
Ma:	Every day in class we get an opportunity to ask. Sometimes if we do not have mathematics and we have a problem, we go to him after school or whenever you see him anywhere but not in the street. At school you can go to him and ask individually.
Me:	Ahh, I think most of the times if I don't understand something. If I don't understand, during the exams, and before we write a test that is when I consult the teacher.
Se:	Well for me I don't really go to my math teacher for individual help. As I said before, I listen in class so I am more likely to catch up very fast, but once I don't understand anything I don't go for an individual lesson, Instead I go back to the class because I know there is always somebody else who does not understand. So I ask him in class so that he can explain to everybody.
Ti:	Not very much, most of the times I only make use of him [consult the teacher] when we are at a geometric topic or when I am studying it. That is the only time I go consult him for help. That is the only time I meet him individually. He can never tell you he does not have time. When you go to him he always leave what he was doing to assist you until you understand and then continues with his work [teacher support is great]. He never let a learner who does not understand go without understanding.

Excerpt 2. 6: Teacher Support

Results in Excerpt 2.6 above, seem to highlight that participants sought help relentlessly until they mastered the mathematic content in question. For example *Da* pointed out that he consulted the teacher three times on the same mathematical problem, without the fear that the teacher might turn his request down. However *Li* consults twice a week, worth noting here is

that some participants preferred consulting during class for the benefit of peers that may be encountering similar learning difficulties. Consultations were done more frequently prior to writing a test or examination Buthelezi's (2007) study supports these findings; as she found that resilient learners receive high levels of support from educators and friends. Evidently, it is critical for teachers to create deliberate time for learners to ask questions. To exemplify this, one participant suggests that every day presents an opportunity that should be put to use, by consulting and learning from the teacher during the daily mathematics lessons. Similarly Borman and Overman (2004) study revealed that resilient learners tend to develop much stronger and more supportive relationships with their teachers than do non-resilient learners. Thus according to the participants they have/had great teacher support in mathematics. In cases where the participants did not feel comfortable to approach the teacher for individual assistance, they received the needed help in groups with friends instead.

Theme 2.7: Peer Relations

During the interviews participants recounted the role that friends and peers played in their mathematics achievement as summarised in the following excerpt, Excerpt 2.7.

R: How would you describe your interactions with your peers with reference to learning mathematics?

Ai: We feel free among each other because we are all helpful and we encourage one another. There was a time a classmate cried because of math. I just comforted her to stop crying and advised her to at least look for help. She was just there crying without asking anyone for help.

Da: With my friends, we are competing, who is going to be the best in school and who is going to get the best grades.

Je: Well as for me, I only go to some that I know they are interested in mathematics. I go to them and ask questions and they would help me.

Li: For my classmates, we use to come together and do things. But once we write a test and you are the highest, they get to be angry However, I help them and from there, they never fail. They are also performing well in mathematics.

Ma: On my side I feel like helping others when they don't understand because when I help them, it also increases my understanding. Sometimes; when I just explain something, I realize, "wow" I really understand. We are very good, we explain to each other, there is no that thing of..., even if I am good in mathematics, really good, I won't say, "I cannot help anyone because when I help them they are going to get better than I." I also need somebody to celebrate with, so I offer help. , I make you [them feel] very good, I try my best to pull them at my level, so that both of us can be happy at the end of the day. I wouldn't want to be celebrating alone.

Me: Aah, actually for us, we don't really seem okay currently. Right now, we don't really study together, because everyone studies on his/her own. This one studies the way she/he studies and the other one does his/her own ways. Maybe if you... or I have two friends right now and they don't come to ask me anything, because I don't know, they have brains [clever], not clear I take away my pride. When I don't understand something I go to one of them.

Se: Well, we only have little discussions on mathematics related issues if one of us do not understand.

Ti: I am getting along with them very well, because most of them are familiar with. Some of them, we came from the same primary school, so interaction with them is very good. There is no problem. In terms of learning mathematics: "I do anything for mathematics" I approach them and ask them for help/assistance".

Excerpt 2. 7: Peer Relations

Data presented in Excerpt 2.7, show that competition amongst peers served as motivation for some of the participants to perform well in mathematics and in such instances learners study

individually and are reluctant to help one another with mathematics activity. While a number of participants described their peer relations as promoting help amongst learners with mathematics activity. The learners interviewed stood out as champions amongst their peers and they offered help to fellow learners where needed. Some participants approach their peers for assistance with mathematics school work, re-affirming once again the help-seeking characteristic of resilient learners. In particular one participant warns that pride should not be given room to hinder success in mathematics, thus she approaches her peers when needing help with mathematics activity. Generally the participants felt free to help and encourage their peers when learning mathematics because they valued success of their friends and classmates in mathematics since in most cases the classmates were acquaintances from the same primary school. Findings show that some participants engage in mathematics group discussions with the aim to help their peers understand. In support of these findings Kiswardy (2012) described the aforementioned attributes as social competences, which include qualities such as empathy, caring and communication skills.

Theme 2.8: Ideal Early Learning Experience

Given the opportunity to structure their ideal mathematics classroom, participants described key components for excelling in mathematics as presented in Excerpt 2.8 as follows:

R: If you could structure your own early learning experience in mathematics, what would it include?

Ai: I want a classroom whereby the teacher is friendly, makes jokes with everyone but he must not always make jokes because kids might disrespect the teacher. My classmates should also show some respect and they must also listen to the teacher. The walls of the class should also have some posters of some things of mathematics the multiplication table.

Da: I want a teacher who, helps a learner to understand a certain problem, with no complaints. If a child has a problem with an equation while the teacher is in the class, he/she should go to the chalkboard and teach the whole class. It might not only be one learner that has a problem. I would like a teacher to be serious, because when teachers and share jokes with students, the students are likely to disrespect them.

Je: I think a mathematics teacher should be kind, friendly and a person that interacts with the children and gives them full attention. And He/she should be active to activate the learners not to get sleepy. Mathematics to most of the people is really, boring. The teacher should be very active and friendly to children and not be mean.

Li: I believe a teacher must be that teacher who likes to teach and never gives up. Even when the kids are asking “stupid questions” he/she should never give up. There must not be many kids in that class because they may not get attention from the teacher if they are a lot, maybe 25 must be the maximum.

Ma: For the Grade 1 level, they should try out different types of learning because not all of us learn in the same way. Some kids are visual learners, you need to draw numbers creatively with colours.

Me: The teacher should be kind, loving and hyper [active], not a lame teacher. A lame maths teacher explains like “this and that” no one really gets interested, people sleep. The teacher should make the classroom interesting and people should be woken by the teacher. If the teacher is lame people would be sleeping and no one would understand anything.

Se: Okay, I think in a dream mathematics class there should be whatever material is needed to actually help us with the mathematics. I also think that the classroom should have some posters with mathematics equations and all colourful mathematics situation. The dream mathematics teacher should be a teacher who is willing to help anytime, whether it is in the class or outside the classroom. This teacher should be able to go out of their way to make learners understand. The teacher should also be positive. A positive teacher is one who is able to encourage you when you have failed a mathematics test. Teacher should also be willing to give a chance to the learners to explain equations to the class.

Ti: Teachers should teach mathematics through playing. They should bring items for the children to play. Anything related to mathematics is fun for kids to enjoy, because kids learn through playing.

Emerging from the data in Excerpt 2.8 above, is that participants strongly believe that an effective mathematics teacher must demonstrate a good balance between kindness and seriousness when teaching mathematics and keep the class awake. In addition to that, the teacher is expected to complain less and be willing to help individual learners with mathematics activities. Thus the teacher should demonstrate care and be creative in teaching mathematics to ensure that all learners understand. Participants described the ideal teacher as someone positive who sees good in others and have faith in the learners- that they can excel in mathematics. Wright (2013) in support of these results maintains that teachers who contribute to resilient learners' positive learning experiences express high expectations, are competent in their content areas, and challenge learners to their best. A teacher who never gives up in the face of failure but demonstrates hope in the learners' mathematical capabilities. Participants further emphasised that the teacher should use teaching methods that are suitable to the learning styles of diverse students (auditory learners, visual learners and kinaesthetic learners). Evidently participants appreciate to be given an opportunity in a mathematics classroom to explain their work to their peers. To this end Wright (2013) suggests teaching methods that stimulate active learner-participation rather than merely allowing learners to sit and listen. Furthermore the participants urge that mathematics at primary school should be taught with games for effective learning through fun. The classroom should be well decorated with mathematical objects and content to make it attractive.

Class atmosphere was also mentioned as a key element in the teaching and learning of mathematics. To this end participants pointed out that the classroom should not be overcrowded to ensure that every learner gets individual assistance with mathematics school work when necessary. Lastly the participants highlighted the importance of teaching and learning resources such as posters, and manipulatives.

Theme 2.9: Learning of Mathematics at Primary School vs Secondary School

In Excerpt 2.9 below the participants reflected upon their learning of mathematics from primary school to secondary school.

R:	How have you seen your learning of Mathematics change from primary school to secondary school?
Ai:	Primary school was the best, but secondary school got worse especially in grades 8 and 9. However, it became better in Grade 10.
Da:	There is no improvement; I think I went down, because in high school you meet different kinds of friends, they just like joking and playing around. If you get time to study these days is when you have a test or examination. That is why my marks went down a bit.
Li:	From Grade 1 to 6, it was weak and then from Grade 7 to 8 it was good. In Grade 9, I had a teacher that never taught. He only came and gave one example and an exercise. My mathematics performance went down. In Grade 10, I had a teacher who was committed and my mathematics (performance) went up.
Ma:	The beginning was very low, low. I went on top and then dropped gradually and then went up again. So, it [performance] is up down, up down.
Me:	Okay, let me say primary school until Grade 7 I was not good in mathematics. But in Grade 7, that is when I realised that math is really easy. In grades 8, 9 the math teacher was not good, I tried things on my own here and there. I asked people here and there. The highest symbol I got in grades 8 and 9 was a C and in Grade 10, that is when I really improved. In Grade 10 first term I got a B. In the second term and the final result I got A's in math. There is really, really a big change.
Se:	It has been getting better because only small or little work that is being added in every syllabus and I already know a bit of primary things.
Ti:	Since Grade 1, I have been good in Mathematics. So, the teacher that I had in Grade 1, was good. She taught me very well. So [yes]! It influenced my other grades very well, because you know, Math comes from level to level. In high school, I only started performing [well] in Grade 10 during the first term.

Excerpt 2. 9: Learning Mathematics at Primary School vs Secondary School

Results in Excerpt 2.9 above show that the transition from primary school to secondary school improved in mathematics during the different transition periods. For some participants primary school learning of mathematics laid a good foundation for secondary school learning of mathematics as was the case for *Ti*. However, for *Me*, *Li* and *Ai* despite good track record of performance in mathematics during primary school, their performance dropped at secondary school. *Ma*, described how her performance in mathematics kept fluctuating following an up and down trend during secondary school. There is support for these findings in the work of Rutter (1990), it appears that resilience levels are on a continuum where at different life stages, a person may be more resilient than in another life stage. The learners' performance also depended on the level of effort into their activities and learning of mathematics in general.

Theme 2.10: Expectations of Learning Mathematics

Evidently, learners talk to their peers regarding learning mathematics at secondary schools. Specific details on learners' expectations of learning mathematics are presented in Excerpt 2.10 below.

R: What were your expectations of learning mathematics as you entered secondary school grade?

Ai: I expected it to be difficult because we have to learn some new things and not just the easy things of course. I expected it to be difficult, but not really difficult.

Da: I expected it to be very hard, because from what we hear from people, “no mathematics there, you deal with letters no more numbers” so I expected something very difficult but when I came it was not really difficult.

Je: Well as for me, I thought going to high school, to do mathematics was going to be on another level and was going to be “Chinese” I thought I was not going to understand. My street mates [neighbours], told me that, mathematics at high school is very tough, it is on another level and you won’t understand it. And, they told me that it is only smart people who master mathematics. When I got to Grade 8, mathematics was very easy and I kept on thinking that they will keep on complaining about mathematics. It’s always easy or maybe it would get tougher as we go on.

Li: I had a positive attitude that mathematics would be easy, fun and enjoyable.

Ma: I was expecting it to be a lot of fun and interesting with new things to learn.

Me: Actually I was thinking mathematics would be really hard, because I saw my sister’s notes. Seeing those graphs it really scared me, you know. The graphs were looking so complicated and I had no clue how they did it. So yes, when I was at primary school I thought [learning] math was extremely hard. But when I got here [secondary school] I found out that these things [graphs] I saw in my cousins and sisters books were not that complicated; only if you know how it is done then you are good.

Se: I thought mathematics was going to be a horrible subject. I thought it was going to be hard because when you are in Grade 7 they would tell you, there is this algebra, it is so tough. “oh my God”, I am going to have Algebra, it is going to be so hard” I expect whatever comes should come I would try how to figure it out.

Ti: When I came to high school, I thought mathematics was going to be tough for me. Because I heard that algebra is tough. I was afraid, but it is fun, because it is the first time that I could/was allowed to use a calculator in a mathematics class. So I used to play with a calculator that is all.

Excerpt 2.10: Expectations of Learning Mathematics

In Excerpt 2.10 above, the expectations of the learners varied from fear of the difficult content to easy and having fun. *Da* expected learning of mathematics at secondary school to be very hard. These expectations were informed by conversations the participants had with secondary

school learners. Again, participants pointed out that they were informed that the mathematics they used to know in the form of numbers changed at secondary school to included letters. For example *Je* expected mathematics to be on another level more like “Chinese” as informed by her peers. Thus, learners arrive with fear that mathematics is a very difficult subject when they enter secondary school. For some participants, they looked forward to learning new things that would be fun and interesting. However, their expectations were not met, in fact they felt the subject was scary and should not be compulsory at Grade 8. Another participant thought that mathematics would be a horrible subject, worth noting is that amidst all of these expectations there was hope and determination to learn mathematics against all odds.

On the other hand, *Li* entered secondary school with a positive attitude, which was viewing mathematics as easy and enjoyable. Likewise, *Me* felt that mathematics would really be hard and was proven wrong as it turned out to be easy as she grasped the method of solving mathematical problems.

Theme 2.11: Mathematics Teacher Expectations

Excerpt 2.11 presents the learners expectations of a mathematics teacher at secondary school.

R: What were your expectations of a mathematics teacher? How did you find them?

Ai: To be the same as the primary teacher who is helpful, kind or let me rather say friendly, who explains in a better way [passionate about mathematics] because whenever he [teacher] gave us an exercise, he did not explain to us to understand. He [teacher] did not really explain because he kind of finds it as a waste of time. He [teacher] only used to say, page what, exercise what and do the things and that's all without explaining.

Da: I expected them to be serious teachers. Just those teachers that don't joke around [such that] when you do a mistake, they hit you. My expectations were not fulfilled. You know when you are in primary, you see people who have passed Grade 10, or Grade 8, and they would tell you that..., mathematics was hard".

Je: Well, I was expecting my mathematics teacher to be very rude, they don't pay attention to people and they would beat children in the class and all that. As for me, I just thought about them [expectations] myself.

Li: I used to think maybe they would be rude and if they explain once they would go out and then they would not explain again. Then maybe are those teachers that use to give people lots of homework. While I was in Grade 7, the kids that were in Grade 8, used to come to us and say 'Grade 8 is tough, those teachers are having bad manners, they are rude and all those'.

Ma: I was expecting to get a very helpful person [teacher]. The kind that is able to listen and the one that gives extra time for explaining to individuals. Must be fun, not really too serious. Instead, mathematics was just something scary, you would even think, why do they make this subject compulsory? Why can't I choose not to have mathematics? I got that from my primary experience that is how my primary teacher was. So I was like okay, if she is like that then my maths teacher at high school should also be like that.

Me: Actually, when I was in primary school, I thought, you know, high school teachers were, those teachers that I saw on televisions, really fun and hyper-active. I was expecting mathematics teachers to be strict. When I got to high school I found out that our mathematics teacher was really funny, and he really liked "vulgar" jokes, which I didn't personally like. He insults in class. And when I saw other math teachers, they were really nice and friendly. My expectations were informed by TV and notebooks.

Se: I prayed so hard to have a good teacher, a teacher who would not let me drop from how I used to perform in mathematics. There are [teachers] who would give you an equation and they don't care about who is doing their work. If you don't do your work they don't care, they don't give you enough attention. You know there are all those things that they would tell you about. When I got here I did not find all that was said. We thought it was fun, when you come to class and you didn't do your homework and the teacher won't even ask about the homework but as you grow, you actually realize that if I don't do it then how am I going to understand everything else in the future.

Ti: I thought maybe they would be like rude, because they are used to deal with bigger boys in Grade 12. So the way they deal with them [Grade 12 boys] is the way they would deal with us [Grade 8 pupils]. I was very afraid but then it turned out that they were kind and hardworking. But then our Math teacher was not so hardworking, he just used to give us a lot of work without explaining, but I was expecting him to be better. I heard from my peers.

Excerpt 2. 11: Mathematics Teacher Expectations

Results presented in Excerpt 2.11 above show that the participants interacted with Grade 10 learners, peers and TV to visualize the characteristics of a mathematics secondary school teacher. Mathematics secondary school teachers were expected to be: serious teachers who do not make jokes, administer corporal punishment when learners make mistakes, very rude and do not pay attention to learners.

These expectation were somehow not met at the different schools the learners were....In this regard one participant recounted that she was afraid of the mathematics teachers but they turned out to be kind and hardworking. However participant *Ai* expected the secondary school mathematics teachers to be the same as the primary school mathematics teachers, kind, helpful and these expectations were not met. According to the participants the secondary school mathematics teachers could not explain to the benefit of all learners understanding in fact the teachers felt it was a waste of time to put in so much effort.

One specific participant, expected secondary school mathematics teachers to be like the teachers on a TV program that is fun and maybe strict. These expectations were partially met in that the teacher was funny but made vulgar jokes in class and used insults. The data also evidenced that some participants prayed to get good mathematics teachers who would not affect their mathematics performance negatively. For *Se* [Interview 10 may 2015] her expectations were met, she expected the teachers to “*not care regarding learners’ completion of home work and that teachers would not pay attention to the learners.*” The reality was that, the teachers did not check homework of the learners. Clearly, even when the teacher seems not to care, the resilient learner found the silver lining to it, that it is important to do homework despite the teachers’ lack of supervision, for it has benefits in the future. This is how participant *Se* puts it:

“if I don’t do it then how am I going to understand everything else in the future” [Interview 10 may 2015].

Theme 2.12: Learners’ Role in Learning Mathematics

Participants took time to describe their role in achieving the expectations shared in the previous excerpt and their expressions are presented in Excerpt 2.12 as follows:

R:	What do you see as your role in achieving those expectations?
Ai:	Is to always be at school and whenever I am in his/her class for mathematics I should concentrate and be as respectful and not make noise.
Da:	I expected to be the type of person who is always quiet and just become the best in mathematics.
Je:	As for me, my role in the mathematics class, I should do my home works, I mean yeah. I told myself first I am not going to answer questions because the learners might laugh at me. But then I [will do] my home works and everything the teacher told us. If orders were defied, they would beat us up.
Li:	I used to contribute in class; ask questions and sometimes volunteer myself to teach the kids.
Ma:	My part was to pay attention, not to always depend on the teacher for help, but to also try to help myself.
Me:	[Yes], you know, being ahead of the teachers, that is what I was told, by my cousins, you should always be ahead of your teacher and your notes. Respect is the most important thing in the relationship of teacher and learner. I should be the one asking questions from teachers.
Se:	So you also have that thing of “what if my math teacher or my other teachers call and find out that I am doing badly? My dad also always talks to me, be it something personal or be it something school related. He told me not to give up when I fail a test. He always tells me that “you just have to go back, see where you went wrong and correct it.”
Ti:	For example, if the teacher explains well and is kind, to you, as a learner you must respect the teacher. You should study and listen to the teacher in the class when explaining. For you is to study to pass the test that you are given. The teacher should feel that his hard work paid off. My peers felt that mathematics was going to be tough, especially the part of algebra.

Excerpt 2. 12: Learners’ Role in Learning Mathematics

Findings in Excerpt 2.12 show that the participants respect their teachers and do their homework and also participate actively in class for self-gain and also to please the teachers. *Ti, Ma, Me,* and *Da* pointed out that their roles involve doing homework and being self-directed. On the other hand participant *Je* mentioned that learners' role is to participate in the lesson and obey the teacher out of fear of corporal punishment, and continue to work even in the face of laughter from peers. Furthermore, it is the learners' responsibility to study and listen attentively during lessons and pass the tests to motivate the teacher and show appreciation for the teachers' efforts in teaching mathematics. In addition to that learners should attend classes, read ahead of the teacher, being proactive and ask questions from the teachers. These findings are in agreement with Benard (2004), who argues that schools that are successful in promoting resilience build on learners' intrinsic motivation and interests, by encouraging cooperation in learning instead of competition. Respect was held in high regard by the participants as one of the key factors for a good relationship. Participants indicated that they value helping fellow learners via peer tutoring. Some participants, for example *Se*, felt that she had to maintain her good performance in mathematics from primary school in secondary school and achieve the high expectations from her primary school teachers and family members. Worth noting here, is that the participants stated that learners should not always depend on the teacher for help, but first work individually. For example *Ma* said: " *My part was to pay attention, not to always depend on the teacher for help, but to also try to help myself*" [Interview 14 April 2015].

Theme 2.13: Highlights of Learning Mathematics

In Excerpt 2.13 the participants' highlights of achievement in mathematics are presented.

R: What would you describe as highest point and low points thus far in mathematics?

Ai: My highest was a B obtained in Grade 10 and my lowest was an E in grades 8-9.

Da: A*, I think, it was in Grade 4, 5 somewhere there, I felt proud. Lowest achievement was a C, in Grade 3. In Grade 3 first term I got an A and then second term a C then a third term an A or B. Grade 5 and 6 I think I also got a C somewhere there but the other grades I think I was just getting A. I got a C because I was too playful. In mathematics when you make a small mistake, everything that follows is already wrong.

Je: Well as for me, my highest point of achievement was an A. I actually scored it in grades 7 and 9 second term. Well, actually I felt very happy because the teacher always encouraged us to study mathematics. I made him happy and we gave him hope again to continue teaching. He always used to threaten us that “okay if you guys are not going to perform in Math then, I will move, I will go to another school if you are not making me proud. I was very happy at least. My lowest level of achievement was an E. I got an E symbol in Grade 10 first term because Grade 9, I passed Math. I think I scored a B and when I went to Grade 10 [because] my friends that like mathematics they told me, that it is easy and since [then] I scored a B. I also told myself that mathematics is easy. So when I got to Grade 10 [for the] first term, I had a mentality that Math is easy. So, for the first term, I didn’t study. When others were studying I just looked at them, thinking that everything is in the head.

Li: I always aimed for an A and I got it, but when I went to Grade 9, I aimed for an ‘A’ but all I got was a C.

Ma: I don’t really have my best yet, I am getting better. The first time I got an A* in mathematics was in Grade 10, got 91% and this term also I got 92% in mathematics so every moment for me is the best. Every grade I get in mathematics, as long as it’s an A* for me it is the best moment. The worst symbol I have ever gotten is a C.

Me: High performance for me started in Grade 7 and it became a reality for me in Grade 10.

Se: Okay, I think my highest point was my A in mathematics Grade 10. Low point; maybe some of those times in Grade 5, and Grade 4 was you just didn’t care.

Ti: It was when I passed my Grade 10 [national] examination with an A symbol in mathematics. I heard a person who got an A in mathematics in Grade 10 final examination. People said, final exam is tough, so this is the highest performance for me. [Yes] I got an E symbol in mathematics in Grade 8 second term.

Evidently from Excerpt 2.13, the performance of learners varied from grade to grade and their encounter with the different teachers. For some participants, they performed well in primary school and saw their performance drop upon entering secondary school and picking up again in Grade 10. Most of the participants saw their grades in mathematics dropping to as low as symbol D or E in the early grades of secondary school but in Grade 10 they regained momentum and scored symbols A or B like *Ai* and *Ti*. Worth noting here is that none of the participants blamed their lower performance in mathematics to life adversities they experienced but instead through adversities they managed to bounce back to good performance at least in Grade 10. Learners show resilience of threat by others who scared them that mathematics was a difficult subject.

One participant spoke from experience and warned that a good performance in mathematics in one grade does not guarantee success in the next grade, but requires hard work in every grade to excel in mathematics. There is support for these results in the work of Washington (2008), who suggests that resilience may also depend on the context in which one experiences hardships. Some of the reasons for the drop in the performance mentioned were, playing with friends instead of doing mathematics school work, not working hard under the belief that “mathematics is easy” and just purely not minding about their performance in mathematics.

Theme 2.14: Good Mathematics Lesson

Excerpt 2.14 below highlights participants’ perceptions of the characteristics of a good mathematics lesson.

R: What is a good lesson of mathematics? What happens in a lesson when you leave and say to yourself; “that was a good one...”

Ai: It was a lesson whereby everyone in the class was quiet, the teacher was teaching with joy and the class was also concentrating on the lesson. When we came out of the class everyone’s face looked happy. They got what the teacher was trying to say and also when I understand.

Da: It was a nice lesson, when we were being taught factorisation and the teacher explained that there are four methods of factorizing, he explained them so well that everyone in the class understood them.

Je: Well actually the teacher should teach us not just give us an exercise to do and mark it for us.

Li: I believe, people must just have a positive attitude and then they must always listen and then ask.

Ma: I must learn new things and they should be very complicated [challenging] and but solved in a very easy manner. For a lesson to be a good one, must leave you wanting for more. You can only want more if you understand what is happening.

Me: There was a time, I think, it was this year where most of the learners did not understand and the teacher, was done explaining. She gave us something [reinforcement activity] to do and then I was the only one who got it [the activity] right. I felt so happy and they kept on asking me. And as I was explaining to them [peers]. I gained more knowledge. I felt so good,

Se: I think working out an equation that was so tough, you go out feeling so good, “yes I got the right answer” or that moment you wrote this test and everybody else failed and you passed, wow!

Ti: Instead of just being kind, the teacher should be fun. She/he should make jokes. When you laugh, you enjoy the lesson, so you would always be waiting [looking forward] to go back to that lesson. There must also be time that they [learners] are serious. So the teacher should respect the learners in the way that he expects them to respect him. The teacher should provide enough information to the learners on the topic that they are doing [learning] and explain very well to make them understand. [This should be done by] putting an exercise on the chalkboard and calling them [learners] to do it on the chalkboard and when they [learners] do a mistake you try to correct them.

Excerpt 2. 14: Good Mathematics Lesson

In Excerpt 2.14, participants emphasised that a good mathematics lesson is a lesson with a teacher full of joy, showing good command of the subject content and have explained the

concept using a variety of methods of solving mathematical problems. It should also employ good explanations that are understood by all learners such that the participants showed care for their peers. Results further reveal that a good mathematics lesson must leave the learners eager to learn more. A lesson was also considered good if the participants were able to complete their mathematics class activities. A room for laughter in between the lesson results in motivated learners who want to have mathematics lessons over and over again. However, some learners felt it was their responsibility to show ‘seriousness’ in class and respect their teachers. For a good mathematics lesson to take place teachers should also have good command of the subject content according to participant *Da*. This is how *Da* puts it: “It was a nice lesson, when we were being taught factorizing, and the teacher explained that there are four methods of factorizing, he explained them so well that everyone in the class understood them.” In addition, targeted opportunities should be provided for learners to discuss and share their methods of problem solving in mathematics. These results are in agreement with Banatao (2011), who notes that providing bountiful and meaningful opportunities for learners is crucial in embolden resilience in children. Similarly, corrections to the learners’ mistakes should be provided promptly and the participants indicated that they value feedback to their work and progress on a particular mathematics task. A mathematics lesson is classified as good when taught by an enthusiastic teacher; learners leave such a class with a happy face. A positive attitude amongst fellow learners was also mentioned as a key factor of a good mathematics lesson. In two cases for participants *Je* and *Me* they viewed excelling above their peers as an indicator of a good mathematics lesson.

Theme 2.15: Learning Support available for learning mathematics

Data presented in Excerpt 2.15 details the learning support that was available or unavailable to the participants while learning mathematics.

R: What kinds of supports are available to you? What supports do you feel that you need that are currently unavailable?

Ai: I only have the support of the teacher and my friends and my dad. I wish to have my cousins and family support, just by explaining where I do not understand.

Da: The only thing that made me study hard is because I want to have a laptop. [Who promised you?] My mother, No, she didn't say she would buy but I just said; "if I pass, she will buy me a laptop". [And she agreed?] No, she said, she does not have money and then I said oh! "You will buy", then she said okay. I knew she didn't really agree but I thought if I passed very well, maybe she will. [Did she eventually buy you the laptop?] No!

Je: Well yeah, I have a support when I study mathematics. I have to struggle if the teacher is not available. This is a bit confusing. I have my cousin that was also good in mathematics so she helps me too. The support I want that is not available is to get more serious. When somebody tells me to study, study, study is all I wanted. My dad threaten us that you should study or if you don't study you will end up in the street. "I won't support you" So actually that is the support I wanted from him.

Li: Support from my step sisters, from my neighbour, even teachers, you can even go to another school or even to some teachers who can help you.

Ma: My teacher and my mathematics textbook that we were given by the school (are my support base). I would like, the rest of the learners in the school to understand mathematics so that I can do better. If I know that a lot of us understand mathematics I would try my best to stay at the top; because sometimes it really gets boring if you are the only one performing. But if the learners change their attitudes towards mathematics, which would improve their performance, then I would improve my performance too. I would try to do better all the time and not limit myself.

Me: Friends, teachers, no extra classes, they are a waste of money. You have a textbook, a teacher, and different mathematics teachers at school and if you do not understand from a particular teacher, you can [consult] another teacher. So why pay for... you know I have seen a lot of people paying tutors and yet they fail. Different math teachers are there, we have different textbooks and learners in class, so why not ask [teachers and learners]. If your mathematics teacher does not explain very well, there are other math teachers [at the school].

Se: Honestly being part of the KYDP, I was told to appreciate what I have, as much as I saw other learners having all this excellent books I just told myself 'look, your parents don't have money to buy you that, so why cry over it or just worry about it when you know there is nothing you can do?'

Ti: I had family support, peer support and teacher support, but no extra resources. Yes, I need internet access for me to research information about mathematics.

Excerpt 2. 15: Learning Support available for learning mathematics

Data in Excerpt 2.15 show that participants' learning support differs from learner to learner. Some had more learning support than others. The support was from teachers, family, friends/peers and youth organisations. A few indicated lack of parental/family support with learning of mathematics or motivation to study hard in mathematics. However, *Li* and *Me* had more learning support with learning mathematics from teachers and friends. However, *Ti* felt that there are vast online learning tasks in mathematics online but he did not have access to internet. Lastly one participant (*Se*) wistfully indicated that she would have loved to have extra mathematics books but she realised that due to poverty her parents were unable to provide the extra reading materials. Yet, this learner encouraged himself to be content with what he has and not yearn for what he or his parents are unable to afford. She recalls that being a member of a societal youth program: Katutura Youth Development Program (KYDP) has taught her to appreciate the little she has and make the best out of it. These results are supported by Washington (2008) who maintains that resilience may develop because one can frame experiences in a more positive context rather than with a defeatist attitude. Evidently society can play a role in enhancing the resilience of learners through youth development programmes.

Theme 2.16: School Learning Support

The participants' perceptions regarding school learning support for mathematics are captured in Excerpt 2.16.

R: What is your impression of your school's support towards learning and achievement? Do you think the school is in support of the learners passing mathematics?

Ai: Yes Miss, because they show it by providing us textbooks, we don't share like in other subjects.

Li: At our school, they make sure that we have textbooks and then if there are no textbooks, they make sure that they make copies for us.

Ma: I think that the school considers it important that we perform well in mathematics because I see that most of our mathematics teachers give up their personal lives and come to school on Saturdays. They even go to the extent of coming to school on a Sunday to teach in order for learners to perform very well in mathematics. So they think mathematics is very important.

Me: There is support for passing math, because you know the teachers speak highly of math and encourages me a lot. Also the learners who were here before, were good in math. If you know math and people come and ask you for mathematics, you feel important and at school, the math teachers speak highly of mathematics and that encourage people to study harder. Even the learners, if you are good in math, the other time I was explaining to a boy something he did not understand and it makes you feel important. Not clear. I think there is a huge support in learning mathematics at this school.

Se: Yes, I think my school does because we have committed teachers. You have sometimes those teachers that will not show up for a week or two but here [at this school] no. If they [teachers] are not around then it is for a day or two and they are doing something serious. It makes me feel good and it makes my learning easy. When you know your teacher would be there, you can always go back to that teacher before you write your exam.

Ti: They give it importance because they only give an award if you get [score or obtain] a [symbol] A in Mathematics. The school provides support via prize giving [school has high expectations of the learners in mathematics].

Excerpt 2. 16: School Learning Support

In Excerpt 2.16 above, the participants described the form of learning support provided by the school as efficient. Schools give recognition of award to the learners who passed well in mathematics. For example, school awards a prize to the learners who obtained the highest score

(A or A* in mathematics), the schools avail some funds for prizes. This is done to encourage more learners to pass mathematics. School support is also evidenced by the high commitment and sacrifices of the teachers; such teachers are available for learners to consult when necessary and they taught mathematics even on Sundays. For example, *Ma* [Interview 14 April 2015] said: *“I see that most of our mathematics teachers give up their personal lives and come to school on Saturdays. They even go to the extent of coming to school on a Sunday to teach in order for learners to perform very well in mathematics.”* According to Rutter (1979) effective schools focus on academics, clear expectations and rules and high levels of learner involvement, the result is high rates of attendance and academic attainments. Participants recounted that they had teacher encouragement and motivational talks on mathematics. Benard (2004) in support of these findings established that children achieve more when they are directly taught that intellectual development is something they can all achieve through effort, as compared to something only some people are born with. Another indicator of school support was in the form of availability of mathematics textbooks and no learners were sharing a mathematics textbook in some cases the school had to make copies of mathematics textbooks.

Theme 2.17: Good Learner-Teacher Relations

Participants’ descriptions of learner-teacher relations are outlined in the following excerpt, Excerpt 2.17.

R: If you could imagine an excellent relationship with your Mathematics teacher in an ideal world? What would it be like?

Ai: We are not really close because we are just getting to know each other this term.

Da: It should be a very good relationship. The teacher must communicate with the learner openly, and when the learner's hand is up the teacher must not hesitate and say I am busy while he is not. If he is really busy with something important, he/she can tell the learner can come back later.

Je: Well it should be really be good. When you are asking questions in the class. The, teacher doesn't get mad but answer you with a smile on the face. The teacher should always have time for you.

Li: It would maybe be good and then he must be able to communicate and be free with him or her.

Ma: Mine is not a dream, I already have my ideal relationship with my mathematics teacher. Because sometimes, if he sees that, I am not in a good mood he would try to take time and ask "what's wrong, what's happening, is everything alright at home, can I help you with this?" Maybe if he sees that this child is really, really hungry during break time and has nothing to eat. He would take something from his pocket and say "take this and go buy yourself something to eat". He is generous and caring. It is not only about him being able to teach mathematics; he has emotions; he can relate to us in [different] ways.

Me: We have a good relationship.

Se: It is a relationship where we both can understand one another, where a learner is not afraid of approaching the teacher. Relationships where the learner knows that even if I fail a test, my teacher is not going to say "but you are stupid, how you can fail a test?".

Ti: For me, our friendship is not like a learner with a teacher. It is like I am with a friend, because we are so close, we interact very closely.

Excerpt 2. 17: Good Learner-Teacher Relations

In describing an excellent learner-teacher relationship participants used words such as: open communication allows room for learner independent while supporting their learning/when the need arises. Participants like *Li* and *Da*, mentioned that both learner and teacher need to understand one another, be free from fear for the learners to approach the teacher. A teacher-learner relationship should be free from the use of degrading terms towards learners in the

event of failure in a mathematics task or test. Benard (1993, p. 32) in agreement with these findings, notes that teachers who convey the message that “this work is important; I know you can do it; or I won’t give up on you”, have the power to promote resilience in learners. Participants described a learner-teacher relationship in which the teacher takes on the role of a friend. For example, *Ti* [Interview 14 May 2015] said: “*For me, our friendship is not like a learner with a teacher, it is like I am with a friend, because we are so close, we interact very closely.*” In such a relationship the teacher appreciates learners for asking questions in class and avails time for the learners, thus communicating care and showing emotions.

Theme 2.18: Tips for Excelling in Mathematics

Excerpt 2.18 that follows, sheds light on simple academic strategies employed by the participants when learning mathematics.

R: Are there any particular tips that stand out to you for passing Mathematics?

Ai: I would tell you that for you to pass mathematics, you must have the feeling of practicing a lot and the mentality of being hard [at work]. You must also listen in class. Have a positive attitude always.

Da: The first one is, think positive, you can do it, you can solve this problem, and always think [every] question has answers. Do not always say ‘no sir [teacher] I cannot do it’ or, ‘you gave me the wrong question’. You must always think ‘he gave it to me so I have to solve it, it has an answer’. Always try your best.

Je: Well, in the area of mathematics, you should not have a lot of things in your mind. You shouldn’t be worrying about other things, and you should just be calm and sit comfortably and just do mathematics.

Li: I believe you must always practice, never give up.

Ma: Not hating the subject. Having a positive attitude (towards the subject) and the desire to do better.

Me: There are no secrets to (passing) mathematics. ...listen in class when the teacher is teaching. If you do not understand you must try to work it out on your own. If you still do not understand or you do not get the correct answer, you know, we have different math teachers at school, and we have learners in the class who might understand better than you do, so you consult them for assistance.

Se: Yes, let’s say, one thing I learned about mathematics is that never memorize whatever is in the activities you are doing because mathematics is not always the same. For example, if you have an equation today that has different numbers and you memorize that, those are not the numbers you are going to get in the next exam. Also, with mathematics, “practice makes perfect”. I think with mathematics, you should be really willing to understand, but if you have a negative attitude, there is no way you are going to catch up with mathematics.

Ti: Well, encourage them to study very hard. It does not always [imply] that you should study at school. You can study at home. Make your time table. Wake up at 03h00 in the night, wash your face and have some coffee and study until you go to school. That would help you, because you are fresh, your mind is fresh and you would get something in your head when you go write [exams], you would know what to write.

Excerpt 2. 18: Tips for Excelling in Mathematics

Results presented in Excerpt 2.18 suggest that learners need to have a positive attitude towards the learning of mathematics coupled with a desire to do better. Furthermore, resilience in

mathematics requires focus on the mathematics subject content no matter the context i.e. environmental challenges that may be present (perceived efficacy). Participants also advise for learners to draw up well in advance a study time table/schedule for learning mathematics to lower the anxiety of learning under pressure in a short period of time (effective stress management). They also recommended that learners should always pay attention during a mathematics lesson and persevere in solving mathematical problems first on their own, then seek for help until the correct answer is found and giving up is never an option (self-regulation). In addition to that, *Se* suggested that understanding the nature of the mathematics content is crucial in determining the suitable learning style e.g. in mathematics memorizing will not yield successful results (problem solving). These findings highlight potential and promising factors commonly associated with resilience; perceived efficacy, persistence, self-regulation skills, effective stress management, and problem solving as identified by Masten and Obradovic (2006).

4.5 Phase 3: Reflection on the Meaning of Academic Resilience in Mathematics

During the third phase (Appendix 3, p. 283) participants were encouraged to reflect on the meaning of their resilient experiences. The aim was to address the intellectual and emotional connections between the participants' mathematics academic work and life. Making meaning required the participants to look at the facilitators that contributed to their academic resilience in mathematics. The emerged themes from the interview are presented as follow: Academic performance in mathematics, value of mathematics, future aspirations, defining experiences of learning mathematics, highlight of academic performance in mathematics, facilitators and barriers, experience vs expectations, opportunity for improvement, tips for excelling in mathematics, and facts on learning mathematics.

Theme 3.1: Academic Performance in Mathematics

Participants recounted their academic performance in mathematics, their responses were captured in Excerpt 3.1 below.

R:	How would you finish the following sentence: My academic performance in mathematics in Grade 10 was...??
Ai:	It was excellent because it also created [placed] a smile on my father's face. He did not expect me to get an A in Math, so it was really good for me and my family.
Da:	excellent!
Je:	Very good
Li:	Was good because I got the symbol that I aimed for.
Ma:	Excellent!
Me:	I would say not really impressive because, I could have done better, if I had parental support. If my parents could accept that I was writing the exams and if I had more time for my studies.
Se:	Amazing
Ti:	Very excellent

Excerpt 3. 1: Academic Performance in Mathematics

The participants all had good academic performance in mathematics. They used words such as excellent, good, amazing, very good and very excellent to describe their academic performance in mathematics. However, participant *Me* expressed that she was not impressed with her achievement in mathematics. She felt that she could have done better if she had parental support and free time to study instead of doing all the house chores.

Theme 3.2: Value of Mathematics

Excerpt 3.2 that follows summarises the importance of mathematics in the lives of the participants.

R: Given what you said about your life before you become successful, how do you understand/usefulness mathematics in your life?

Ai: Yes Miss, I think mathematics is like compulsory in all the careers and it is also good to know math because even though you are not working or you are just a mother in the house it helps you to budget and to plan.

Da: It makes sense to me because you learn how to count. Learning how to count is very important because it would help you in the future. If you have kids and then you don't know how to count, how will they...? They would even say "no, he is not my father", when you visit the school. It is just exciting and it is tricky, you enjoy it whenever you are solving a certain problem.

Je: Well as for me, mathematics is okay. There are parts that don't make sense and parts that makes sense. Actually, the part that is okay is mensuration...it make sense in real life. But for algebra expressions, till now, it does not make sense. All I ask is "what is the use of us being taught about this, if we are not going to apply it in real life?"

Li: Mathematics is very important because in every career that you choose, math is always required, so it is very important.

Ma: It is almost everything to me. Everything I do, basically becomes mathematics. I use mathematics terms when I speak to my friends, the terms we have learnt from the class. I would just say a joke such as "stop acting like a simultaneous equation, make it easy for me to know what's wrong with you, make it easier to solve when she just laugh at the joke, she becomes ok."

Me: Actually for me, I feel that I understand mathematics. I feel people who are really good in math are important. A teacher at our school [had a book]. About the historical background of mathematics. Those guys [the writers] really inspired me. [Also], if I look at previous Grade 12 learners, there was a boy who helped the teachers to do sums and that boy really inspired me. I think mathematics is a very important subject.

Se: As much as mathematics is all about the numbers, it is also a subject were you can learn how to go about life situation. For example, algebra is so hard but once you are determined to solve whatever equation, you can solve it. So this, can, it can reflect back in life if you are faced with a certain situation, 'where there is a will there will always be away'.

Ti: To me mathematics is the key to all other careers. It is the key to success. You can never be successful without mathematics. Mathematics to me makes very much sense to me, because I understand it very well. I can take something that was not taught in class and by the time we do that topic, I have already gone through it by myself on my own [proactive, self-directed] and manage to get most of the things [exercises] right, so I understand it very well.

Results presented in Excerpt 3.2, show that the participants considered mathematics as a relevant subject that adds value in their lives. Career, general conversation with peers, to solving real life experiences and a predictor to a successful life. For example, *Ma* value mathematics so much that it is reflected in her life whereby he uses mathematics terms in her conversations with peers. Most of the participants linked the importance of mathematics to career choices as it is part of entry requirements to many of the lucrative career options. Another participant value mathematics because it teaches counting which he considers a valuable skill in life. Another participant narrated that mathematics is important because the problem solving skills utilised in a mathematics classroom are applicable to solving real-life problems. For another participant, excelling in mathematics is a predictor of success in the future. In addition, one participant felt some topics in mathematics are valuable in real-life situations while others are not making sense to her at all.

Theme 3.3: Future Aspirations

Results in Excerpt 3.3, gives a presentation of the future aspirations the participants.

- R:** Given what you have reconstructed/ described in these interviews, where do you see yourself in the future?
- Ai: It means a lot because if you want to go to the school of medicine you have to at least get a good symbol in mathematics.
- Da: Okay, if I don't die I see myself very successful as a CA- Chartered Accountant.
- Je: From here, I actually want to go to UNAM and just become a successful optimist.
- Li: For me, I want to be a teacher, to teach mathematics. I also want to encourage kids that have negative attitude about mathematics to change and have a positive attitude towards mathematics.
- Ma: I want to go to university and study Accounting, Economics, Mathematics or Education. I want to be a teacher in Accounting, Economics or Mathematics.
- Me: Actually my dream was to become a psychologist, but ever since last year I saw my passion in mathematics. I changed, and wish to try to do something that I truly desire a career as an engineer. Really now I want to become an engineer or do a bachelor of [science in] mathematics.
- Se: Okay, I think with mathematics, whatever field or whatever I am going to study in the future I think mathematics will help somehow somewhere. Now I am doing commerce, but mathematics is coming in. So, it's just not one of those subjects that I am good at and so be it. I am planning to become a chartered accountant; there are some parts of mathematics that are really helpful when it comes to accounting subjects. Well, I have always wanted to become a psychologist yes, because of certain reasons. The reason why I want to become a chartered accountant is because; first, it is the field of study that I follow and secondly, I just want to prove to my family, and to everybody that I can actually achieve something big.
- Ti: It tells me that there is a career that I am going to choose. I will be successful because I know mathematics. I will be a CA (Chartered Accountant), Economist or a mathematics teacher. My career must involve mathematics.

Excerpt 3. 3: Future Aspirations

Findings shown in Excerpt 3.3 show that the participants aspire to become successful professionals in different fields. Most of the participants are majoring in the commerce field except for *Ai* who majors in Science. They placed emphasis on having excelled in mathematics as opening doors to their future careers. Some of the careers that they are hoping to join in the future are: chartered accountancy, medicine, mathematics education, and engineering. Hence these resilient participants have a sense of a bright future. In line with the work of Anderman, Austin and Johnson (2002), who observed that goal direction and educational aspirations are attributed to learners' success in school; for example learners who follow these careers were influenced by their educational achievements, especially in mathematics, even though they might not have come from poor backgrounds.

Theme 3.4: Defining Experiences of Learning Mathematics

Participants described the defining experiences of learning mathematics; their narratives are presented in the following Excerpt 3.4. However some participants' responses were omitted as they were not answering the question.

R:	What would you describe as one of the defining experiences of leaning mathematics?
Da:	Grade 8, because we learned new things. At primary school they didn't really teach us about algebra. When we came to high school, it became taught because of algebra. We thought that when the Sir [teacher] was explaining things such as $1+b$, we wondered how? "No, it is too impossible" but when the Sir [teacher] was done solving the problem, we realised, "ooh now it makes sense."
Ma:	Excelling and becoming good at the level that I am, getting my first A* in mathematics. That is what excites me the most.
Me:	I would say, when you try to understand math, there are people who inspire you and those who discourage you. It is when you get to understand mathematics, and this started in Grade 7 [turning point].
Ti:	It was when I passed my Grade 10 [national] examination with a Grade A in Mathematics. Because I never heard about a people who did that, getting a Grade A in Mathematics in Grade 10 final examination.

Excerpt 3. 4: Defining Experiences of Learning Mathematics

Results in Excerpt 3.4 show that some of the participants like *Da* were excited and they appreciated learning new things e.g. introduction to algebra, and these became part of defining experiences of learning mathematics. However participant *Ti* recounted that it was a defining moment for him to obtain symbol A in the final Grade 10 national examination that made him feel very proud of his achievement. For participant *Me*, her defining moment occurred at primary school where she finally realised that she understood mathematics.

Theme 3.5: Highlights of Academic Performance in Mathematics

Participants shared their best moments and challenges encountered while learning mathematics. The highlights of the participants' academic performance in mathematics are presented in Excerpt 3.5.

<p>R: If you had to think back on the highlights of your academic performance in mathematics, could you describe one of the best times? Could you describe one of the more challenging moments?</p>
<p>Da: When I got an A* in Grade 4.</p>
<p>Ma: I think those Grade1 years, when the signs were so confusing, the numbers, you did not understand what you were doing, and you just copy numbers.</p>
<p>Ti: Okay, I enjoy learning the topics of transformation and algebra. Although my peers say algebra is tough, for me I enjoy it and it is easy. It was more challenging for me when I learnt how to calculate tax. In Numbers and Operations [we] where given an electricity receipt and to calculate the bill. But apart from content issues, it is challenging when I learnt mathematics in a group with my friends. It makes me proud to help others. Another challenge was when I was revising my mathematics work, then suddenly someone started playing loud music in my neighbourhood and I could not concentrate, because of noise.</p>

Excerpt 3. 5: Highlights of Academic Performance in Mathematics

Findings recorded in Excerpt 3.5 indicate that the participants' experiences of learning mathematics were not free from challenges. Reported challenges included calculating tax, the four operation signs. This was, especially the experience of *Ti*. He further recounted that it was challenging for him to learn mathematics in groups but it was fun for him to be of service to his peers via peer tutoring. For another participant, the challenge emerged from the neighbourhood where nearby bars play loud music. For example *Ti* said: *“Another challenge was when I was revising my mathematics work, then suddenly someone started playing loud music in my neighbourhood and I could not concentrate, because of noise”* [Interview 14 May 2015].

On the other hand there were best moments too in which the participants felt happy for excelling in mathematics. For example one participant recounted that his greater moments in learning mathematics was when he scored an A* in mathematics. Participants also shared how they overcame the challenges they faced while learning mathematics, such as relying on self-encouragement when the environment you are in would not provide it and finally also praying which has the power to provide hope. These findings are supported by Bliensens and Loser (cited in Buthelezi, 2007), they argue that constructs such as hardiness, adaptation, adjustment, mastery, plasticity, and social buffering are part of resilience.

Theme 3.6: Facilitators and Barriers

In learning mathematics the participants described the facilitators and barriers which are summarised in Excerpt 3.6 as follow:

R: If you had to think about your successes and challenges in learning Mathematics, what do you think contributed to your successes? What would you describe as your biggest challenges? Can you describe these facilitators and barriers?

Ai: I like to always concentrate in the class; I really don't make noise in class. I always focus on the teacher and I do a lot of practice. I changed my attitude towards mathematics being difficult.

Da: I think what mostly contributed was "every problem can be solved" and also that I wanted to have a laptop and I want to have money when I grow up. I started being serious. Those things pushed me up. Every time I thought about that, I just took my math book or any book and I started studying.

Je: Well, actually what contributed was my hard work, my parent; my dad and my Maths teacher.

Ma: The support that I got from my family, my teacher and myself as well; my patience for mathematics, when I changed my attitude, my desire to pass the subject. I struggled to understand questions being asked during tests when I was in grades 8 and 9 and not understanding the difference between Math signs when I was in lower primary.

Me: I am a person who is determined, you know, I hate failing so I have to make sure that I ask a teacher or someone or even a learner if I do not understand something. Through explaining to other people that also made me gain more knowledge. By "accepting and loving the subject, making it my responsibilities to do that or let me say making it my passion

Se: Okay first of all, let me start with myself; I am a very positive person. I am hard working and I am looked up to [role model], so I always have to make sure that I achieve certain grades. I am quite, how can I put it? I have that willingness in me, I am willing to learn whatever it is that I know it will be beneficially not only to me but to the next person, and my friends. First of all I think my best friends; the deputy head girl and another LRC have been, always there for me, so when I do not understand a math test they would say, "Can I help you"? Or how can I help you"? If I fail a math test, they are not those people that would tell you; "oh it is just math, just leave" but they would always tell you "okay fine you failed this math test, what are you going to do about it"? Are you going to sit on that test paper that you failed or are you going to do something about it?"

Ti: Successes: my Grade 1 teacher. Since I was in Grade 1 my mom used to encourage me. My mom expected me to pass very well. She told me that the only thing that made her happy was when she saw me studying and I passed. She brought me prospectus for various universities (UNAM, NUST, and IUM). She advised me that education is a good field to study because you get work easily.

Results presented in Excerpt 3.6 above, indicate that facilitators to learning mathematics can be classified as: individual traits, teacher support, family support, and friends and peers encouragement. And the following were some of the barriers to learning mathematics: negative attitude towards learning mathematics, poor comprehension of mathematics questions in tests. For example participants like *Ma*, *Me* and *Da* pointed out the importance of having a positive attitude towards learning mathematics, hard work, and a sense of willing to learn the subject as key components to excelling in mathematics. According to Banatao (2011, such individual traits are illustrative of the positive developmental outcomes of resilience. In addition to that, participants expressed that being determined to pass mathematics has the power to motivate learners to excel in mathematics. For example *Me* said: *“I am a person who is determined, you know, I hate failing so I have to make sure that I ask a teacher or someone or even a learner if I do not understand something”* [Interview 27 April 2015]. Most of the participants have teacher support and friends support. However, a few mentioned that they had/have family support which is influential in their performance in mathematics. On the other hand, some individual participants mentioned how they have benefited from peer tutoring. Participants maintained that, peer tutoring improve their understanding of the subject as they explain to their peers. He’s (2014) study, indicated that resilient learners who possess self-efficacy, coping skills and educational aspirations tend to excel in mathematics. However *Ma* described her struggle to understand mathematics questions in a test or class activity in the early grades of secondary school as a barrier to her learning of mathematics.

Theme 3.7: Experience Vs Expectations

Excerpt 3.7 put forward the participants’ experiences with regard to their expectations of learning mathematics.

R: How did your experience compare to your expectations at the beginning of the school year?

Ai: I expected to get a C in mathematics and I ended up scoring a B. I expected a C because I had that mentality of mathematics being difficult and I was not good and my teacher did not explain in a better way, so I thought the next teacher was going to be the same.

Da: I targeted an A in mathematics.

Je: Well, my expectation in Mathematics at the beginning I thought I was going to fail mathematics because we swapped teachers. I got a new teacher in Grade 10, I was used to the one from grades 8 to 9. I thought I was going to fail as we were going to be taught different things from what we were taught already. I thought it was not going to be the same at all. I expected to fail mathematics because I was not used to him [the new teacher] and he did not know my name.

Li: Like Grade 10 first term, I got a B and then I worked harder and harder, even stay at school after school; Saturdays I came to school and then at the end I got an A.

Ma: I expected to do better and score a high mark. To continue performing well in mathematics, that is what I expected to do and that is what I wanted. At the end of Grade 8, I expected a B, at least a B, not a C. However, at the end of Grade 10 what I wanted was an A because I knew that now I had confidence in myself and I knew that if it was possible I could actually get an A in mathematics.

Me: I have achieved my target symbol for mathematics. Set out to get an A and obtained an A.

Se: I didn't expect to get an A, I seriously didn't. You know they say that you should aim high so that when you fall, you don't really fall low (my dad). He would say that if for example you aim for an A, when you to fall, you will fall on a B, if you aim for B, then you are going to fall on a C if you fall. When I got to Grade 10, we were asked to draw our target in whatever subject. I was sitting there and wondered: "an A in math"? It is a national exam, you don't know who is going to mark your paper, and will you really get an A? But I just kept it like that. I decided I was going to make a way to get that A.

Ti: I was not surprised by my performance in the final examination; it was exactly what I was expecting. I always had been expecting the score of an A in the national examination. It was nothing new to me.

Excerpt 3. 7: Experience Vs Expectations

Results presented in Excerpt 3.7 above indicate that participants had high expectations of their performance in mathematics in the Grade 10 national examination. For many of the participants setting achievement targets is important and they worked hard to achieve them. Evidently, one participant *Ma* performed below her set target in Grade 8, some participants like *Ai*, *Se*, and *Li* surpassed their target of achievement in mathematics with some participants achieving exactly what they set out to. Participants held high positive expectations of themselves in excelling in mathematics- this is known as self-efficacy For example *Me* [Interview 27 April 2015] said: “*I have achieved my target symbol for mathematics. Set out to get an A and obtained an A.*” These findings are supported by Benard (1993), who argues that learners who set high goals are committed to achieving those goals when they exhibit high levels of self-efficacy. Their expectations were informed by their previous performance in mathematics from previous grades and the perception of the complexity of mathematics as a subject. One participant described that she was afraid of failing mathematics due to the change of mathematics teachers. According to Spruill (2011) learners glean information about their academic abilities through grading, teacher evaluations, and comparisons to their classmates’ achievements.

Theme 3.8: Opportunity for Improvement

Participants shared how they would have improved their Grade 10 results in mathematics, Excerpt 3.8.

- R: If you had to do mathematics at Grade 10 again, what would you do differently?**
- Ai: I would want to practice Math more, rather than watching TV because I used to watch TV a lot. So I did not get enough time to study Math.
- Da: I would concentrate more on algebra because when the teacher was teaching algebra, and I didn't understand I used to give up. Sometimes I did not concentrate and I thought about other things. [You mean when you lose concentration you sleep?] No, my body was there but my mind was elsewhere.
- Je: Well, there is something I would do differently. I would practice Maths more and just give it much attention than I did before, it [practice] leads to good results.
- Li: Maybe I would ask different teachers and I would see how each of them would help me to understand.
- Ma: Nothing, I would do the same thing I did. I would not do anything differently because the strategy that I used in Grade 10, I will use it again, I will still get the same results so...
- Me: I think I would concentrate more on math and maybe score even a 100% in mathematics Grade 10 if you are really determined. I would maybe put aside TV and focus on mathematics.
- Se: You know, first I would say if only there was a higher symbol though, so that maybe...so I think...
- Ti: I would pass with an A*, by studying hard and concentrating hard in the class. Whenever I do not understand something well, I would not try it on my own but rather go to the teacher. And also I would master the textbook.

Excerpt 3. 8: Opportunity for Improvement

As can be seen in Excerpt 3.8 above, many of the participants indicated that given the opportunity to re- write mathematics examination they would aim to improve and work harder to achieve better results. However *Ma* reported that she would not change a thing given a second chance to do mathematics at Grade 10 again, because she is certain that if she followed the same strategies as before it would yield the same happy results. One participant would concentrate more in class to avoid being a victim of mental absenteeism and do more practice solving mathematical problems. Another area of change would be more consultation hours

with teachers and where possible, different mathematics teachers to see which one explains the concepts better. This willingness and desire to excel in mathematics may account for their achievements in mathematics Grade 10 national examinations.

Theme 3.9: Tips for Excelling in Mathematics

Excerpt 3.9 touch on the participants' tips and advices for excelling in mathematics.

R: If you were asked to speak to a group of Grade 10 learners who are preparing for the mathematics national examination, what advice would you give them?

Ai: I would tell them that you cannot study mathematics overnight, and you must also keep practicing mathematics for you to know it and also seek help where you don't understand.

Da: Advising them not to panic and when they are done answering the questions, they must go through again, there might be mistakes and always trust what they got in their answers, or trust their answers.

Je: The kind of advice that I would give them is that they should study mathematics and they should never give up on studying. They should not memorize, they should study to understand... Even though they come across a tough equation or something they should not just give up on it or say "I will not master it", I would advise them to actually go to the nearest person that is good in mathematics to help them out.

Li: Firstly never give up. Practice, be committed, ask for help from people, even if you are not sure, you never know if that person can do it or not.

Ma: I would tell them to relax and not to panic and encourage them that mathematics is an easy subject. While they are writing the examination, they should not be thinking about the negative things in mathematics. They should just concentrate on the things that they are doing at that moment. I would actually tell them that they should not try to study mathematics like other subjects. For example, sitting with the maths textbook and paging through, you will not learn anything. They should practice the things they have learnt. They should ask if they do not understand. Mathematics is not like a subject where you explain, you must know how to do the things.

Me: I would tell them that, the first thing is the relationship between the teacher and the learner. Secondly, they should not hate the subject or hate the teacher because if you hate the subject, you won't really get the interest of studying it or you won't really understand the subject. The third thing is, you should practice math. If you hate the teacher, you would be sitting in the classroom hoping for the lesson to be over. Mathematics is all about practicing, if you want to get good grades in mathematics you should practice math and ask learners or a teacher that you are comfortable with when you do not understand.

Se: Okay, first of all, I would tell them that no symbol (grade) is impossible. So if you want to get an A in mathematics, you can actually get it. I would tell them that, it is very important that you have a positive attitude towards mathematics because that is the only way you are going to excel in mathematics. I would also tell them that it is very important to practice, because mathematics is not a subject where you just have to read. You have to sit down and practice your mathematics. I would also tell them that whatever test you write, even if you get 2 out of 15, don't throw it away, because you actually learn from that.

Ti: I will always advise them that they should study hard and then they should never be afraid to ask when they do not understand. They should feel free to ask whenever they do not understand. I would make sure that, for example after calculating their answers, they should go through it again and see if it is correct. They should try to master the tough topics first like Geometry.

Excerpt 3. 9: Tips for Excelling in Mathematics

Emerging from the data in Excerpt 3.9, is that learners should strive to have a positive attitude towards mathematics. According to the participants, there is no secret to excelling in mathematics. Consequently, learners with a positive attitude towards learning mathematics display characteristics of being determined, and committed, seeking help from peers and teachers, avail time for studying mathematics and see every failure in mathematics as an opportunity to learn and to do better. Apart from that, participants advocated that it is important to understand the nature of mathematics which they described as a “to do” subject. It is therefore extremely important for learners to practice what they were taught in mathematics regularly if they are to excel in the subject. Supporting these findings, Bandura (1995) suggests that when people experience feelings of success, they believe that they have skills to succeed and will be more ready to bounce back from setbacks or failure. According to the participants, it is crucial for learners to be responsible for their own performance in mathematics and keep the faith that they can achieve any symbol in mathematics.

Theme 3.10: Learner- teacher Relationship

In summary, Excerpt 3.10 presents teacher-learner interactions as recalled by the participants.

R:	How would you describe your relationship with your Mathematics teacher?
Da:	It is good because we communicate well and try to get help from him where I do not understand.
Je:	Well the relationship I have with my teacher, is good.
Li:	For this year she is good, she is a person who makes jokes. She is fun, she is good at explaining, even if one person understands, and she make sure that everyone understands before she goes to the next thing.
Ti:	It is still good. I interacts with my teacher more. I receive all that I ask from my teacher.

Excerpt 3. 10: Learner-teacher Relationship

As reported in the earlier phases of the interviews, the participants had/have good supportive relationships with their mathematics teachers as presented in Excerpt 3.10 above. They highlighted the importance of good communication and good command of mathematics subject content by their teachers. Waxman et al. (2003), maintain that resilience is promoted by schools that provide attentive caring teachers and good teacher-learner relationships for the learners to have good performance.

Theme 3.11: Facts on Learning Mathematics

Participants shared facts from their experiences of learning mathematics which are shown in Excerpt 3.11 which in turn informs their meaning of academic resilience in mathematics.

R: What has this experience taught you about learning mathematics?

Ai: For you to learn mathematics, you have to be a hard worker, you must have a positive attitude towards mathematics, and you must always pay attention to the teacher whenever he/she is teaching. It also requires you to practice more.

Da: It was not easy, because when you start learning mathematics, you learn new things. It is not like English where you learn nouns in Grade 4 and then you learn nouns again in Grade 8. In mathematics, [yes] in Grade 4, you learned normal division but Grade 8 you learned division with different methods, so it was very tricky but at the same time exciting because you know when you are bored you can always take your mathematics book and start working on it.

Je: Well, telling someone about learning mathematics, I would tell you that mathematics can be both tough and easy. So, if mathematics gets tough on you, it will be very tough on you forever but if it gets easy it will be very easy till the end. Mathematics is very important because you use it in every day's life. Everything you do is all about mathematics it is very important.

Li: Mathematics is all about numbers and you just need to apply your knowledge in order to get that certain thing and its fun if you are committed; it is very fun and enjoyable.

Ma: My experience in mathematics taught me that; in order to really succeed in a subject like mathematics, you need to love the subject, be willing to be helped and if you do not understand something, you should be willing to ask be willing to receive the help that you are asking. Try to enjoy the subject. A teacher that gives time, that explains to a learner not to a professional, and not aggressive and loud and the one that is able to relate completely with the learner.

Se: Okay, I will tell them that learning mathematics is not bad at all, with mathematics it is not about what the next person thinks about mathematics. There will be this person that will tell you, but mathematics is hard, it is not, there is nothing hard about mathematics, it is about how people think. So if you have a mentality that mathematics is a hard subject, or a tough subject, then it is not going to work. I would tell people that you can pass mathematics if you want to pass mathematics. I would also tell them that, it is not about what you think about the teacher or about 'that the teacher does not teach well'. It is about you sit and listen and try to understand, put away whatever you think about that person that is giving you mathematics. In many cases, you will find teachers who tells you that 'I get paid so whether you listen to me or not, that is your baby to feed' so it is all up to you, it is all in your hands it is something you can control.

Ti: Learning Mathematics requires much more attention than any other subject does. It requires you to pay full attention, it requires time, you can never be good in Mathematics unless you spend time doing Mathematics. It also requires a good teacher, the kind who can explain mathematical content very well.

Excerpt 3. 11: Facts on Learning Mathematics

Findings presented in Excerpt 3.11 shed light on key aspects of learning mathematics and excelling in it. For some participants they maintain that love for the subject and ability to concentrate during mathematics lessons are key to excelling in mathematics. They further advise that learners should be willing to seek help from their peers and teachers. There is substantial support for these findings in the work of Henderson and Milstein (1996), whose study revealed that learners use external sources to resolve problems, with the teacher being the most consulted person, followed by a trustworthy friend. Participants hold the opinion that consulting with peers provides many different views that could be helpful to understand mathematics. A few insisted that family support is essential for excelling in mathematics- it provides the learners with a reason to succeed.

Although the participants stated that mathematics is important in their daily lives, they also cautioned that learning mathematics can be difficult or easy and very time demanding. For example, learning mathematics requires time and commitment to do mathematics schoolwork (practice). Therefore learners' performance is in their own hands. According to Benard (1993) resilient learners are autonomous in the sense that they have the ability to act independently and exert some control over their environment in which they learn mathematics. Furthermore participants promote learning mathematics that is unclouded by peers' perceptions of the subject or the teacher's personal traits. Thus hard work and positive attitude towards mathematics yield good academic achievement in mathematics. These findings are supported by Benard (2004), who states that learners' positive outlook of self, fosters a pride in learning and promotes positive development in school.

4.6 Summary

In this chapter the collected data is presented, analysed and interpreted according to the three phases of the interviews. The researcher presented an overview of each participant in order to capture the life focus story of each learner and their experience of academic resilience. The chapter further presented relevant emergent themes with the raw data outlined in the form of excerpts.

Findings show that some of the participants are orphans or live in single-parent families. Despite that, these learners have strong relationships with family, peers or teachers. In most cases, these learners were born to un-educated parents and did not receive parental support for their academic work in mathematics. As a result they relied on teachers' and friends' support for learning mathematics. Thus participants did not receive sufficient external support with the learning of mathematics.

Furthermore results indicated that these learners faced challenges while learning mathematics. The first challenge was found to be neighbourhood in which they lived, poverty stricken and characterized by violence, alcohol and substance abuse. As expected these neighbourhoods made it nearly impossible for the learners to focus on mathematics activity due to the noise emanating from the surrounding bars. Secondly, the same local communities failed to provide the participants with role models in mathematics which learners could emulate. Fortunately these resilient learners were self-determined, self-directed and possessed high levels of self-esteem, and coping skills. Thus they relied on internal personal traits of resilience to overcome these challenges; e.g., they stayed at school after hours, utilized community libraries or waited for the noise to subside until twelve o'clock mid-night to concentrate on their mathematics activity. Giving up was never an option for these learners. To overcome the issue of lack of role models, participants turned to their mathematics teachers to instil in them the love for mathematics.

Learners described their learner-teacher interactions as very good and strengthened by good communication and mutual respect. Evidently the learners were free to consult their mathematics teachers and they reported that they view their mathematics teachers as friends. In short their teachers were reported to have a positive attitude towards teaching mathematics. They spoke highly of the subject and were so committed that they taught even on Saturdays and Sundays to ensure that their learners understood mathematics and the learners in turn worked hard to perform well in mathematics to compliment the teachers' efforts. These teachers were also reported to have faith in their learners' mathematical capabilities and they never give up on their learners.

Regarding learning and excelling in mathematics, learners emphasized that the nature of the subject dictates the suitable method of learning it. They described mathematics as a "to-do" subject that heavily borrows from the saying "practice makes perfect" they maintain that the best way to learn and excel in mathematics is through practice of mathematics activities. Participants further cautioned that in addition to making time practice mathematics activities, you need a positive attitude towards learning mathematics, seek help when necessary and never give up in the face of failure.

Overall the nature of resilience in mathematics is not consistent but evolves with the events and life circumstances in the lives of the learners. Thus participants reported that their journey of learning and performing well in mathematics did not follow a straight path but alternated at different levels of schooling. Some of the participants performed well in mathematics at primary school level and saw their performance dropping at entry grades of secondary school and another group of participants performed poorly at early primary school grades and picked up again at secondary level. Nonetheless they did not blame their low performance unto the life adversities they faced but rather chose to take it all in their stride and continued to excel in

mathematics. And their high achievement in mathematics informs their sense of a bright future. These learners have aspirations to become professionals in the next five years.

The following chapter will present the concluding remarks of the discussed data according to the research questions of the study.

CHAPTER 5: CONCLUDING REMARKS

5.1 Introduction

In this chapter, findings from the study were synthesised in order to answer the research questions. This involved merging themes to develop clusters of meaning of the experiences of academic resilience in mathematics as a phenomenon in its settings. Firstly results were concluded according to themes, secondly according to the literature and thirdly with respect to the research questions of the study.

5.2 Display of academic resilience in mathematics and the context in which these resilient experiences occur

The concluding remarks of results on the display of academic resilience in mathematics and the context in which these resilient experiences occur will be done in the following manner: firstly concluding remarks on the home background of at-risk Grade 10 learners with resilient outcomes in mathematics, followed by their social background, then conclusions on their experience of academic resilience in mathematics, and finally a conclusion on the role of teachers and peers in influencing the academic resilience in mathematics of Grade 10 learners at-risk.

5.2.1 Home background of at-risk Grade 10 learners with resilient outcomes in mathematics

The findings from the learners' interview questions have provided some evidence that the majority of the learners at risk of school failure lived in poverty-stricken neighbourhoods in which families operate bars and cuca-shops to make a living. Most of the learners were orphans and lived in single-parent households or with guardians or step-parents. Many families consisted of 4-13 siblings and many parents were unemployed or employed at low paying jobs such as domestic worker or general worker and had low levels of education. For example, *"...dad only went until Grade 8. He works as a general worker"* [Mercia, Interview 27 April

2015] Although many of the participants were orphans, it is worth noting that they have healthy relationships with a parent or/and other family members which is a promoting factor of resilience as supported by Resnick et al. (1997) and Wehlage et al. (1989) who agree that learners who express strong social bonds with adults and peers prove less likely to disengage from school and more likely to participate in the school life and achieve.

In addition to low employment status, the parents of the six participants were not educated beyond primary or secondary school; in one extreme case parents did not attend school at all. This was the case for Lineekela [Interview, 16 April 2015] who explained that her “*parents did not go to school...*” at all. These results are in agreement with Schoon et al. (2004) who observed that socioeconomic adversity is a significant risk factor for educational failure as it influences consequent adjustment in work and health related outcomes. As a result of low level of parental education, many of the learners were challenged to learn mathematics on their own without parental support (Perez et al. 2009). For example, Mercia [Interview 27 April 2015] indicated that she does “*not get any parental support with [her] learning.*” Poor parental education should, however, not be acceptable as an excuse for poor or no parental support in education, since it can come in various forms such as: checking homework, attending school meetings and events, discussing school activities at home, encouraging children to spend time on studying and doing their school work, to mention a few. Being appreciative of her parent’s support, Maria said: “*My father motivates me very well... he always tells me to pray to God for help when I do not understand my school work*” [Interview 14 April 2015].

Results also revealed that many participants had no role models since their family members were not good at mathematics. Instead, some lived with parents or siblings that had dropped out of school. For example, Jessica recalled that her “*family members are not really good in mathematics,*” she studies on her own. David could also remember that his father “*...dropped out of school long time ago. [His] mother went as far as Grade 10, [but] she failed Grade 10*”

[Appendix 4, Interview 29 May 2015]. For David it must have been immensely difficult to hope to pass a grade that his own mother had failed and to still look up to her for academic support. In fact, some of the participants maintained that their parents/family did not influence their learning of mathematics positively. This lack of role models in mathematics was another challenge that resilient learners had to overcome in order to perform well in mathematics. Also worth noting is that some participants were fortunate enough to have a sibling or a cousin who was good in the subject and able to support them with their learning of mathematics. In the same vein, Werner and Smith (1988) stated that family role models play an important role in providing protective assets for resilient youth.

Evidently resilient learners often lack parents who possess the necessary academic knowledge to directly assist and support them with their school work (Sanchez et al., 2006). Despite this reality, Mercia's complete lack of connection and support from her family is rare. Learners who believe that their parents did not care about their school work are likely to lose interest in and commitment to school work, which might result in low motivation and ultimately poor academic performance but that was not the case with the resilient learners in this study. Instead, they exercised autonomy in the face of a dysfunctional family environment (Benard, 1993). This is evident in the cases of Mercia (Me), who managed to remain positive in the face of verbal abuse from her aunt and focused on learning mathematics instead.

5.2.2 Social background of at-risk Grade 10 learners with resilient outcomes in mathematics

Emanating from the data were the challenges and stressors the resilient learners faced on a daily basis in learning mathematics at home. As alluded to earlier, these learners lived in poverty-stricken informal settlements where loud music and noise coming from the nearby bars were reported as a constant challenge in their home environment. For example, Aina described her home atmosphere as follows: *“My home background isn't one of those that one would*

dream of; in fact you can say it is not a learning friendly environment, I had to learn mathematics in an environment known for its noise and lack of space to study. However, with the school circumstances it was a better sphere to study in as it was peaceful, quiet and study friendly. It had support of the table and chair which made it even more study friendly. At school there would always be somebody to help you with learning mathematics' [Interview 28 May 2015]. These findings seem to urge schools to become the fortress in challenging times and provide the much needed quiet and conducive environment for the learners to study and do their school mathematics work.

Most participants reported that learning mathematics at school was best and perhaps the only option for some of the participants, because at school there was support in terms of a chair and table and peers who could provide support with learning mathematics unlike at home. The profound message here is that participants found support for resilience in simple things like chairs and tables that other learners take for granted. These findings are in agreement with Garnezy (1991) who insists that schools should provide a refuge for children and serve as a protective shield to help them withstand the multiple challenges they are faced with in this stressful world. This is a serious cry for help from the learners, and the Ministry of Education supported by schools should try to address the issue by providing 24/7 study centres where learners will have a supportive environment to do their school mathematics work free from noise; without these centres learners would be at risk of school failure (Henderson & Milstein, 1996; Wright, 2013).

Also emerging from the results is the fact that participants felt that their neighbourhood negatively influenced their learning of mathematics. Their neighbourhood climate was described as unfavourable to learning mathematics because violence and alcohol abuse seemed to be the norm on their streets. For one participant the home and neighbourhood atmosphere could best be described as hostile, dangerous, destructive, a place of hopelessness, unfriendly,

congested and suffocating, and yet she managed to perform well in mathematics. This is how Maria puts it: *“Our house is surrounded by shebeens, everywhere, from behind thus there is noise all around. And there are children in the house; you cannot really concentrate on what you are doing because they will be screaming around, jumping on top of you and stuff like that, so my neighbourhood is a no, no, no. Then there will be fights in the street; you will just hear people are throwing each other with stones, bottles are breaking and stuffs like that. We could even see the fights because they just fight like in front of our house because our house is located next to the road. These people have consumed alcohol, they are very drunk and cannot even stand on their feet. When they are drunk they start arguing and it leads to fights. This happens both during the day and evening”* [Interview 14 April 2015]. Owing to internal protective factors such as self-control and high self-esteem, problem-solving and coping skills, instead the participants chose not to drink and succumb to adversity and hardships. While other learner gave up and went along with everybody else, resilient learners focused on working hard, thus ensuring a good academic performance in mathematics. For example, to overcome the challenge of noise at home and lack of space and support for learning mathematics, some learners opted to study at school while others went to the community library and the third group resigned themselves to waiting out the noise and learning in the early morning when bars are closed. Clearly giving up is not an option, thus resilient learners had to cope with multi-tasking between their school work and household chores, engage in decision making, exercise self-control and persistence in their determination to excel in mathematics.

5.2.3 Experiences of academic resilience in mathematics of at-risk Grade 10 learners

Research findings from the present study indicate that even though the nature of mathematics is complex, it vastly differs from other academic subjects such as life science, biology,

geography but is not impossible to learn. The key message here is that the nature of the subject content dictates the learning styles relevant to excel in that particular subject. For example, Aina said: *“For you to know math you have to have a pen and a rough book and a calculator, because you just cannot study mathematics like biology or something, you have to practise it for you to learn it. Develop a habit of practice makes perfect”* [Interview 28 May 2015]. Since mathematics content does not lend itself to memorising, the key to excelling in mathematics is being focused, self-directed and to practise by solving different mathematical problems. These findings are supported by Benard (2004) who highlighted the high level of determination needed to excel in mathematics, which is illustrative of the positive developmental outcome of resilience.

Furthermore, results revealed that resilient learners had different experiences in their journey of learning mathematics. For some of the participants learning mathematics was reported as both fun and challenging at the same time. One participant was faced with the challenge of a negative attitude towards learning mathematics which necessitated that she makes a positive change in order to perform well. This is how Maria puts it: *“Learning mathematics, I do not think it was that easy. I passed mathematics in Grade 10 because I changed my attitude, the attitude that I had from Grade 8 and Grade 9, I hated mathematics. I decided to change it and I decided to start loving the subject. I just had to teach myself how to love the subject because my passion for the subject was going to cause me to pass because I knew that if I keep on hating the subject, no matter how hard I wanted to pass it, I won’t make it because I will just be like oh! Whatever, I do not like the subject at all”* [Interview 14 April 2015]. Thus resilient learners employ their coping skills and make decisions that will enable them to achieve desired results such as performing well in mathematics despite hating the subject at some point. As a result, learners felt that it was fulfilling to excel in mathematics and used their understanding of the subject during peer tutoring opportunities. Similarly, Banatao (2011) stated that when learners

are resilient they are receptive to learning, noticing the care and encouragement given by adults and develop better relations for themselves and those around them. Despite their challenging home and social backgrounds as mentioned earlier, these learners managed to perform well in mathematics. Words such as excellent, good, amazing and very excellent were used to describe their academic performance in mathematics that meant quite a lot to them as it strengthened family bonds. For example, Aina said: “... *it was excellent because it made my father smile, because he did not expect me [to] get an A in mathematics; it was really good for me and my family*” [Interview 28 May 2015]. On the other hand, one participant was not impressed by her performance in mathematics and felt that she could achieve more even with a little support from the family. This is how she puts it: “*Ahh, I would not say it is really impressive because I would have done better if I had parental support. If my parents would accept that now I am writing exams and if I had time for my studies*” [Interview 27 April 2015]. These are reasonable expectations that learners have, namely that parents could support their children’s learning by freeing them from household chores during exams and test times to ensure they get ample time for studying and doing their mathematics school work.

5.2.4 The role of teachers, family, and peers in influencing academic resilience in mathematics of at-risk Grade 10 learners

Responses to questions from the learners’ interviews revealed that the majority of the learners relied on teacher and peer support for their learning of mathematics. For example, most of the learners reported that their teachers played a great role in their performance in mathematics because they were always available and had faith in their learning capabilities. Maria (Ma) said: “...*My Mathematics teacher kept telling me that “math is easy and you can do this” ...I was like, “Ok, other people believe in me, so I also believe in myself*” [Interview 14 April 2015]. The evidence here is that teachers who contribute to resilient learners’ positive learning experiences express high expectations, are competent in their content areas, and challenge

learners to do their best. These findings are supported by the study by Wright (2013). For example, Aina said: *“My teacher influenced my academic achievement in mathematics positively because he used to explain more in a better way and told me that whenever I do not understand I can go to him and ask for help”* [Interview 28 May 2015]. This shows that there is a need to encourage teachers to foster caring teacher-learner relations that promote good academic performance in mathematics and ensure that all learners are aware that intellectual development is something they can all achieve through effort, as compared to something only some people are born with (Benard, 1993).

Also emerging from the data is that a few participants were fortunate to have received encouragement to learn mathematics from a mother, a family member who was good in mathematics or a neighbour. For one participant, the fact that his mother reportedly pointed out that excelling in mathematics is/was a great determinant in obtaining a degree and eventually securing a job in the future; thus it is important to work hard in mathematics and this was sufficient motivation to learn mathematics. In the same vein various authors found that parental influences lead to action, thus both verbal and non-verbal parental messages communicate to the child the parents’ expectations and values regarding the importance of education (Hossler et al., 1999; McCarron & Inkelas, 2006; Smith & Fleming, 2006). Thus parental encouragement has the power to influence academic success in mathematics and should be promoted at all costs.

Findings also indicated that participants are appreciative of the role played by their peers in their academic performance in mathematics. They praised healthy peer relations in which they feel free to give/receive assistance and at times they engaged in discussion groups focused on mathematics school work. To support this point, Aina said: *“We feel free among each other because we are all helpful and we encourage one another”* [Interview 28 May 2015]. There is support for these findings in the work of Pascarella and Terenzini (2005), who claimed that

peers are a significant factor in learners' academic achievement and persistence. Emerging from the data also was the fact that competition amongst peers served as motivation for some participants to perform well in mathematics and in such instances learners study their mathematics school work independently of peers.

On the other hand, one participant indicated that pride should not be given room to hinder success in mathematics, but rather one should seek help whenever needed from peers or teachers without delay. This is how Aina puts it: “... *my classmate was crying because of mathematics and I told her to stop crying and at least look for help because she was just crying and she did not even ask anyone for help*” [Interview 28 May 2015]. This communicates the point that resilient learners possess help-seeking characteristics as long as there are capable and willing individuals (teachers/peers) to give a helping hand. This perspective is given weight by Kiswarday (2012) who claims that resilient learners display social competences which include qualities such as empathy, caring and communication skills. For example, Maria said: “*I help other learners when they do not understand mathematics because when I am helping them it also increases my understanding of the subject matter*” [Interview 14 April 2015].

5.3 The meaning of academic resilience in mathematics

The concluding remarks on the meaning of academic resilience in mathematics and the sense participants make out of it will be given in the following manner: firstly a conclusion on the experiences of learning mathematics of at-risk Grade 10 learners with resilient outcomes in mathematics, followed by the influence of primary school mathematics on their academic resilience in mathematics at secondary school; then a conclusion on the supports and barriers to learning mathematics, and finally a conclusion on the value of learning mathematics to at-risk Grade 10 learners.

5.3.1 Experiences of learning mathematics of at-risk Grade 10 learners

Results showed that the experiences of learning mathematics for at-risk Grade 10 learners varied from one participant to another. For example, some participants started performing well in mathematics at primary school while others started excelling in mathematics only later on at secondary school. However, there is consensus regarding academic resilience in mathematics; it is facilitated by excellent teachers, teachers who are passionate about mathematics, are good listeners and related subject content to learners' everyday life experiences. Equivalent findings are drawn from the work of Wright (2013), who described resilient-fostering teachers as those who emphasise positive teacher-learner relationships, make learning interactive, and value learners' voice. Aina recounted her experience as: *"fun at primary [school level] because we had an excellent teacher. He used to make us understand and he had the passion of teaching; he was passionate about the subject and he was always happy whenever he was teaching"* [Interview 28 May 2015].

On the other hand, participants who had unfavourable early experiences of learning mathematics reported that their hate of the subject was the result of the mathematics teachers' attitude towards them. For example, one participant felt neglected by the teacher and consequently she ended up hating the subject. This is Jessica's expression: *"Well for me at first, I did not like mathematics... I am a type of person in order for me to pass a subject, the teacher should give me attention, at primary school our teacher was very strict and so I did not like mathematics, I did not like numbers or just studying mathematics but then when we got a new teacher, that teacher paid much attention to me and praised my effort. I got to love mathematics. But the beginning I did not like mathematics at all"* [Interview 29 May 2015].

For another participant the teacher failed to explain the content properly. This shows that the teacher has great power to facilitate or hinder academic resilience in mathematics. It can be

assumed and in line with the findings of Borman and Rachuba (2001) that schools that serve children from impoverished backgrounds may introduce risk factors by failing to provide a supportive school climate or by delivering inadequate educational resources. Worth noting here is that participants rose above these unfavourable learning experiences and managed to perform well in mathematics at secondary school. Owing to great teachers and personal attributes such as perseverance and determination these learners learned to love mathematics despite unfavourable earlier learning experiences.

5.3.2 Influence of primary school academic resilience in mathematics of at-risk Grade 10 learners at secondary school

Findings revealed that participants were divided with regard to the influence of primary mathematics on their academic resilience in mathematics at secondary school. Most of the participants felt that the success they had at primary school laid a good foundation for learning of secondary school mathematics. These participants reverted to their love of mathematics from primary school during challenging times at secondary school to keep the momentum of good performance in mathematics in the absence of a good teacher. For example, Mercia said: *“When I came to high school, our mathematics teacher was not really good and then I relied on what my primary teacher taught me. He made mathematics interesting and when I came to high school I did not give up on that. I think me and another learner were the highest in mathematics in Grade 8; even though we did not have a good teacher, I tried by all means to study by my own because I was not willing to fail mathematics, for anything”* [Appendix 5, Interview 27 April 2015]. He (2014) argues, in a similar vein, that high levels of self-efficacy and coping skills greatly influenced students’ performance in mathematics. Again support is found in the work of Bandura (1995), who states that when people experience feelings of success, they believe that they have skills to succeed and will be ready to bounce back from setbacks or failure.

Conversely, two participants reported that their experience of learning mathematics at primary school did not impact their performance at secondary school level; in fact, they opted to disregard it and make a fresh start. This is echoed in Banatao's (2011) work who found that resilient learners exercise what he termed "adaptive distancing"; which refers to the power of learners to separate themselves from negative situations or experiences, realising that they are not at fault in the situation, and that their life will be different if they focused their effort on doing better at school. The message here is that poor early learning experience in mathematics will not determine one's fate in mathematics, instead one has the power to start again and excel in mathematics if one is determined. For example, Maria had this belief: *"my experience at primary school really did not change anything because when I got to secondary school everything was different. I left it all behind and I moved on to something new"* [Interview 14 April 2015].

5.3.3 Facilitators of and barriers to learning mathematics for at-risk Grade 10 learners

Findings demonstrated that participants had protective factors/facilitators to aid their success despite the barriers they faced while learning mathematics. For example, participants recounted that they had relied on facilitating factors such as individual traits, teacher support, family support, and peer encouragement. Simply put, participants emphasised the importance of having a positive attitude towards learning mathematics, hard work, and a sense of willingness to learn the subject. To exemplify this, Maria [Interview 14 April 2015] said that her *"...patience for mathematics when [she] changed [her] attitude, [and] desire to pass the subject"*; contributed to her academic performance in mathematics. However, another participant emphasised determination and asking help from teachers and peers. Mercia explained: *"I am a person who is determined, I hate failing so I have to make sure that I ask a teacher or someone like a learner if I do not understand something and by explaining to other people that made me gain more knowledge and by accepting and loving the subject, making it my passion"*

[Appendix 5, Interview 27 April 2015]. This perspective is given weight by Benard's (1993) stance that the two key skills for resilient learners are planning, which sees oneself in control of the subject/situation and resourcefulness in seeking help from others.

Thus learning of mathematics does not occur in a vacuum; it is facilitated by the people in the immediate environment of the participants, i.e. family, teachers and peers. Data showed that most of the participants had a good supporting system of teachers and peers. Unfortunately, the same could not be said about the family. Many participants credited their good performance in mathematics to good teachers who showed that they cared and made time to consult with individual learners, and peers who communicated care and empathy for their performance in mathematics. Selma said: "*... I am a very positive person. I am hard working. I am looked up to (role model), so I always have to make sure that I achieve certain grades. I am quite... how can I put it? I have that willingness in me, I am willing to learn whatever it is that I know will be beneficially not only to me but to the next person, and my friends, first of all I think my best friends; they have always been there for me, so when it comes to I do not understand a mathematics test they will be like okay fine, 'can I help you? How can I help you'? And also if I fail a mathematics test, they are not these people that will tell you; 'oh it is just mathematics, just let it be'. They will always tell you 'okay fine you failed this mathematics test, you failed what you are going to do about it? Are you going to sit on that test paper that you failed or are you going to do something about it?'*" [Interview 10 May 2015]. Another way of viewing this evidence is that earlier failure in mathematics can be used as a stepping stone to achieve good grades in mathematics later.

Also emerging from data are the barriers to learning mathematics. The home background has proven to be a challenge on more than one aspect, namely noise, household chores, resources for learning mathematics, exposure to violence and substance abuse and lack of/minimal parental support, to mention a few. Participants reported that the nature of the subject of

mathematics requires practice and as such it is a subject demanding time that for some learners requires a quiet place to effectively do mathematics school work. However, owing to poverty most of the participants live/lived in overcrowded homes in neighbourhoods where people operated cuca-shops/bars to make a living and such places played loud music until late, making it nearly impossible for the participants to study mathematics at home. For example, David said: *“The biggest challenge in Math was just the surrounding, the community that I live in. I just... either I study at school after school or I study in the night. Set an alarm when everybody is gone. Because people can even be awake until 12:00 so I set an alarm like 6, 7 there and then when people are sleeping, I study then when they wake up I am already done with whatever I was doing”* [Interview 29 May 2015].

As is to be expected from people under the influence of alcohol, participants witnessed violence and fights on their streets. To support this, David said: *“Like now the drinking, with the bar in the house, when people come to drink in the house, they start like at two o’clock and that time you are like back from school at one-thirty and when you are coming from school you do not have time to study because people are making noise, they are playing songs [music] and they are drunk. When people are drunk, you know they don’t keep quiet, they always speak loud. So it’s like until twelve o’clock [mid-night] in the night so you don’t get time to study”* [Interview 29 May 2015]. This shows that learners need support from the school, in terms of provision of a secure place where they can do their mathematics at peace i.e. 24/7 study rooms or community/school library with flexible operational hours. Therefore, Bandura (1986, 1993) is not alone in his finding that learners feel more in control when the environment can be modified to supply options and assist in strengthening self-efficacy. In addition, one participant had the challenge of overcoming her negative attitude towards learning mathematics and the perception that it was a difficult subject. This is how Aina puts it: *“I changed my attitude towards mathematics being difficult”* [Interview 28 May 2015]. Another participant had to overcome

the negative effect of peer pressure where peers encouraged him to go play soccer instead of studying mathematics. This shows that these resilient learners had to rely on decision-making skills, communication, and self-efficacy to attain good grades in mathematics.

5.3.4 Value of learning mathematics for at-risk Grade 10 learners

Results indicated that some of the participants performed well in mathematics, especially at upper primary level and entry grades of secondary school. To illustrate this, David [Interview 29 May 2015] said: *“Grade 3, maybe because I just decided to work harder. Because I was like, I always wanted to be in the smart peoples group, and then I just started performing well in mathematics. It’s like the teacher divided us like the smart people this side especially in mathematics.”* High performance in mathematics was reported to have been promoted by self-directed individual efforts, deciding to work hard in mathematics, good teachers, seeking help from peers/teachers, success in mathematics activities i.e. tests and examinations led to high levels of self-efficacy. In the same way Benard (1997) suggested that from early childhood onwards resilient children tend to establish positive relationships with both adults and peers that help them bond to their family, school, and community. Lineekela stated: *“Grade 7, I use to have a good teacher who explains well and I used to go ask other people for help...”* [Interview 16 April 2015]. This personal strength in resilience is often referred to as “good intellectual functioning” (Masten & Coatsworth, 1998). For one participant academic resilience was determined by an award given for mathematics at the school awards ceremony. This was the case for Selma: *“I was in Grade 8 when I realised that I am good in mathematics because I got a certificate with an A in mathematics. ... You feel YES! I have finally achieved a certain grade/symbol in a subject that I love doing”* [Interview 10 May 2015].

Academic resilience/good performance in mathematics was described as exciting, amazing and as an experience that leads to feelings of pride that should be shared with everyone who matters

i.e. friends, teachers and family. For example, *“When I realized that I was becoming better at mathematics I was becoming really good, I would be boasting at my friends and showing them like, now look I got this, look at my report, look at this, I got an A, what do you think? I would be jumping around, I would go to the teacher, and tell them Miss I got an A, go to my parent, my aunt and everyone until they know I got this in mathematics, I am so happy and everything”* [Maria, Interview 14 April 2015]. For another participant achievement in mathematics won his peers’ approval and made him feel like he is the most intelligent person in the group. In the same vein Bandura (1995) noted that mastery, and the feeling of doing something well or feeling competent are associated with self-efficacy. The message here is that excelling in mathematics generates so much joy and facilitates self-efficacy that schools should strive to ensure that every learner experiences this joy by providing environments that allow for success in mathematics. Also emerging from the research findings is that participants held the opinion that mathematics makes sense and is valuable to their lives as long as it was understandable to them and its relevance to real life.

For example, most of the participants reported that mathematics is the key to success in terms of lucrative careers as it is part of the entry requirements to careers they aspire to study for in the future and it is essential for financial budgeting and planning in real life. Worth noting here is that resilient learners have a sense of a bright future, albeit heavily determined by their performance in mathematics; thus having a good grade in mathematics is an indicator of a bright future. These findings are given weight by the work of Eccles and Gootman (2002) who claim that resilient children are associated with high self-esteem, a strong commitment to do well in school, a strong sense of purpose in life and a high academic achievement. This is how David put it: *“Ok, if I don’t die I see myself very successful as a CA- Chartered Accountant”* [Interview 29 May 2015]. Also, one participant stated that success cannot be attained without mathematics. To be specific, Titus said: *“To me mathematics is like key to all other careers, it*

is the key to success, and you can never be successful without mathematics. Mathematics makes very much sense to me, because I understand it very well, even though I can take something that was not taught in class, by the time we do that topic I already went through it on my own (proactive, self-directed) and manage to get most of the things (exercises) right, so I understand it very well.” Furthermore, data revealed that some participants were really mathematics fanatics, as they went an extra mile, to incorporate it in their daily communications, found inspiration in reading historical backgrounds of early mathematicians. Moreover, one participant believed that children will deny their fathers/parents in public if they lack basic numeracy taught in mathematics. From this point of view, David puts it as follows: *“It makes sense to me because you learn how to count and learning how to count is very important because it will help you in the future, like if you have kids and then you don’t know how to count. They will even say no, he is not my father, if you come to school”* [Interview 29 May 2015]. The value of learning mathematics transcends school to reach the family and fulfil the future aspirations of the learners. Therefore, the Ministry of Education, parents and the schools guided by the teachers could work together to ensure that all Namibian children are part of a bright future and feel they are capable of achieving anything they dedicate their efforts to. There is overwhelming support for this stance in the work of Werner and Smith (1982, 1992) who described one’s sense of purpose as the most powerful asset to propel young people towards healthy outcomes despite life’s challenges.

5.4 Individual differences in the experiences of academic resilience in mathematics of at-risk Grade 10 learners

The concluding remarks on results regarding the individual experiences of academic resilience in mathematics of at-risk Grade 10 learners will be conducted in the following manner: firstly a conclusion on the attitudes towards learning mathematics of at-risk Grade 10 learners with

resilient outcomes in mathematics, followed by their role in and highlights of learning mathematics, then a conclusion on their expectations of learning mathematics, and finally a discussion on the influence of teachers as role models on academic resilience in mathematics of at-risk Grade 10 learners.

5.4.1 At-risk Grade 10 learners' attitude towards learning mathematics

Findings from this study showed that participants had a positive attitude towards learning mathematics. It appears that resilient learners are free from anxiety about mathematics and are happy and keen on doing the school mathematics work independently. Similarly, Buthelezi's (2007) found that at-risk learners were eager to learn mathematics and were excited when doing mathematics work, often independently. Jessica [Interview 29 May 2015] declared: "*whenever we are going to the mathematics class I always say thank God. At least we are going to be busy in class and doing something worthwhile.*" It appears that participants possessed high levels of self-efficacy, since they were assured that every mathematics problem has a solution and they were determined to find it on their own or with the help of the teachers/peers; either way they will find the correct solution. Spruill (2011) is not alone in adopting this view that perceived self-efficacy is an important concept to consider in the realm of education because it provides clues to the sense that learners have regarding their academic abilities. For example, "*I am not like those people when given homework in mathematics they get worried and panicked. I just feel like there is an answer to every problem in mathematics thus I just work it out until I find it*" [Interview 29 May 2015]. All in all, resilient learners enjoyed learning through the problem-solving approach and demonstrated high levels of determination to find the correct solution and master the skill of solving mathematical problems.

Also arising from the research findings is the fact that it was as though there was a dark cloud over participants' excitement in learning mathematics, because they felt like the "odd ones out"

given that most of their classmates were not equally excited to learn mathematics. Clearly, teacher intervention is needed here, to ensure that majority, if not all, of the learners feel happy to learn mathematics. However, one participant cautioned that the joy of learning mathematics is heavily dependent on the teaching approach of the teacher. This is how Selma [Interview 10 May 2015] puts it: *“It also depends on who is giving you mathematics, for example if you have a mathematics teacher that you like you will be willing to listen to them even if it’s the last period, but if the mathematics teacher is not engaging, then you would not possibly want to listen to them.”* The key message here is that effective teaching/learning of mathematics requires the use of relevant communication strategies that foster alignment of the teacher, learner and the content; more specifically engagement in the learning activities, if mental absenteeism is to be avoided/reduced (Neshila, 2011). Equivalent findings are drawn from the work of Waxman et al. (2003), who claim that fostering resilience requires instruction that is learner-centred and engaging; these are challenging lessons in which learners are involved in developing new skills and learning to focus their attention. In the same way, Wright (2013) suggests using lessons that stimulate active participation in the learning process rather than merely allowing learners to sit and listen.

5.4.2 At-risk Grade 10 learners’ role in and highlight of learning mathematics

Results indicate that participants took solid responsibility for their own learning of mathematics. The roles of a learner in learning mathematics include but are not limited to: attending class regularly, establishing rapport with the teacher and other learners, participating in the lessons, achieving the best in mathematics, completing homework, engaging in peer tutoring, excising “self-help”, and being pro-active. This is how Aina puts it: *“Is to always be at school and whenever I am in a mathematics class, I should concentrate and be respectful and not make noise”* [Interview 28 May 2015]. This shows that the profile of resilient learners is the ideal learner for any teacher. This perspective is given weight by Bernard (1997) who

argues that a resilient child is one who works well, plays well, loves well and expects well despite being faced with life adversities. Worth noting is that even for resilient learners, leaning mathematics can be challenging in the face of laughter, where participants felt shy to answer the teachers' questions in a mathematics lesson out of fear of being laughed at by their peers or did their homework out of fear of being punished. Jessica [Interview 29 May 2015] said: *"... I am not going to answer questions because the learners might laugh at me, all I did is my homework and everything the teacher is telling us or else they beat us up."*

Also emanating from data is the importance of mutual respect as a key factor to good learner-teacher relationships or learner-learner interactions. For example, Mercia declared: *"... respect is the most important thing in the relationship of teacher and learner. I should be the one asking questions from teachers"* [Interview 27 April 2015]. Participants indicated that they learn best when they participate in the lesson by asking/answering questions and they valued helping their peers with mathematics work. In addition, they were motivated to perform well in mathematics as a means of motivating their teachers. For example, learners communicate appreciation for their teacher and achieve high expectations of their primary school teachers or family members. This is a clear case of the learner guiding the teacher by showing the way i.e. active participation in their learning means they are ready for learner-centred education and performing well means motivation is important for academic resilience in mathematics. To serve as an example, Titus [Interview 14 May 2015] said: *"For example if the teacher explains well and is kind, the learner should respect the teacher, study and listen to the teacher during class. And to study and pass well the test so that the teacher could feel like his hard work paid off."* Certainly this study highlights a different view to the learning of mathematics i.e. effective learning/teaching of mathematics through establishing relationships as opposed to mathematics being about facts and has nothing to do with the traditional perception of mathematics from an affective domain perspective.

Moreover, it was found that participants' highlights of learning mathematics were mainly measured in terms of the grade/symbol obtained in the Grade 10 national examination. This approach is supported by Masten et al. (1995) who suggested that for school-age children, appropriate indicators of resilience would be academic success and positive relationships with peers as well as adults. They felt that this was their highest point of achievement where they performed well in mathematics, obtaining a grade/symbol of A or B in mathematics at a national examination level. Individual participants reported a varied trajectories of learning mathematics reflecting their fluctuating performances over the years; but their experiences are significant since some of the participants improved from an E symbol in mathematics in early grades of secondary school to a B symbol in Grade 10 national examination which is a remarkable achievement. For example, Titus explained: *"It was when I passed my Grade 10 (national) examination with symbol A in Mathematics. Because I never heard of people who did that, getting an A symbol in Mathematics in Grade 10 national examinations. Because the people were like final exam is tough so this is the highest performance for me. Yes, I got symbol E for Mathematics in Grade 8 second term"* [Interview 14 May 2015]. The lesson learnt here was that past failure/success in mathematics does not predict one's final performance in mathematics; all it requires is hard work and determination to achieve the best. This is how Jessica [Interview 29 May 2015] puts it: *"I learnt that even though you have passed mathematics before, it does not mean that the next test you write it is a given that you will just pass."* The implications of these findings could be that resilience needs to be nurtured from time to time, year to year and should not be taken for granted. The findings of this study are consistent with Buthelezi (2007) who observed that caring educators who give and receive respect from the learners were reported to be an asset in the school context.

5.4.3 At-risk Grade 10 learners' expectations of learning mathematics

Findings of this study showed that the majority of the learners arrived at secondary school with expectations of learning mathematics and of the mathematics teacher who are often overlooked during the very first mathematics lesson of any grade. Informed by experience, self-imagination, senior learners, TV and peers, these learners enter a mathematics class armed with expectations and prejudices such as: mathematics at secondary school is very difficult; it will be difficult to comprehend 'just like learning Chinese'; it will be a tough and horrible subject to learn. This is how Selma [Interview 10 May 2015] explains it: "*I thought mathematics is going to be a horrible subject.*" These findings are in agreement with Sarason (1990) who firmly established that when one has no stake in the way things are, when one's needs are provided no forum, when one sees oneself as the object of unilateral actions, it takes no particular insight to suggest that one would rather be elsewhere. Reportedly the learners in the first mathematics lesson sat with all these fears and anxieties which do not make a positive start to the first lesson in the mathematics curriculum; instead it requires teachers to communicate care and give forum for discussing these fears that might place learners at risk of failure. For example, Jessica said: "*... going to do mathematics at high school will be on another level and it is going to be Chinese. I am not going to understand because even my neighbouring peers said it was tough*" [Interview 29 May 2015]. On the other hand, two participants reported keeping a positive attitude and a strong belief that learning mathematics at secondary school would be fun and enjoyable. To illustrate this Maria [Interview 14 April 2015] said: "*I was expecting it to be very fun and interesting, new things to learn*". This shows that the first mathematics lesson is a "great teaching moment" in which the teacher facilitates interactions with the learners and comforts their fears, addresses misconceptions and motivates them to achieve the best they can.

Furthermore, results indicated that learners' varied expectations with regard to the characteristics of a mathematics teacher at secondary school include: kindness, helpfulness and ability to explain well just like the primary school mathematics teacher, no sense of humour, very rude and administers corporal punishment. For example, Jessica said: *"I was expecting my mathematics teacher to be very rude, they do not pay attention to people and they will be beating children in the class"* [Interview 29 May 2015]. These expectations were taken as a serious matter by the learners, who even prayed to God for divine power to intervene and ensure that they get a good mathematics teacher. This is how Selma [Interview 10 May 2015] puts it: *"I prayed so hard to have a good teacher who will not let me drop from how I used to perform in mathematics. As you grow you actually realize that this teacher is not asking for the homework but if I do not do it then how am I going to understand everything else in the future."* But as to be expected with ideas/feelings that are not communicated many of these expectations were not realised at the time of the interviews for this study. Wright (2010) noted that teachers who foster resilience are caring and appreciative of the cultural experiences that learners bring to the classroom. In one instance the expectations were partly met in the sense that the teacher was fun but not hardworking and engaged in vulgar jokes in class that were more insults than jokes. Findings also showed that some of the learners' negative teacher expectations were met e.g. some of teachers were reported not to have cared for the completion of the learners' homework; in fact, teachers rarely check their learners' homework. Meaning that resilient learners are self-directed; thus even in the absence of teacher supervision with regard to homework, they continued to complete their homework, for it has benefits in the long run.

5.4.4 The influence of teachers as role models on academic resilience in mathematics of at-risk Grade 10 learners

Research findings showed all the participants had one or two teachers as role models, who had a positive influence on their learning of mathematics. These teachers provided support,

encouragement and the much needed motivation to learners when the home background was found lacking. This is similar to what Wright (2013) alluded to when he said at-risk learners have a strong need to perceive that an environment is caring, respectful, and supportive. These teachers were described as active, well prepared and able to combine humour with their teaching of mathematics. Therefore, these teachers were available and communicated care for their learners' performance in mathematics i.e. being committed to the Saturday classes and engaging in code switching are some of their efforts and ensured that all their learners experienced academic resilience in mathematics. For instance, Lineekela [Interview 16 April 2015] said: *"Like we used to have Saturday classes, every Saturday like even if, like for some people if they get paid on Friday, Saturday they won't come but for him he makes sure that he is there even if like Friday was maybe public holiday he makes sure that Saturday is always there, even holiday classes he is there."* Similarly, Benard (2004) noted that when learners are nurtured in their environment, encouraged and allowed to develop their basic needs, these experiences promote individual resilience through characteristics such as problem-solving skills, autonomy, social competence and a sense of purpose. Thus these teachers employed teaching methods and teaching activities which are centred and focused on the understanding of mathematics by the learners through the provision of opportunity for meaningful participation e.g. peer tutoring. This is how Selma puts it: *"...The one special thing about these teachers is that they will always find a way to make you understand mathematics"* [Interview 10 May 2015]. Therefore, resilient learners need schools and teachers to provide an opportunity to fulfil the basic human need for social support, caring and love. Arguably such teachers communicate high expectations to their learners by sharing their perceptions of mathematics with the learners. For example, the teacher being in a position of authority, if s/he believes that mathematics is easy to understand then maybe it is. *"...this one is my role model, with him I*

just keep improving, improving, and going higher and higher. He thinks mathematics is very easy, it is just a matter of understanding” [Maria, Interview 14 April 2015].

5.5 Concluding remarks of results regarding a model for promoting academic resilience in mathematics for at-risk Grade 10 learners

The concluding remarks on results on the model for promoting academic resilience in mathematics of Namibian at-risk Grade 10 learners will be given in the following manner: firstly a conclusion on the facts on learning mathematics of Namibian at-risk Grade 10 learners with resilient outcomes in mathematics, followed by their ideal context of learning mathematics, then a conclusion on the learning support for promoting academic resilience in mathematics, and finally concluding remarks on the proposed model for promoting academic resilience in mathematics of Namibian at-risk Grade 10 learners.

5.5.1 The facts of learning mathematics for the Namibian at-risk Grade 10 learners

Results indicated that learners used certain criteria to judge the worth of a mathematics lesson. For example, a mathematics lesson was viewed as a good lesson if and only if it satisfied certain requirements such as: the class was highly disciplined, all learners understood the lesson, it was taught with enthusiasm by a knowledgeable teacher, and it encouraged learner engagement, with the end result being happiness and eagerness to learn more mathematics. For example, Maria [Interview 14 April 2015] said: “...[for] the lesson to be a good one it must leave you wanting more.” Clearly a good mathematics lesson is one that is taught using a variety of computational strategies which promote learner autonomy. Moreover, it is believed that deliberate opportunities should be provided for learners to discuss and share their methods of computation through social interaction where learners get a chance to compare answers and computational strategies, reflect on their answers, justify their methods and above all are able

to correct their mistakes. To demonstrate this Titus [Interview 14 May 2015] explained: “...*call them (learners) out then they can do the exercise on the chalkboard and when they do a mistake you try to correct them*”. Likewise, Banatao (2011) argues that providing ample meaningful opportunities for learners’ participation is crucial to strengthen resilience in children.

One of the results arising from this study is the fact that participants took time to analyse the nature of mathematics and identify the best learning strategy for a subject they described as skill-oriented. It appears that mathematics is viewed as a complex subject that is unique in nature in its use of numbers and symbols as opposed to theoretical subjects such as life science, biology, etc. For example, Aina [Interview 28 May 2015] stated: “*For you to know mathematics, you have to have a pen and a rough book and a calculator, because you just cannot study mathematics like biology or something, you have to practise it for you to earn it. Develop a habit of practice makes perfect.*” Participants reported that mathematics content cannot be memorised but it can be mastered through vigorous practice since it is an application or a “to do” subject; as such it requires a lot of individual effort and self-directed learning and a high level of determination to perform well. Regarding learning mathematics through practice, Selma said: “*I study in a quiet place so nobody disturbs me. For me to easily study mathematics I practice*” [Interview 10 May 2015].

Furthermore, findings shed light on key aspects of learning mathematics that promote academic resilience in mathematics. Besides understanding the nature of mathematics as a subject, participants also encouraged other learners to seek help from peers and teachers where necessary. Equivalent findings are drawn from the work of Henderson and Milstein (1996) who noted that learners use external sources to resolve problems, with the teacher being the most consulted person, followed by a trustworthy friend. The participants concur that a learner’s performance in mathematics is entirely in the hands of that learner, since learning mathematics requires time and commitment from the learner to do mathematics school work (practice). “*For*

you to learn mathematics, you have to be a hard worker, you must have a positive attitude towards mathematics, and you must always pay attention to the teacher during lessons. And it also requires you to practice mathematics more” [Aina, Appendix 6, Interview 28 May 2015].

These results are supported by Benard (2004) who states that learners’ positive outlook of self - fosters a pride in learning and promotes positive development in school.

5.5.2 The ideal context for learning mathematics for the Namibian at-risk Grade 10 learners

Results showed that to promote academic resilience in mathematics key elements such as the teacher, learners, and content must be aligned in a supportive learning environment. For example, participants indicated that an effective teacher must demonstrate a good balance between humour and seriousness when teaching mathematics. In addition to that, effective teachers are described as loving, passionate about teaching mathematics, and available to help all learners anytime in or outside the classroom without complaints. For example, David [Interview 29 May 2015] said: *“I want a kind of teacher that when a learner does not understand a certain problem, a teacher helps with no complaints.”* Clearly from the participants’ views, learning mathematics is influenced by teacher attributes such as a positive attitude which communicates care and hope and cultivates the culture of never giving up (persistence) in their learners. This is how Lineekela puts it: *“I believe a teacher must like teaching and never give up”* [Interview 16 April 2015]. These findings are consistent with Wright (2013) who noted that teachers who contribute to resilient learners’ positive learning experiences express high expectations, are competent in their content areas, and challenge learners to do their best.

Also emerging from the data is the fact that learners learn differently and as such mathematics should be taught using different teaching methods that will be inclusive of the three learning styles - auditory, visual and kinaesthetic. To serve as an example, Maria [Interview 14 April

2015] said: “...they should try out different type of teaching because not all of us learn in the same way.” Participants also emphasised social interaction in the teaching of mathematics to allow switching of roles, though momentarily, between the learners and the teacher, where the learner goes to the board and explains mathematics to peers. This shows that learners have a lot to gain from peer tutoring and mathematics teachers should encourage mathematics discussion that will facilitate learning from peers as well and promote cooperative learning. However, this can only occur if the learning environment is supportive of effective teaching/learning of mathematics. Therefore, participants described the ideal classroom climate as respectful, attractive, not overcrowded, clean, and resourceful. This is how Mercia puts it: “let me say that the class should be attractive and the environment... it should be clean, the teacher should be kind, loving and you know, hyper, you know not a lame teacher, a mathematics teacher, a lame teacher explains like “thiis and thaat” no one will really get interested, people will sleep, so the teacher should make the classroom interesting and you know, people should be awoken by the teacher. If the teacher is lame people will be sleeping and no one will understand anything” [Interview 27 April 2015].

Furthermore, the findings revealed that a good and supportive learner-teacher relationship is very crucial in promoting academic resilience in mathematics. Participants reported having strong teacher-learner relationships which are strengthened by good communication, encouragement for learners to seek help from the teacher when needed, the development of a good sense of humour and lastly the teacher with good command of the subject knowledge. For example, David [Interview 29 May 2015] said: “it is good because we communicate well and I try to get help from him where I do not understand.” Relatedly, Waxman et al. (2003) maintain that resilience is promoted by schools that provide external factors such as fostering a sense of achievement, attentive teachers and good teacher-learner relationships.

5.5.3 Learning support for promoting academic resilience in mathematics for the Namibian at-risk Grade 10 learners

Findings of this study showed that in order to promote academic resilience in mathematics, learners need learning support from teachers, peers, family and the community as well as from the school. Learning support from the teacher and peers mainly meant explaining mathematics work where participants did not understand. Although this support was appreciated, some learners wished that they had the family support in a form of encouragement to provide them with a reason to study harder in mathematics. For example, Aina [Interview 28 May 2015] explained: *“I only have the support that came from the teacher and friends and my dad. I wish to have my cousins’ and family’s support, just by explaining where I could not understand”*. It is important to note that learners also indicated that having access to internet or extra reading materials in mathematics might go a long way in improving their learning of mathematics. Since parents of at-risk learners were living in poverty they might not be in a position to provide these extra resources to their children but a library with internet access and past question papers could be useful in this regard. To illustrate this Selma stated: *“honestly being part of the Katutura Youth Development Program (KYDP), I was told to appreciate what I have, so as much as I saw other learners having all this excellent books and what not, I just told myself; look your parents do not have money to buy you that so why cry over it or just worry about it when there is nothing you can do about it”* [Interview 10 May 2015]. These results are supported by Washington (2008) who maintains that resilience may develop because one can frame experiences in a more positive context rather than with a defeatist attitude. This shows that the society can also play a role in enhancing resilience of the learners through youth programmes. Resilient learners appear to excel more when they are challenged; one participant pointed out that she wished there were more learners in their school who are good in mathematics so she could compete with them and feel challenged to do better.

One aspect that emerged from the results is that learners perceived that they had/have school support in their learning and achievement in mathematics. For example, at the school of the informants for this study, mathematics text books are not shared by learners as with other subjects' text books; if they are not enough the school provide copies for the learners. Also teachers were committed to teaching mathematics even on Saturdays and Sundays for free; there is minimal teacher absenteeism at the school; teachers were always in class and the school has high expectations of its learners through the practice of awarding a certificate for mathematics only to those learners with an A symbol. For instance, Maria said: *“I think that the school considers it important that we perform well in mathematics because I see that most of our mathematic teachers gives up their personal lives to come to school on Saturdays. They even went to the extent of coming to school on a Sunday to teach in order for learners to perform very well in mathematics so they think mathematics is very important”* [Interview 14 April 2015].

Again, teachers were reported to speak highly of mathematics and that in turn encouraged and inspired the learners to achieve the best. There is overwhelming support for this stance in Wright (2013) who established that teachers who foster resilience cultivate knowledge and convey to the learners that they have the capacity to learn mathematics. This shows that when learners witness the teachers' efforts and hard work in teaching them mathematics, they reciprocate these efforts and tend to work with perseverance on their school mathematics work and they perform well. Thus, Rutter (1979) is not alone in adopting the view that effective schools focus on academic achievements, clear expectations and rules, high levels of learner involvement, and the results are high rates of attendance and academic attainment.

5.5 Summary

In this chapter the synthesis of the findings into concluding remarks was undertaken in order to answer the research questions implicitly. The learners displayed academic resilience in mathematics in varied ways but of importance is that these learners are self-directed, self-determining, have positive relationships with parents, teachers and peers, and are resourceful in terms of seeking help with their learning of mathematics. The context in which at-risk Grade 10 learners learn their mathematics is best described as unfavourable, being born to uneducated parents, living in poverty-stricken neighbourhoods that are characterised by high levels of noise, exposure to violence and substance abuse. Faced with home backgrounds that failed to provide role models in mathematics, such learners relied on the school to provide them with a place to learn their mathematics, a chair (and a table) to sit on to in order to study and above all, learning support from peers or teachers. The findings revealed that resilient learners remained positive and worked hard to perform well in mathematics with the learning support from teachers and friends/peers. The following chapter will present the recommendations and summary of the key findings of the study.

CHAPTER 6: A MODEL FOR PROMOTING ACADEMIC RESILIENCE IN MATHEMATICS

6.1 Introduction

As alluded to in earlier chapters, research on resilience in education has evolved over the past four decades. However, most of the research in this area has been based on studies in the USA as a context and as such it might not necessarily reflect the Namibian experience. The present study was a modest attempt to gain a deep understanding of the lived experiences of at-risk Grade 10 learners, in the Khomas Education Region, who are from disadvantaged home backgrounds and yet are able to succeed academically in mathematics. It elucidated how these learners displayed academic resilience in mathematics and the context in which the resilient experiences occurred. Furthermore, the study explained the meaning that participants made out of their experience of academic resilience in mathematics. The study also illuminated individual differences of academic resilience in mathematics. In addition, it clarified the means of promoting academic resilience in mathematics with reference to the I³ model of promoting academic resilience in mathematics. With these objectives, this closing chapter presents its recommendations and a summary of key findings of the study.

6.2 Recommendations of the study

The recommendations that follow in table form, emanated from the results reported earlier and their discussion; they will be presented in the following manner: firstly recommendations regarding the display of academic resilience and the context in which resilient experiences occur, followed by recommendations regarding the meaning of academic resilience, then suggestions on individual experiences of academic resilience in mathematics, followed by recommendations on the model for promoting academic resilience in mathematics and finally recommendations on future research.

6.2.1 Display of academic resilience in mathematics and the context under which resilient experiences occur

Recommendations regarding the display of academic resilience in mathematics are presented in Table 6.1.

Observed Findings	Recommendations
Resilient learners rely on their self-efficacy, self-determination and self-directed skills to effectively learn mathematics.	The life skills syllabus needs to be revised to add a section aimed at developing essential life skills which promote academic resilience in mathematics as well as other school subjects. The Ministry of Education, in conjunction with schools, should supplement the curriculum to support learning of mathematics.
The learners did not receive parental support with the learning of mathematics.	Schools should inform parents about school activities in local media such as the radio. Efforts are needed to strengthen the parents' relationship with the school through the school board and encourage parents to attend school meetings by highlighting the importance of parental presence on school grounds to the learners.
Home background was reported to be a barrier to effective learning mathematics due to the noise emanating from surrounding bars and cuca shops.	The Ministry of Education should, as a matter of urgency, consider collaboration with the local authorities to develop a policy regulating the operating hours of local cuca shops/bars and acceptable level of music played from juke boxes.
Some learners have no space to learn mathematics at home.	As a learning support strategy, schools should provide learners with space to learn mathematics when the home environment is not conducive. The Ministry of Education could liaise where possible with the community members to get human resources to run 24/7 study centres at all secondary schools to ensure that learners have somewhere to go and learn school mathematics work, especially on weekends. This recommendation is necessary where there are no funds to build community libraries or a library for every secondary school.

Table 6. 1: Display of Academic Resilience in Mathematics

6.2.2 Meaning of academic resilience in mathematics

In table 6.2, the recommendations on the meaning of academic resilience are outlined.

Observed Findings	Recommendations
Learners value their academic resilience experiences in mathematics.	Education authorities and other stakeholders should embark on promoting a sense of achievement in mathematics. For example, the Ministry of Education could develop a reward programme for schools that manage active and effective mathematics clubs. Rewards could include lucrative prizes for the best mathematics club per region e.g. a funded field trip for the teachers and learners who are members of the mathematics club. An invitation to the annual mathematics conference at Swakopmund might also be a relevant reward.
Teachers are challenged in providing individual learning support to the learners owing to the large number of learners in the classroom.	It is also recommended that the class size be reduced to a maximum of 25 learners per class. The rationale behind a maximum number of 25 learners per class is to ensure that all learners can receive individual learning support in mathematics when necessary and hopefully there will be no shortage of mathematics textbooks with the reduced number of learners.
Low parental involvement or lack thereof in learning of mathematics.	The Ministry of Education promote parental participation and encouragement as a matter of urgency in the learning of mathematics, For example, it could introduce numeracy programmes or strengthening the current literacy programme that will give the parent and the children common ground for understanding mathematics.
A good mathematic lesson is heavily dependent on the teachers' teaching approach to mathematics.	Therefore, it is recommended that teachers should be encouraged by the school principals and heads of departments to teach mathematics using varying teaching approaches which facilitate deeper understanding of mathematics concepts coupled with appreciation of the value of the subject.

Table 6. 2: Meaning of Academic Resilience

6.2.3 Individual differences in the experiences of academic resilience in mathematics

The recommendation regarding individual differences in the experiences of academic resilience in mathematics is summarised in Table 6.3 as follows:

Observed Findings	Recommendations
Learners enter a mathematics class at secondary school with certain expectations of learning mathematics.	Teachers should be encouraged by school principals to give learners a forum to share their expectations and experiences of learning mathematics. Such opportunities could be useful teaching moments in which the teacher addresses misconceptions and the fear of learning mathematics in order to facilitate effective teaching/learning of mathematics.
Teachers are viewed as role models for learning mathematics when they possess good command of the subject knowledge.	Teacher training institutions should ensure that future mathematics teachers graduate with more than sufficient subject knowledge and exposure to various computational strategies that they could rely on to develop learner autonomy once in the mathematics classroom.
The study revealed that good teacher-learner relationships facilitate good performance in mathematics.	The Ministry of Education should host a workshop aimed at sensitising mathematics teachers to the benefits of teaching/learning mathematics through establishing good teacher-learner relationships. Moreover, it is important to engage teachers in a debate of effective teaching methods for mathematics as dictated by the nature of mathematics as a “to do” subject.
Participants reported that they prefer learning mathematics at school because their home background was not favourable for learning mathematics.	School principals and teachers to strive to provide at-risk learners with supportive environments with sufficient teaching/learning resources for all learners. Therefore, I reiterate again that the Ministry of Education through the life skills teacher should consider offering a section in the curriculum on fostering resilience to all learners across the secondary school phase to ensure that learners reach their maximum potential in school even in the face of adversity.

Table 6. 3: Individual Differences in the Experiences of Academic Resilience in Mathematics

6.2.4 Model for promoting academic resilience in mathematics

The following Table 6.4, highlights the recommendations on a model for promoting resilience in mathematics.

Observed Findings	Recommendations
Learners appreciate learning mathematics through participation and opportunities to share their methods of mathematical computations	Thus schools are urged to establish learner-centred mathematics classrooms where learners are given the opportunity for meaningful participation and are free to learn mathematics through social interaction. Furthermore, to that schools are urged to harness the power of peer tutoring by encouraging learners to share their understanding of mathematics with fellow learners which is beneficial to all parties involved.
Learners appreciate to actively participate in the lessons and learn better through learner interaction.	It is also recommended that teachers should make room in their teaching schedule for mathematics discussions in order to accommodate the need for active participation in the lesson by learners who are to be viewed as individuals with ideas, and experiences that they brought to the mathematics classroom as opposed to the view that learners are empty vessels that should be filled with mathematical knowledge.
Participants reported that they had a teacher(s) as role models for learning mathematics; and so teachers should be encouraged by the school principals to demonstrate a positive attitude towards teaching/learning of mathematics.	The researcher dares to tentatively suggest that in promoting academic resilience in mathematics, learners need more motivation to ensure the desire to practise mathematics outside of the mathematics classroom or in the absence of the teacher.
Promoting academic resilience in mathematics requires teachers who are available to provide learning support to the learners anytime and anywhere.	Teachers should be urged to indicate consultation hours on their classroom doors especially after school. These efforts could be complemented if the Ministry of Education sets a policy on compulsory afternoon study at all secondary schools and use this time for individual or group learner consultation time.

Table 6. 4: Model for promoting academic resilience in mathematics

Simply put, academic resilience in mathematics is promoted when learners have learning support, good relationships with the teachers and family and a sense of belonging to the school; through self-determination and perseverance learners experience success in mathematics. These concepts were termed as ‘**I am**’, ‘**I have**’ and ‘**I can**’ in the language of resilience (Grotberg, 1995). To complement all the above recommendations, the study proposes the following model as a support intervention to promote academic resilience in mathematics in the Namibian context:

The triple I (I-I-I) model for promoting academic resilience in mathematics

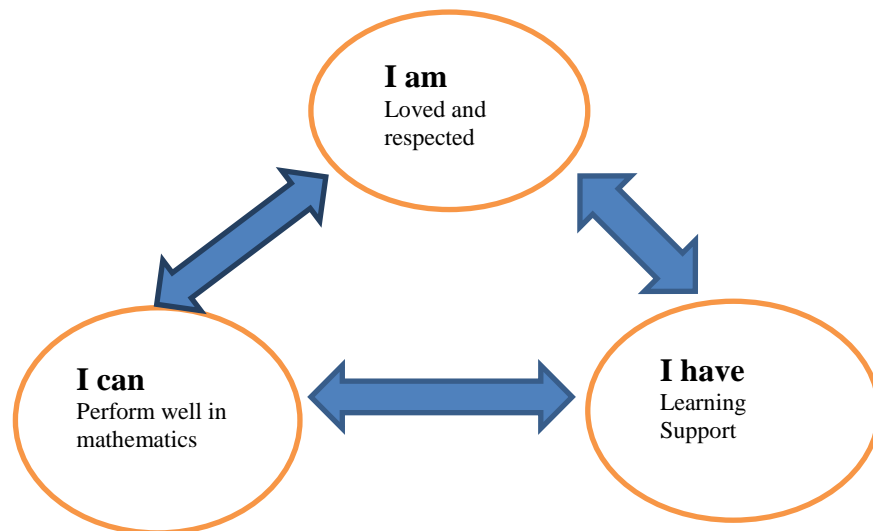


Figure 6. 1: Triple I Model for promoting academic resilience in mathematics

To address the ideal context for learning mathematics and informed by the reported qualities of good mathematics lesson a model is proposed to address these emergent findings. Based on the reviews of resilience and academic resilience literature, Bronfenbrenner ecological systems model, Silas Casillas (2008) academic resilience model and influenced by Grotberg (1995) theory of resilience, this model focuses on the internal and external factors that promote academic resilience in mathematics. As a point of departure, a child does not grow up in a vacuum, but is connected to the people in his/her environment (Williams, 2011). Hence the

model has an element of “I have” which comprises the teachers, family, friends/peers, school and the community at large referred to as socio-cultural tools. Equivalent findings are drawn from the work of Buthelezi (2007) who noted that resilience does not occur in a vacuum, but is the result of an interaction between internal and external factors that create a resilient person.

On the other hand, there are the internal factors, often referred to as the personal dimension, which are the most important factors in the academic resilience model which is represented by “I am” which represents the social being and there is “I can” indicating the social inert ability of the individual which in short refers to the personal strengths such as motivation, beliefs, attitude, self-efficacy and self-determination (Grotberg, 1995). This stance is given weight by the work of Sandoval-Hernandez and Cortez (2012) who argue that even in the presence of favourable external factors, academic resilience would not work without the manifested determination of the individual learner. Thus the researcher suggests that this model should be considered as a combination of internal and external factors as viewed through the lens of a resilient learner, hence the use of the first person. According to Kumpfer (1999) person-environment interactional processes are critical in understanding resilience. Thus the use of arrows between the features of the proposed model for promoting academic resilience in mathematics indicates the relationship between the internal and external factors which determine the outcome of the resilience process (Buthelezi, 2007). Clearly the school and all stakeholders in education should take into account these factors that ultimately facilitate the learning of at-risk learners to achieve resilient outcomes in mathematics.

The proposed model identifies three aspects of factors which promote academic resilience in mathematics termed ‘I am’, ‘I have’ and ‘I can’ respectively. The following sections will explain each of these aspects with respect to the research findings of this study.

I. I am

The findings of this study showed that resilient learners seek to satisfy their basic needs such as love, trust and respect. Participants reported that they are self-directed, self-determined and find joy in learning mathematics. Learners need to feel loved, trusted, respected and protected by those who care for them in the environment i.e. teachers, friends/peers and family. Therefore, schools assisted by teachers' efforts and parental involvement should provide learners with a caring and supportive environment, characterised by good teacher-learner relationships and good parent-learner relationships, which are two elements in promoting resilience. Research increasingly points out that caring and supportive environments and climates are essential for learning (Henderson & Milstein, 1996). For example, schools could increase pro-social bonding by ensuring that there is at least one caring adult in the school to avoid the feeling of isolation (Buthelezi, 2007).

II. I have

As shown by the results, learning of mathematics does not occur in isolation, instead it happens at school facilitated by teachers and peers/friends. Resilient learners have reported that they value the little family support they receive when learning mathematics. Given the low level of education of their parents, it is to be expected that parents were unable to assist their children with mathematics school work. Nonetheless, the learners need parental involvement in their learning of mathematics, for example parental supervision with mathematics school work and regulating the amount of time learners spend learning mathematics. Therefore, effective promotion of academic resilience in mathematics requires educators to sensitise parents to the notion of whether they are educated or not they can still communicate care for their child's performance in mathematics i.e. they should talk about school activities and attend school events where possible. Equivalent findings were drawn from the work of Perez et al. (2009) who suggest that when faced with challenges of living in poverty and low levels of parental

education, resilient young people draw on their available personal and environmental resources.

Also arising from the findings is that a good teacher-learner relationship is crucial in the learning of mathematics. In the absence of family support, literature reported that teachers can best fulfil the role of “*loco prentice*” and support learners. A good teacher has the power to transform the academic performance in mathematics of the learners. For example, when good teachers explain mathematics well because they are knowledgeable about the subject and relate the textbook content to real-life examples, the end result is a resilient learner who is passionate about learning mathematics. These results are given weight by Wright (2013) who explained that instructions are relevant when presented in meaningful chunks and related to real-life situations, while promoting reasoning and joyful learning. In fact, the majority of participants credited their good performance in mathematics to the positive influence of teachers. These teachers were described as active, with a positive attitude towards mathematics; they are, passionate about teaching mathematics, engaging the learners in the mathematics lessons and promoting peer tutoring. In turn their learners are optimistic and loved doing their mathematics school work or attending a mathematics lesson.

On the other hand, learners have also indicated that the sharing of mathematics ideas in groups yielded different views on the same mathematical problem which they found to assist their understanding of mathematics. This shows that peer support in learning mathematics is a valuable feature in promoting academic resilience in mathematics. Learners appear to believe that in sharing mathematics expertise with peers there is a hidden benefit in the form of an opportunity to practise mathematics and is true in mathematics that “practice makes perfect.” This cooperative approach to learning mathematics is recommendable, as it provides learners an opportunity to learn mathematics in an informal setting where more learners, if not all, will be more relaxed to express themselves in the absence of the “expert” teacher and it eliminates

the fear of making mistakes. Schools should revisit the concept of establishing school mathematics clubs - it may prove to be useful in providing learning support for the learners by the learners. Needless to say, the school climate also has influence on learning of mathematics. Participants pointed out that low teacher absenteeism demonstrated that the school values high academic achievement. Furthermore, ensuring that every learner had a mathematics textbook was also considered important in achieving resilient academic outcomes in mathematics. These findings are supported by Borman and Rachuba (2001) who argue that schools that serve children from an impoverished background may introduce risk factors by failing to provide a supportive school climate or by delivering inadequate educational resources.

III. I can

Furthermore, emanating from the research data is that learners with resilient outcomes in mathematics appear to exercise, self-determination, self-efficacy, use problem-solving skills, autonomy, just a few, to navigate the challenges they faced whilst learning mathematics. Consequently, these learners with a positive attitude towards learning mathematics displayed characteristics of being determined, committed, seeking help from peers and teachers, making time to study mathematics and seeing every failure in mathematics as an opportunity to learn and to do better. In support of these findings Bandura (1995) agrees that when people experience feelings of success, they believe that they have the skills to succeed and will be more than ready to bounce back from setbacks or failure. It is important to realise that resilient learners enjoy learning mathematics because the subject lends itself to the problem-solving approach and learning which is described as challenging yet fun in finally finding the solution.

This shows that in learning mathematics learners have the desire to do better and persevere in solving mathematical problems first on their own and then seeking help until the correct solution is found, since giving up is not an option. These findings highlight potential and promotive factors associated with resilience, namely perceived efficacy, persistence, self-

regulation skills, effective stress management, and problem-solving as identified by Masten and Obradovic (2006). This shows that schools should teach life skills and include lessons on resilience, to ensure that learners are equipped with protective skills when faced with life adversities. Buthelezi (2007) also insists that life-skills education is very important and exposure to enriching activities within a supportive environment contributes to learners' adaptive behaviour.

6.2.5 Future research

1. An explicit study utilising mixing methods needs to be conducted on factors that promote academic resilience in mathematics which can provide a broader understanding of the phenomenon under study.
2. There is a need to find out whether teaching experience influences academic resilience in mathematics.
3. Another suggestion is that it would have been significant to conduct a longitudinal study of academic resilience in mathematics at Grade 10 and a follow up study at Grade 12 and four years later after graduation to show the fluidity of the construct of resilience and its consistency at various stages of life of the participants.
4. Finally there is a need to investigate the perceptions of teachers, parents and learners on the experience of academic resilience in mathematics. Such a study would have highlighted different views of the construct of resilience with reference to learning mathematics.
5. Lastly, it is essential to carry out a similar study focusing on other subjects apart from mathematics to see if learners from the same impoverished background can also show academic resilience in their other subjects.

6.3 Summary of Key Findings

The section that follows, the key findings of the study will be presented according to the research question. First is the summary of key findings with regard to the display of academic resilience in mathematics and the context under which resilient experiences occurred; followed by a summary of key findings regarding the meaning of academic resilience in mathematics; next would be the key findings regarding individual experiences of academic resilience in mathematics. Fourthly, the summary of the key findings regarding a model for promoting academic resilience in mathematics will be presented. The chapter then concludes with major contributions of the study.

6.3.1 Display of academic resilience in mathematics and the context under which resilient experiences occur

The fact that learners had healthy relations with at least a parent, a teacher or their peers enabled them to display academic resilience in mathematics”. These strong social bonds with both adults and peers support the learners’ desire to participate in the life of school and achieve academically. Overall the learners who were interviewed and who had scored highly in mathematics, possess high levels of self-confidence, self-efficacy, self-determination, optimism, willingness to learn from mistakes, willingness to give/receive help with their learning of mathematics, concern about what they can control rather than what they cannot and having a strong network of trusted people. Most if not all the learners reported that their good achievements in mathematics is due to good teachers and peer tutoring. They described good teachers as those who have faith in the learners’ mathematical capabilities and go an extra mile to give clear explanations that would leave learners wanting to learn more mathematics because they are motivated.

Learners relied on their self-determination and optimism for learning mathematics, and because of these skills, they were able to adapt to the challenges in their environment and achieve good results in mathematics. It was reported that succeeding in mathematics required self-directed efforts to practise school mathematics work and the notion that giving up in the face of failure is not an option. For example, self-determination was used to change negative attitude towards learning mathematics into a positive one and to cultivate a desire to achieve the best in mathematics. These learners viewed failure as a stepping stone to success in mathematics because it serves as a guiding map to areas where the learner should put in more effort.

Furthermore, findings showed that the context in which learners had/have to learn mathematics was reported as unfavourable and not conducive for learning mathematics. Most participants were orphans born to uneducated/under-educated parents; living in crowded homes in poverty-stricken neighbourhoods. These neighbourhoods were characterised by cuca shops/bars which were very noisy so that it was challenging for the learners to study at home. Learners reported exposure to violence, alcohol and substance abuse in their streets. In addition, because of the low levels of parental education; learners received little or no family support with their learning of mathematics and consequently their home background failed to provide them with role models in mathematics. Instead, some of the participants lived with siblings who had dropped out of school, mothers/parents who had failed Grade 10 and peers who disliked mathematics.

Fortunately, the participants used problem-solving and coping skills to navigate these challenges and refused to succumb to the overwhelming hopelessness presented by their disadvantaged home backgrounds. For example, some learners woke up at midnight when cuca shops/bars were closed in order to study mathematics, while others went to a community libraries and some opted to go to school in an effort to avoid learning in the midst of noise and chaos. The school had/have another advantage over home in the sense that it offers learning

support to the learners in terms of a table and chair and a teacher/peer to assist with learning of mathematics, both of which were a rare commodity in the home environment.

6.3.2 Meaning of academic resilience in mathematics

Academic resilience in mathematics was described as an exciting and amazing experience which made participants feel proud and this pride was shared with a trusted network of people (teachers, friends and family). It was reported that learners with resilient outcomes in mathematics had their peers' approval which in turn promoted their self-efficacy. According to the findings, mathematics as a subject is valued and makes sense in the lives of the participants on condition that it was understood by the learners and its relevance to the learners' everyday life was clarified. Some of the participants viewed mathematics as the key to success as it is an entry requirement to lucrative careers. Moreover, the learners' sense of a bright future is determined by academic resilience in mathematics - thus having good grades in mathematics translates into a better chance for a bright future.

Although participants reported different experiences with regard to their learning of mathematics throughout primary school until secondary school, there is a consensus that their academic resilience in mathematics was facilitated by excellent teachers who were passionate about teaching mathematics, were good listeners and related subject content to the learners' everyday life experiences. For example, participants who had unfavourable learning experiences of mathematics recounted that they hated the subject because the teacher had a negative attitude towards the learners and failed to explain the mathematics content very well. Therefore, a good teacher-learner relationship and logical structure of the mathematics content by the teacher are key facilitators of academic resilience in mathematics.

Subsequently, depending on their experiences, some participants felt that their earlier primary school learning of mathematics laid a good foundation for their later learning of mathematics

at secondary school. On the other hand, learners with negative experiences (e.g. low motivation, lack of sense of belonging to class and negative attitude towards learning mathematics) of learning mathematics at primary school, felt it did not positively influence their learning of mathematics at secondary school. As a result, this group of learners opted to disregard their unfavourable primary school experiences of learning mathematics and start afresh. This is a remarkable ability, an example of adaptive distancing which allow learners to separate themselves from negative experiences that are beyond their control and move on to achieve resilient outcomes in mathematics.

In a nutshell, facilitating factors of academic resilience in mathematics included learners' individual traits, teacher support, family support, and peer encouragement. Thus effective learning of mathematics does not occur in a vacuum, but is facilitated by social interactions with teachers, family and peers. Results indicated that most participants received learning support mainly from teachers assisted by friends/peers but family support was minimal and limited to verbal communications. Barriers to mathematics learning were reported to come from the home backgrounds of the participants in terms of high levels of noise, lack of role models in mathematics, minimal parental support with learning of mathematics, exposure to violence, and alcohol and substance abuse.

6.3.3 Individual differences in the experiences of academic resilience in mathematics

Individual participants reported varied trajectories of learning mathematics reflecting their fluctuating performances over the years, but what was significant is that some participants improved from an E symbol in mathematics in early grades of secondary school to a B symbol in the Grade 10 national examination and this is a remarkable achievement. Overall findings show that participants had positive attitudes towards learning mathematics demonstrated by their lack of fear of mathematics or anxiety, and their happiness and eagerness to do mathematics work independently. It should be mentioned that participants possessed high

levels of self-efficacy, which was facilitated by the assurance that every mathematics problem has a solution and they were determined to find it on their own or with the help of the teachers/peers; either way they will find the correct solution. However, one participant cautioned that the joy of learning mathematics is heavily dependent on the teaching approach of the teacher.

Results also indicated that participants appear to be the ideal learners who take responsibility for their own learning of mathematics. For example, the roles of a learner in learning mathematics include but are not limited to: ensuring class attendance, establishing rapport with teacher and fellow learners, participating in the lesson, achieving the best results in mathematics, completing homework, engaging in peer tutoring, utilising “self-help”, and being pro-active. Findings demonstrated the influence of fear on learning mathematics e.g. a learner felt shy to answer the teachers’ questions in a mathematics lesson on grounds of fear of being laughed at by their peers and did her homework to avoid being punished. However, this dread can be minimised by a supportive classroom environment which is crucial for effective learning of mathematics.

Equally important to the promotion of academic resilience in mathematics is the learners’ active participation in the lesson by asking/answering questions and learning mathematics with/from their peers. Furthermore, findings highlight motivation as a two-way construct, i.e. when learners are motivated to learn mathematics their resilient good mathematics outcomes in turn motivate the teacher to teach mathematics. In addition, past failures/success in mathematics did not predict learners’ final performance in mathematics; all it required was hard work and determination to achieve the best in mathematics. Participants were able to achieve resilient mathematics outcomes because they reported having had one or two teachers as role models, who had a positive influence on their learning mathematics. These teachers

provided support, encouragement and much needed motivation to learners when the home background was found lacking.

6.3.4 Model of promoting academic resilience in mathematics

The main description of a good mathematics lesson revolves around discipline, comprehension of mathematics content, teacher mastery of the mathematics content, teacher enthusiasm, and learner engagement and interaction which motivates learners to learn more mathematics. It was found that a good mathematics lesson must be taught using a variety of computational strategies to promote learner autonomy. The majority of learners reported that they appreciated the opportunity for meaningful learning via sharing their computational strategies, correcting their mistakes following a class discussion and thus learning from one another.

There was a general consensus amongst the learners that mathematics is complex in nature as it is not a theoretical subject but uses numbers and symbols that are difficult to memorise for an assessment activity. The participants warned that the nature of mathematics dictates the best or most suitable learning style i.e. drill and practice. Findings indicated that mathematics, also referred to by learners as a “to-do” subject, requires regular and focused practice of mathematics school work to excel in it. Therefore, academic resilience is promoted by the ‘**I can**’ attribute such as: individual learners’ efforts, persistence and determination to focus on doing their mathematics school work. This attribute in turn is fuelled by the ‘**I have**’ attribute of the learner, for example learners have reported that they seek learning support from their teachers, peers/friends and family though seldom. Thus at the heart of promoting academic resilience lies motivation to learn and practise mathematics school work.

Overall, the findings showed that resilience-fostering teachers communicate care and hope, faith in their learners’ capabilities to learn mathematics, a sense of achievement and good teacher-learner relationships which is crucial to the development of a healthy ‘**I am**’ attribute

of the I³ model of promoting academic resilience in mathematics. These teachers were reported to have been available in providing learning support in mathematics to their learners anytime and anywhere i.e. in and out of the classroom without complaint. Results further showed that learners had good teacher-learner relations and good parent-learner relations as well as good peer relations, which translate into “I feel a sense of belonging” and “I am loved and cared for”, without which any person would not have the drive to learn mathematics. Vital to note here is that these findings are important because they provide baseline information upon which to form theoretical models of academic resilience in mathematics. For example, this study deduced that the internal factors represented by **I am** and **I can** attribute of the model are interwoven with the external factors here in referred to as the **I have** attribute and together they facilitate the phenomena of academic resilience in mathematics in the Namibian context.

6.3.5 Major contributions of the study

School failure at Grade 10 remains a challenge in Namibia. Learners at-risk of school failure are from disadvantaged backgrounds such as: learners from poor single-parent families; learners from unemployed families, learners who are orphans; learners who are teenage parents, and learners who are from communities that are prone to crime, violence, alcohol and substance abuse. Although these learners are considered to be at-risk of school failure they manage to excel in mathematics and this phenomenon is termed academic resilience. This study give insight into the attributes of learners who excel in mathematics despite the challenges. The study makes new contributions to the body of knowledge for academic resilience in mathematics of at-risk Grade 10 learners, including:

- **Display of academic resilience in mathematics and the context under which resilient experiences occur**

The study showed that learners display academic resilience in mathematics via high achievement in mathematics because of healthy relationships with teachers,

peers/friends and some family members. Overall, resilient learners possess high levels of self-efficacy, self-confidence, self-determination, optimism, willingness to learn from their mistakes, willingness to give/receive help with their learning of mathematics, and concern to focus on what they can control rather than what they cannot.

Findings of this study demonstrated that these experiences of resilience occur in contexts seen as unfavourable. At-risk learners are often orphans born to uneducated/under-educated parents who could not assist them with the actual school mathematics work but encouraged them verbally. Their home background is generally lacking in terms of providing them with role models for learning mathematics. They live in neighbourhoods where people operate cuca shops/bars in order to make a living. Consequently, learners are challenged with high levels of noise coming from these cuca shops/bars, exposure to violence, alcohol and substance abuse which influenced their learning of mathematics negatively on a daily basis. As referred to earlier, such learners refuse to succumb to the huge sense of hopelessness presented by their disadvantaged home backgrounds, instead they rely on problem-solving and coping skills to navigate through these challenges to ultimately succeed in mathematics.

- **Meaning of academic resilience in mathematics**

The study revealed that the experience of academic resilience in mathematics is significantly of value to resilient learners and they used words such as “exciting” and “amazing” to describe their academic experience in mathematics. Learners felt proud of their achievement in mathematics and these feelings were shared with teachers, peers/friends and family (trusted network of people). This finding can be viewed as showing that academic resilience in mathematics promotes social bonding between the learner and the trusted network of people. Furthermore, achieving good grades/symbols

in mathematics won them their peers' approval which in turn increased the learners' level of self-efficacy and mastery of mathematics content. Academic resilience in mathematics is influenced by teacher attributes such as: mastery of the mathematics content, ability to explain mathematics well and to communicate its relevance to the learners' everyday life experiences. Resilient learners have a sense of a bright future which is mainly determined by their academic resilience in mathematics. Data indicated that learners perceive mathematics as the key to success, i.e. it opens doors to many lucrative careers. Simply put, academic resilience in mathematics implies a brighter future. However, achieving academic resilience in mathematics does not occur in a vacuum but rather it is a collective effort by the individual learner supported by teachers, peers/friends and family.

- **Individual differences in the experiences of academic resilience in mathematics**

Findings showed that learners had varied highlights of learning mathematics. One group of learners experienced their highest point of achievement in mathematics at primary school and the second group achieved academic resilience in mathematics at secondary school level. Regardless of past experiences in mathematics, learners can achieve academic resilience in mathematics if they have high levels of self-efficacy, self-confidence, self-determination and "self-help". This emergent concept of the study was used to describe the individual learners' persistence to practise mathematics school work independently first before seeking help as often as necessary from the teacher or peers/friends until mastery of the skill is acquired.

Furthermore, results established that in order to promote academic resilience in mathematics the learners and teachers must fulfil their responsibilities. For example,

the joy of learning mathematics is facilitated by the teacher through careful selection of teaching methods informed by the nature of mathematics content to ensure maximum learner engagement and interaction. Again motivation is also promoted through communicating high expectations of achievement in mathematics by the people learners cared about i.e. the teacher, friends, and family motivate learners to succeed in mathematics since they do not wish to hurt or disappoint them.

- **Model for promoting academic resilience in mathematics**

The study proposed a theoretical model (I³ model for promoting academic resilience in mathematics) for promoting academic resilience of at-risk Grade 10 learners in the Namibian context. This is a significant finding because it is essential to promote and foster resilience in mathematics for at-risk learners from disadvantaged backgrounds as this leads to motivated learners and teachers. Motivated individuals can achieve any goals they set out to achieve – their potential is unlimited. The model consists of three attributes of the learner namely:

1. I am

The finding that at-risk learners with resilient outcomes in mathematics seek to satisfy their basic needs was a significant contribution to our understanding of creating supportive classroom environment that communicates care, hope and a sense of belonging.

2. I have

The evidence that effective learning of mathematics requires support from the teachers, peers and family provides useful insight when designing and target interventions for poor academic performance in mathematics.

3. I can

The study showed that when learners feel a sense of belonging in the classroom and receive learning support from teachers, peers/friends and family, they can achieve resilient outcomes in mathematics.

7. References

- Agnes, M. E. (2013). *Webster's new world college dictionary*. Foster City, CA: John Wiley.
- Ahern, N. R. (2007). *Resiliency in Adolescent College Students*. Unpublished doctoral dissertation, University of Central Florida, Orlando, Florida.
- Alva, S. A. (1991). Academic invulnerability among Mexican-American students: The importance of protective resources and appraisals. *Hispanic Journal of Behavioural Sciences*, 13(1), 18-34.
- American Psychological Association (2010). *The road to resilience*. Washington, DC: American Psychological Association, <http://www.apa.org/helpcenter/road-resilience.aspx> (accessed July 10, 2014).
- Ammermueller, A., & Pischke, J. (2009). "Peer effects in European primary schools: Evidence from PIRLS. *Journal of Labour Economics*, 27(3), 315-348
- Anderman, E. M. (2002). School effects on psychological outcomes during adolescence. *Journal of Educational Psychology*, 94(4), 795-809.
- Anderman, E., Austin, C., & Johnson, D. (2002). The development of goal orientation. In A. Wigfield & J. Eccles (Eds.), *Development of Achievement motivation* (pp. 197-220). New York, NY: Academic Press.
- Aronowitz, T., & Morrison-Beedy, D. (2004). Resilience to risk-taking behaviours in impoverished African-American girls: The role of mother-daughter connectedness. *Research in Nursing & Health*, 27, 29-39.
- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco, CA: Jossey-Bass.
- Astin, A., & Panos, R. J. (1969). *The educational and vocational development of college students*. Washington, DC: American Council on Education.
- Auerbach, S. (2007). From moral supporters to struggling advocates: Reconceptualising parent roles in education through the experience of working-class families of colour. *Urban Education*, 42(3), 250-283.
- Banatao, E. J. (2011). *Educational Resilience: The relationship between School Protective Factors and Student Achievement*. Unpublished doctoral dissertation, San Diego state University.

- Bandura, A. (1998). Personal and collective efficacy in human adaptation and change. In J.G.Adair, D. Balenger, K. L. Dion, & M. Sabourin (Eds.), *Advances in Psychological Science: Social, personal, and cultural aspects*. Psychology Press.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: W.H. Freeman and Company.
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development*, 67(3), 1206-1222.
- Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. Cambridge, UK: Cambridge University Press.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28(2), 117-148.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bank, B. J., Slavings, R. L., & Biddle, B. J. (1990). Effects of peer, faculty, and parental influences on students' persistence. *Sociology of Education*, 63, 208-225.
- Barley, Z., Athrop, H. & Goodwin, B. (2007). Creating a culture of high expectations. *Changing Schools*, 55, 5.
- Beardslee, W. (1997). Prevention and clinical encounter. *American Journal of Orthopsychiatry*, 68, 521-533.
- Belgrave, F. Z., Chase-Vaughn, G., Gray, F., Addison, J. D., & Cherry, V. R. (2000). The Effectiveness of a Culture and Gender-Specific Intervention for Increasing Resiliency among African American Preadolescent Females. *Journal of Black Psychology*, 26(2), 133-147.
- Benard, B. (2004). *Resiliency. What we have learned*. USA: Wested.
- Benard, B. (2002). Applications of resilience. *Resilience and Development*, 269-277.
- Benard, B. (1998). Prevention from inside out: Tapping resilience in youth. *Prevention Tactics*, 2(3), 1-8.
- Benard, B. (1997). *Turning Around for All Youth: From Risk to Resilience*. ERIC/ CUE Digest, Number 126.
- Benard, B., & Marshall, K. (1997). A framework for practice: Tapping innate resilience. *Research/Practice*, 5(1), 9-15.

- Benard, B. (1996). Fostering resiliency in urban schools. In B. Williams (Ed.), *closing the achievement gap: A vision for changing beliefs and practices*, (pp.96-119). Alexandria, VA: Association for Supervision and Curriculum Development.
- Benard, B. (1995). Fostering resilience in children (Eric Document Reproduction Service No. ED 386327)
- Benard, B. (1993). Fostering Resilience in kids. *Educational Leadership*. (Nov.93):4-48.
- Benard, B. (1991). *Fostering resiliency in kids: Protective factors in the family, school, and community*. Portland, OR: Northwest Regional Educational Laboratory.
- Bender, K., Thompson, S. J., McManus, H., & Lantry, J. (2007). Capacity for survival: Exploring strengths of homeless street youth.
- Bentz, V. M., & Sappiro, J. J. (1998). *Mindful enquiry in social research*. Thousand Oaks, CA: Sage.
- Blum, R. W. (1998). Healthy youth development as a model for youth promotion. *Journal of Adolescent Health*, 22, 368-375.
- Bouffard-Bouchard, T., Parent, S., & Larivée, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development*, 14, 153-164.
- Borman, G.D., Overman, L.T. (2004). Academic Resilience in Mathematics among Poor and Minority Students. *The Elementary School Journal*, 104(3), 177-195.
- Borman, G.D., Rachuba, L.T. (2001). Academic success among poor and minority students: An analysis of competing models of school effects. CRESPAR (*Center for Research on the Education of Students Placed At Risk*), Report No. 52, Johns Hopkins and Howard Universities, funded by Office of Educational Research and Development.
- Bosworth, K., & Earthman, E. (2002). From Theory to Practice: School Leaders' Perspective on Resiliency. *Journal of clinical Psychology*, 58(3), 299-306.
- Boyd, C. O. (2001). Phenomenology the method. In P. L. Munhall (Ed.), *Nursing research: A qualitative perspective*. 3rd Ed., (pp. 93-122). Sudbury, MA: Jones and Bartlett.
- Buckner, J. C., Mezzacappa, E., & Beardslee, W. R. (2003). Characteristics of the resilient youths living in poverty: The role of self-regulatory processes. *Development and Psychology*, 15,139-162.
- Bronfenbrenner, U., Moen, P., & Garabino, J. (1984). Family and community. In R. Parke (Ed.), *Review of child development research* (Vol. 7, pp. 283-328). Chicago: University of Press.
- Bronfenbrenner, U. (1979). *The ecology of human development*. London. Howard University Press.

- Brooks, J. E. (2006). Strengthening resilience in children and youths: Maximizing opportunities through the schools. *Children & Schools*, 28(2), 69-76.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in*, 3, 77-101.
- Brown, J. H., D'Emidio-Caston, & Bernard, B. (2001). *Resilience education*. United States of America: Corwin Press.
- Brown, B. B., Clasen, D. R., & Eicher, S. E. (1986). Perceptions of peer pressure, peer conformity dispositions, and self-reported behaviour among adolescents. *Journal of Personal Social Psychology*, 22, 521-530.
- Buthelezi, N. P. A. (2007). *Analysing the School Context for factors that Promote or Impede Resilience among Middle Adolescent Learners*. Unpublished Masters Thesis, University of Zululand.
- Cabrera, A., & La Nasa, S. M. (2001). On the path to college: Three critical tasks facing America's disadvantaged. *Research in Higher Education*, 42(2), 119-149.
- Cabrera, A., Nora, A., Terenzini, P. T., Pascarella, E. T., & Hagedorn, L. S. (1999). Campus racial climate and the adjustment of students to college: A comparison between White students and African-American students. *The Journal of Higher Education*, 70(2), 134-160.
- Carle, A., & Chassin, L. (2004). Resilience in a community sample of children of alcoholics: its prevalence and relation to internalizing symptomatology and positive effect. *Applied Developmental Psychology*, 25, 577-595.
- Cicchetti, O. & Garmezy, N. (1993). Prospects and promises in the study of resilience. *Development and Psychopathology*, (5), 497-502.
- Coburn, J., & Nelson, S. (1989). Teachers Do Make a Difference: What Indian Graduates Say About Their School Experience. *ERIC*, Number: ED306071
- Cook, K. V. (2000). "You have to have somebody watching your back and if that's God, then that's mighty big": The church's role in the resilience of inner-city youth. *Adolescence*, 35(140), 717-730.
- Collins, J. L. (1982, March). Self-efficacy and ability in achievement behavior. Paper presented at the annual meeting of the American Educational Research Association, New American Educational Research Association, New York.
- Collier, V. P. (1995). *Promoting Academic Success for ESL Students*. New Jersey. Allyn and Bacon.
- Condly, S. J. (2006). Resilience in children: A review of literature with implications for educators. *Urban Education*, 41, 211-236.
- Connell, P. J., Spencer, M. B., & Aber, J. L. (1994). Educational risk and resilience in African-American youth: Context, self, action, and outcomes in school. *Child Development*, 65, 493-506.

- Conklin, M. E., & Dailey, A. R. (1981). Does consistency of parental educational encouragement matter for secondary school students? *Sociology of Education*, 54(4), 254-262.
- Cowan, P. A., Cowan, C. P., & Shulz, M. S. (1996). Thinking about risk and resilience in families. In M. Hertherington & E. A. Blechman (Eds.), *Stress, coping, and resilience in children and families* (pp. 1-38). Mahwah, NJ: Lawrence Erlbaum.
- Cresswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed method research* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W. (2007). *Qualitative enquiry and research design: Choosing among five approaches*. Thousand Oaks, California: Sage Publications.
- Crosnoe, R. & Elder, G. H. (2004). Family dynamics, supportive relationships and educational resilience during adolescence. *Journal of Family Issues*, 25 (5), 571-602.
- Cutuli, J., Herbers, J., Lafavor, T., & Masten, A. S. (2008). Promoting competence and resilience in the school context. *Professional School Counselling*, 12(2), 76-84.
- Dauber, S. L. Alexander, K. L. & Entwisle, D. R. (1996). Children in Motion: School Transfers and Elementary School Performance. Retrieved from: www.tandfonline.com
- De Baca, C. (2010). A Review of Literature: Resilience and Academic Performance. *ScholarCentric*, 1-8.
- Deci, E. (1995). *Why we do what we do: Understanding self-motivation*. New York, NY: Penguin Books.
- De Vaus, D. A. (1993). *Survey in Social Research*. 3rd Ed., London: UCL Press.
- De Witz, S. J., & Walsh, W. B. (2002). Self-efficacy and college student satisfaction. *Journal of Career Assessment*, 10(3), 315-326.
- DNEA. (2015). Examiner's report: Mathematics JSC examinations. Windhoek: DNEA.
- DNEA. (2012). Examiner's report: Mathematics JSC examinations. Windhoek: DNEA.
- Dreyer, P. (n. d). Why Resilience? A Review of Literature of Resilience and Implications for Further Educational Research. *Hispanic Journal of Behavioural Science*, 19, 309-317
- Eccles, J., & Gootman, J. (2002). *Community programs to promote youth development*. Washington, DC: National Academic Press.
- Elder, G. H. (1986). Military times and turning points in men's lives. *Developmental Psychology*, 22(2), 233-245.
- Everall, R. D., Altrows, K. J., & Paulson, B. L. (2006). Creating a future: A study of resilience in suicidal female adolescents. *Journal of Counseling & Development*, 84(4), 461-470.

- Fraser, M., Richman, J. & Galinsky, M. (1999). Risk, protection and resilience: Towards a conceptual framework for social work practice. *Social Work Research*, 23(3), 131-144.
- Felsman, J. K. (1989). Vietnamese Amerasians: Practical Implications of Current Research. *ERIC*, Number ED 313604.
- Fergus, S., & Zimmerman, M. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *The Annual Review of Public Health*, 26, 399-419.
- Floyd, C. (1996). Achieving despite the odds: A study of resilience among a group of African-American high school seniors. *The Journal of Negro Education*, 65(2), 181-189.
- Frederickson, N., & Petrides, K. V. (2008). Ethnic, gender, and socio-economic group differences in academic performance and secondary school selection: A longitudinal analysis. *Learning and Individual Differences*, 18, 144-151.
- Freire, P. (1970). *Pedagogy of the Oppressed*. New York, NY: Continuum International Publishing Inc.
- Fullan, M. (1998). The Meaning of Education Change: A Quarter of a Century of Learning. In A. Hargreaves, M. Fullan and D. Hopkins (Eds.), *International Handbook of Educational Change* (pp.214-288). London: Kluwer Academic Publisher
- Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York, NY: Basic Books.
- Garnezy, N. (1993). Children in poverty: Resilience despite risk. *Psychiatry*, 56, 127-136.
- Garnezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments. *Paediatric Annals*, 20, 459-466.
- Garnezy, B. (1985). Stress-resistant children: The search for protective factors. In J. E. Stevenson (Ed.), *Recent research in developmental psychopathology* (pp. 213-233). *Journal of Child Psychology and Psychiatry*, 4(Book Supplement).
- Garnezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development*, 55, 97-111.
- Garnezy, N. (1974) the study of competence in children at risk for severe psychopathology. In E. J. Anthony & C. Koupernik (Eds.), *The child in his family: Children at psychiatric risk: III*. (pp. 547). New York: Wiley.
- Garnezy, N., & Streitman, S. (1974). Children at risk: The search for the antecedents of schizophrenia: Conceptual models and research methods. *Schizophrenia Bulletin*, 8, 14-90.
- Garnezy, N. (1970). Process and reactive schizophrenia: Some conceptions and issues. *Schizophrenia Bulletin*, 2, 30-74.

- Garza, E., Reyes, P., & Trueba, E. T. (2004). *Resiliency and success: Migrant children in the U. S.* Boulder, CO: Paradigm.
- Gayles, J. (2005). Playing the game and paying the price: Academic resilience among three high-achieving African American males. *Anthropology and Education Quarterly*, 36(3), 250-264.
- Gilgun, J. E. (1999). Mapping resilience as a process among adults with childhood adversities. In H. I. McCubbin, E. A. Thompson, A. I. Thompson, And J. A. Futrell (Eds.), *The dynamics of resilient families* (pp. 41-70). Thousand Oaks, CA: Sage Publications.
- Gizir, A. C. (2004). *Academic resilience: An investigation of protective factors contributing to the academic achievement of eight grade students in poverty*. Unpublished Doctoral Dissertation, Middle East Technical University.
- Gokhan, A. & Ali, B. (2013). Investigation of High School Students' Resiliency Perception in terms of Some Variables. *Educational Sciences: Theory & Practice*, 13(2), 922-928
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than I.Q.* New York, NY: Bantam Books.
- Gonzalez, R. & Padilla, A.M. (1997). The academic resilience of Mexican American high school students. *Hispanic Journal of Behavioral Science*, 19, 309-317.
- Gordon, E. W., & Yowell, C. (1994). Educational reforms for students at risk: Cultural dissonance as a risk factor in the development of students. In R. J. Rossi (Ed.), *Educational re-forms and students at risk* (pp. 51-69). New York: Teachers College Press.
- Gore, S., & Eckenrode, J. (1994). Context and process in research on risk and resilience. In R. Haggery, L. Sherrod, N. Garmezy, & M. Rutter (Eds.), *Stress, risk, and resilience in children and adolescents* (pp. 19-63). NY: Cambridge University Press.
- Goux, D., & Eric, M. (2007). Close Neighbours Matter: neighbourhood effects on early performance at school. *The Economic Journal*, 117, 1193-1215.
- Graham, B. (2008). Identifying social interactions through conditional variance restrictions. *Econometrica*, 76(3), 643-660.
- Gray, J.P., Padron, Y.N., & Waxman, H.C. (2003). Review of Research on educational Resilience. Centre for Research on Educational, Diversity and Excellence. *Research report, paper 11-11*. Santa Cruz: University of California
- Groenewald, T. (2014). A phenomenological Research Design Illustrated. *International Journal of Qualitative Methods*, 3(1), 1-26.
- Grotberg, E. (1995). *A guide to promoting resilience in children: Strengthening the human spirit*. Netherlands: Bernard Van Leer Foundation.

- Greene, R. (2002). Human behaviour theory: A resilience orientation. In R. Greene (Ed.), *Resiliency: An integrated approach to practice, policy, and research* (pp. 1-28). Washington, DC: NASW Press.
- Hart, K., Wilson, T. L., & Hittner, J. B. (2006). A psychosocial resilience model account for medical well-being in relation to sense of coherence. *Journal of Health Psychology*, 11, 857-862.
- He, Z. (2014). *Examining the Academic Resilience in Mathematics Performance for Underprivileged Ninth Graders Using the National Data from High School Longitudinal Study (HSLs: 09)*. Unpublished doctoral dissertation, Texas Tech University.
- Heaton, D. (2013). *Resilience and Resistance in Academically Successful Latino Students*. All Graduate Theses and Dissertations, Utah State University.
- Hemingway, E. (2014). *The complete short stories of Ernest Hemingway*. New Canadian Library.
- Henderson, N., & Milstein, M. M. (1996). *Resiliency in schools: Making it happen for students and educators*. Thousand Oaks, CA: Corwin Press.
- Herrero, D. M. (2014). *The Relationship among Achievement Motivation, Hope, and Resilience and their effects on Academic Achievement among first year College Students enrolled in a Hispanic-serving Institution*. Unpublished doctoral dissertation, Texas A&M University-Corpus Christi, Texas.
- Higgins, G. O. (1994). *Resilient adults: Overcoming a cruel past*. San Fransisnco, CA: Jossey-Bass.
- Hoge, E. A., Austin, E. D., & Pollack, M. H. (2007). Resilience: Research evidence and conceptual considerations for posttraumatic stress disorder. *Depression and Anxiety*, 24, 139-152.
- Hossler, D., Schmit, I., & Vesper, N. (1999). *Going to college: How social economic, and educational factors influence the decisions students make*. Baltimore: Johns Hopkins University Press.
- Hossler, D., & Stage, F. K. (1992). Family and high school experience influences on the postsecondary educational plans of ninth-grade students. *American Educational Research Journal*, 29(2), 425-451.
- Hoxby, C., & Weingarth, G. (2006). *Taking Race Out of the Equation: School Reassignment and the Structure of Peer Effects*. Working Paper, Harvard University.
- Hoxby, C. M. (2000). The effects of class size on student achievement: New evidence from population variation. *The Quarterly Journal of Economics*, 115(4), 1239-1286.
- Jessor, R. (1993). Successful adolescent development among youth in high-risk settings. *American Psychologist*, 48, 117-126.

- Jew, C. L., Green, K. E., & Kroger, J. (1999). Development of resiliency. *Measurement and Evaluation in Counselling and Development*, 32, 75-89.
- Jimerson, S., Egeland, B., & Teo, A. (1999). A longitudinal study of achievement trajectories: Factors associated with change. *Journal of Educational Psychology*, 91(1), 116-126.
- Jowkar, B., Kojuri, J., Kohoulat, N., & Hayat, A. A. (2014). Academic resilience in education: the role of achievement goal orientations. *Journal of Advances in Medical Education & Professionalism*, 2(1), 33-38.
- Kanevsky, L. Corke, M., & Frangkiser, L. (2008). The academic resilience and psychosocial characteristics of inner-city English learners in a museum-based school program. *Education and Urban Society*, 40(4), 452-475.
- Kaplan, H. B. (1999). *Towards an understanding of resilience. A critical review of definitions and models*. In: Glantz, M. D. & Johnson, J. (eds). *Resilience and development: Positive life adaptation*. New York: Plenum Press.
- Kaufman, J., Cook, A., Arny, L., Jones, B., & Pittinsky T. (1994). Problems defining resilience: Illustrations from the study of maltreated children. *Development and Psychopathology*, 6, 215-229.
- Kensit, D. A. (2000). Rogerian theory: A critique of the effectiveness of pure client-centred therapy. *Counselling Psychology Quarterly*, 13(4), 345-432.
- Kim-Cohen, J. (2007). Resilience and developmental psychopathology. *Child and Adolescent Psychiatric Clinics of North America*, 16, 271-283.
- Kinard, E. M. (1998). Methodological issues in assessing resilience in maltreated children. *Child Abuse and Neglect*, 22, 669-680.
- Kiswarday, V. (2012). Empowering Resilience within the School Context. *Metodicki obzori*, 7 (1), 93-103.
- Kirby, L., D., & Fraser, M. W. (1997). Risk and resilience in childhood. In M. Fraser (Ed.), *Risk and resilience in childhood* (pp. 10-33). Washington, DC: NASW Press.
- Kleinman, A. (2004). Culture and Depression. *New England Journal of Medicine*, 351(10), 951-953.
- Knapp, M. S., & Shields, P. M. (1991). *Better Schooling for Children of Poverty: Alternatives to Conventional Wisdom*. New York. McCutchan Publishing.
- Korir, D. K., & Kipkemboi, F. (2014). The Impact of School Environment and Peer Influences on Students' Academic Performance in Vihiga County, Kenya. *International Journal of Humanities and Social Science*, 4(5), 140-251.
- Kozol, J. (1997). Reflections on resiliency. *Principal*, 77(2), 5-6.

- Krovertz, M. L. (1999). Fostering resilience. *Trust for Educational Leadership*, 28(5), 1055-2243.
- Kumpfer, K. (1999). Factors and processes contributing to resilience: The resilience framework. In Glantz, M. D., Johnson, J. (Eds.). (1991). *Resilience and development: Positive life adaptations*. New York: Plenum Press.
- Larson, R. (2000). Toward a psychology of positive youth development. *American Psychologist*, 55, 170-183.
- Lee, J. H., Nam, S. K., Kim, A. R., Kim, B., Lee, M. Y., & Lee, S. M. (2013). Resilience: A meta-analytic approach. *Journal of Counselling & Development*, 91, 269-279. doi:10.1002/j.1556-6676.2013.00095.
- Leroy, C., & Symes, B. (2001). Teachers' perspectives on the family backgrounds of children at risk. *McGill journal of education*, 36(1), 45.
- Levin, H. (1988). Accelerated schools for disadvantaged students. *Educational Leadership*, 44, (6), 19-21.
- Levitt, M.J., Guacci F., & Levitt, J. L. (1993). Convoys of social support in childhood and early adolescence: Structure and functions. *Development psychology*, 29, 811-818.
- Linnehan, F., Weer, C. H., & Stonely, P. (2011). High school guidance counsellor recommendations: The role of student race, socioeconomic status, and academic performance. *Journal of Applied Social Psychology*, 41(3), 536-558.
- Liu, O. (2009). An investigation of factors affecting gender differences in standardized math performance: Results from U.S. and Hong Kong 15 year olds. *International Journal of Testing*, 9(3), 215-237.
- Liu, X., & Lu, K. (2008). Student performance and family socioeconomic status: Results from a survey of compulsory education in Western China. *Chinese Education and Society*, 41(5), 70-83.
- Luthar, S. S., & Zeigler, E. (2001). Vulnerability and competence: A review of research on resilience in childhood. *American Journal of Orthopsychiatry*, 61, 6-22.
- Luthar, S. S., & Burak, J. (2000). Adolescent wellness: In the eye of the beholder? In D. Cicchetti, J. Rappaport, I. Sandler, & R. Weissberg (Eds.), *The promotion of wellness in children and adolescents* (pp. 29-57). Washington, DC: Child Welfare League Association Press.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543-562.
- Luthar, S. S. & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology*, 12, 857-885.

- Malecki, C. K., & Damaray, M. K. (2006). Social support as a buffer in the relationship between socioeconomic status and academic performance. *School Psychology Quarterly*, 21(4), 375-395.
- Martel, M. M., Nigg, J. T., Wong, M. M., Fitzgerald, H. E., Jester, J. M., Puttler, L. I., Glass, J. M., Adams, K. M., & Zucker, R. A. (2007). Childhood and adolescent resiliency, regulation, and executive functioning in relation to adolescent problems and competence in a high-risk sample. *Development and Psychopathology*, 19 (2), 541-563.
- Martin, A. J., Anderson, J., Bobis, J., Way, J., & Vellar, R. (2012). Switching on and switching off in mathematics: An ecological study of future intent and disengagement among middle school students. *Journal of Educational Psychology*, 104(1), 1-18.
<http://dx.doi.org/10.1037/a0025988>
- Martin, J. A., & Marsh, H. W. (2008). Academic buoyancy: Towards an understanding of students' everyday academic resilience. *Journal of School Psychology*, 46, 53-83.
- Martin, J. A., & Marsh, H. W. (2006). Academic resilience and its psychological and educational correlates: A construct validity approach. *Psychology in the Schools*, 43(3), 267-281. DOI: 10.1002/pits.20149
- Martin, A. J. (2002). Motivation and academic resilience: Developing a model of student enhancement. *Australian Journal of Education*, 14, 34-49.
- Masten, A.S. & Powell, J.L. (2003). "A Resiliency Framework for Research, Policy and Practice". In Luthar, S. (ed.) *Resiliency and Vulnerability: Adaptation in the Context of Childhood Adversity*. Cambridge University Press: Cambridge, pp.1-29.
- Masten, A. S., & Reed, M. G. (2002). Resilience in development. In S. R. Snyder & S. J. Lopez (Eds.), *The handbook of positive psychology*. Oxford, England: Oxford University Press.
- Masten, A. S. (2001). Ordinary magic. Resilience processes in development. *Am Psychol*, 56(3), 227-238.
- Masten, A. S., Hubbard, J. J., Gest, S. D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology*, 11(1), 143-169. doi:10.1017/S0954579499001996
- Masten A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavourable environments: Lessons for research on successful children. *American Psychologist*, 53, 205-220.
- Masten, A. S. (1994). Resilience in individual development: Successful adaptation despite risk and adversity. In M. Wang & E. Gorden (Eds.), *Educational resilience in inner-city America* (pp. 3-25). Hillsdale, NJ: Lawrence Erlbaum.
- Masten, A. S., Best, F. M., & Garmezy, N. (1990). Resilience and Development: Contributions from the study of children who overcome adversities. *Development and Psychopathology*, 2, 425-444.

- Mayberry, F. (2003). *Understanding At-Risk Learners*. London. Routledge.
- McAdam-Crisp, J. L. (2006). Factors that can enhance and limit resilience for children of war. *Childhood*, 12, 459-477.
- McCarron, G. P., & Inkelas, K. K. (2006). The gap between educational aspirations and attainment for first-generation college students and the role of parental involvement. *Journal of College Student Development*, 47(5), 534-549.
- McCubbin, H.I., Thompson, A., Pirner, P., & McCubbin, M.A. (1988). *Family types and family strengths: a life cycle and ecological perspective*. Minneapolis, MN: Burgess.
- McEwan, P. J. (2003). Peer effects on student achievement: Evidence from Chile. *Economics of Education Review*, 22, 131-141.
- McLeod, S.A. (2016). Maslow's Hierachy of Needs. Retrieved from: www.simplypsychology.org/maslow.html
- McLeod, S.A. (2014). Carl Rogers. Retrieved from: www.simplypsychology.org/carl-rogers.html
- Ministry of Basic Education, Sport and Culture (MBESC) (2001). Annual report. Windhoek, Namibia.
- Ministry of Education and Culture (MEC) (1993). *Towards Education for All: A Development Brief for Education, Culture and Training*. Windhoek Gamsberg McMillan.
- Ministry of Gender Equality and Child Welfare (2012). *National Plan of Action on Gender Based Violence (2012-2016)*.
- Mills, N., Pajares, F., & Herron, C. (2007). Self-efficacy of college intermediate French students: Relation to achievement and motivation. *Language Learning*, 57(3), 417-442.
- Miller, A. (1990). *The untouched key: Tracing childhood trauma in creativity*. New York, NY: Anchor Books.
- Moore, J. (2013). Research Summary: Resilience and At-risk Children and Youth. National Center for Homeless Education. Retrieved from: www.serve.org/nche
- Morales, E. E., & Trotman, F. K. (2011). *A focus on hope: Fifty resilient students speak*. Lanham, Maryland: University Press of America, Inc.
- Morales, E., & Trotman, F. (2004). *Promoting academic resilience in multicultural America: Factors affecting student success*. New York: Peter Lang.
- Morales, E. E. (2000). A contextual understanding of the process of educational resilience: High achieving Dominican American students and the "Resilience Cycle." *Innovative Higher Education*, 25(1), 7-22.

- Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, California: Sage Publication.
- Murray, C. (2003). *Risk factors, protective factors, vulnerability, and resilience: A framework for understanding and supporting the adult transitions of youth with high-incidence disabilities*. Retrieved from: journals.sagepub.com
- Myrick, R. (1997). *Development guidance and counselling: a practical approach*. Minneapolis MN: Educational Media Group.
- Nakale, A. (2013, March 22). New Era, p.12.
- Nambira, G. Kapenda, L, Tjipueja, G., & Sichombe, B. (2009). *Performance of learners in Mathematics at Upper Primary Phase in Okahandja District: Examining reasons for Low Performances*. Professional Development and Research: NIED.
- National Planning Commission (2002). *National Poverty Reduction Action Program (2001-2005)*.
- Natriello, G., McDill, E. L., & Pallas, A. M. (1990). *Schooling disadvantaged children: Racing against catastrophe*. New York: Teachers College Press.
- Naukushu, S. T. (2012). *Factors Affecting the Development of number Sense and its Influence on Grade 12 Learners' Performance in Mathematics in the Oshana Education Region*. Unpublished master theses, University of Namibia.
- Neenan, M. (2009). *Developing resilience: A cognitive-behavioral approach*. New York, NY: Routledge/Taylor & Francis Group.
- Neshila, F., Miranda, H., & Zimba, R. (2015). Academic Resiliency: Revising the Cycle of Educational Failure. *Nera Journal*, 13 (01), 61-78.
- Neshila, K. F. (2011). *Exploring perceptions and educational needs of grade 10 learners at risk of school failure*. Unpublished master thesis, University of Namibia, Windhoek.
- Nettles, S. M., & Pleck, J. H. (1993). *Risk, resilience, and development: The multiple ecologies of Black adolescents*. Baltimore, MD: The Johns Hopkins University.
- Nettles, S. M., Mucherah, W., & Jones, D. S. (2000). Understanding Resilience: The Role of Social Resources. *Journal of Education for Students Placed at Risk (JESPAR)*, 5(1-2), 47-60.
- O'Brien, S. F., & Bierman, K. L. (1988). Conceptions and Perceived Influence of Peer Groups: Interviews with Preadolescents and Adolescents. *Child Development*, 59(5), 1360-1365.
- Okpala, C. O., Okpala, A. O., & Smith. F. E. (2001). Parental involvement, instructional expenditures, family socioeconomic attributes, and student achievement. *The Journal of Educational Research*, 95(2), 110-115.

- Oswald, M., Johnson, B., & Howard, S. (2003). Quantifying and evaluating resilience-promoting factors: teachers' beliefs and perceived roles. *Research in education*, 70.
- Padrón, Y. N., Waxman, H. C., & Huang, S. L. (1999). Classroom behavior and learning environment differences between resilient and non-resilient elementary school students. *Journal of Education for Student Placed At Risk*, 4 (1), 63-81.
- Pajares, F., & Zeldin, A. (1999). Inviting Self-Efficacy Revisited: The Role of Invitations in the Lives of Women with Mathematics-Related Careers. *Journal of Invitational Theory and Practice*, 6(1), 48-68.
- Pajares, F (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66, 543-578.
- Pajares, F., & Miller, M. D. (1994). The role of self-efficacy and self-concept beliefs in mathematical problem-solving: A path analysis. *Journal of Educational Psychology*, 86, 193-203.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: Volume 2 a third decade of research*. San Francisco: Jossey Bass.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). California, USA: Sage Publications, Inc.
- Perez, W., Espinoza, R., Ramos, K., Coronado, H. M., & Cortes, R. (2009). Academic resilience among undocumented Latino students. *Hispanic Journal of Behavioral Sciences*, 31,149-181
- Polit, D. F., Beck, C. T. & Hungler, B. P. (2001). *Essentials of Nursing Research: Methods, Appraisal and Utilization*. 5th Ed., Philadelphia: Lippincott Williams & Wilkins.
- Poplin, M., & Weeres, J. (1992). *Voices from the inside: A report on Schooling from inside the classroom*. Claremont, CA: Claremont Graduate School, Institute for Education in Transformation.
- Resnick, M. D. (2000). *Protective factors, resiliency, and health youth development: Adolescent medicine, State of the art reviews- moodwatches.com*
- Resnick, M., Bearman, P., Blum, R., Bauman, K., Harris, L., & Jones, J. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on health. *Journal of the American Medical Association*, 278, 823-832.
- Richardson, G. E. (2002). Metatheory of resilience and resiliency, *Journal of Clinical Psychology*, 58(3), 307-321.
- Richardson, G. E. & Nixon, C. J. (1997). *A curriculum for resiliency*. Boston, Pearson.
- Richardson, G. E., Neiger, B. L., Jensen, S., & Kumpfer, K. L. (1990). The resiliency model. *Health Education*, 21, (6), 33-39.

- Ripple, C. H., & Luther, S. S. (1998). Academic risk among inner-city adolescents: the role of personal attributes. *Journal of School Psychology, 38*(3), 277-298.
- Roderick, M., Chiong, J., DaCosta, K., Arney, M., Stone, S., & Waxman E. (1997). *Final report 1: Sample recruitment, composition, and retention methods and results*. Chicago, IL: University of Chicago.
- Rosa, E. M., & Tudge, J. (2013). Urie Bronfenbrenner's theory of human development: Its evolution from ecology to bioecology. *Journal of Family Theory & Review, 5*(4), 243-258.
- Rutter, M. (2007). Resilience, competence, and coping. *Child Abuse & Neglect, 31*, 205-209.
- Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Annals of the New York Academy of Sciences, 1094*, 1-12.
- Rutter, M. (1995). Psychosocial adversity: Risk, resilience & recovery. *South African Journal of Child and Adolescent Psychiatry, 7*(2), 75-88.
- Rutter, M. (1993). Resilience: Some conceptual considerations. *Journal of Adolescent Health, 14*, 626-631.
- Rutter, M. (1990). Psychosocial resilience and protective mechanism. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 181-214). New York: Cambridge.
- Rutter, M. (1987c). Parental mental disorder as a psychiatric risk factor. In R. Hales & A. Frances (Eds.), *American Psychiatric Association annual review* (Vol., 6, pp. 647-663). Washington, DC: American Psychiatric Press, Inc.
- Rutter, M. (1987b). Psychosocial resilience and protective mechanisms. In J. Rolf, A. Masten, D. Cicchetti. et al. (Eds.). *Risk and protective factors I the development of psychopathology* (pp.181-214). New York: Cambridge University Press.
- Rutter, M. (1987a). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57*, 316-31.
- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*, 595-611.
- Rutter, M., Maughn, B., Mortimore, P., & Ouston, J. (1979). *Fifteen thousand hours: Secondary schools and their effects on children*. London, England: Open Books.
- Sacerdote, B. (2001). Peer Effects with Random Assignment: Results for Dart-mouth Roommates. *Quarterly Journal of Economics, 116*(2), 681-704.
- Sanchez, B., Reyes, O., & Singh, J. (2006). A qualitative examination of the relationships that serve a mentoring function for Mexican American older adolescents. *Cultural Diversity and Ethnic Minority Psychology, 12*(4), 615-631.

- Salomone, R. (2003). *Same, different, equal: Rethinking single-sex schooling*. New Haven, CT: Yale University Press.
- Sanders, M. G. and Epstein, J.L. (1998). School-Family-Community Partnership and Educational Change: International Perspectives. In A. Hargreaves, M. Fullan and D. Hopkins (Eds.), *International Handbook of Educational Change* (pp.482-502). London: Kluwer Academic Publisher
- Sandoval-Hernandez, A., & Cortes, D. (2012). *Factors and conditions that promote academic resilience: A cross-country perspective*. Paper presented at the annual meeting of the 56th Annual Conference and International Education society, Caribe Hilton, San Juan, Puerto Rico. Retrieved on 2013-06-01 from http://citation.allacademic.com/meta/p553009_index.html
- Sarason, S. B. (1990). The Predictable Failure of Educational Reform: Can We Change Course before It's Too Late? The Jossey-Bass Education Series and the Jossey-Bass Social and Behavioral Science Series. *ERIC*, Number: ED354587
- Schoenfeld, A. H. (2014). What Makes for Powerful Classrooms, and How Can We Support Teachers in Creating Them? A story of Research and Practice, productively Intertwined. *Educational Researcher*, 43(80), 404-412.
- Schoon, I., Parsons, S., & Sacker, A. (2004). Socioeconomic adversity, educational resilience, and subsequent levels of adult adaptation. *Journal of Adolescent Research*, 19(4), 383-404.
- Schunk, D. H., & Pajares, F. (2004). Self-efficacy in education revisited: Empirical and applied evidence. In D. M. McInerney & S. V. Etten (Eds.), *Big theories revisited: Research on sociocultural influences on motivation and learning* (pp. 115-138). Greenwich, CT: Information Age Publishing.
- Schunk, D. H., & Zimmerman, B. J. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Reading & Writing Quarterly*, 23, 7-25.
- Schussler, D. L., & Collins, A. An Empirical Exploration of the Who, what, and How of School Care. *ERIC*, Number: EJ738760
- Seidman, I. (2013). *Interviewing as qualitative research: A guide for researchers in Education and the Social Sciences*. 4th Ed., Teachers College Press.
- Seidman, I. (1998). *Interviewing as Qualitative Research: A guide for researchers in Education and the Social Sciences*. 3rd Ed., Teachers College Press: Columbia University.
- Selinger, H. W. & Shohamy, E. (1989). *Second language research methods*. Oxford: Oxford University Press.
- Shannon, K. E., Beauchaine, T. P., Brenner, S. L., Neuhaus, E., & Gatzke-Kopp, L. (2007). Familial and temperamental predictors of resilience in children at risk for conduct disorder and depression. *Development and Psychopathology*, 19(3), 701-727.
- Smiley, R. K. (2011). *Model development for measurement of resilience in adolescents*. Unpublished Doctoral Dissertation, University of Missouri, Kansas City.

- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioural Medicine*, 15, 194-200.
- Smith, M. J., & Fleming, M. K. (2006). African American parents in the search stage of college choice: Unintentional contributions to the female to male college enrolment gap. *Urban Education*, 41(1), 71-100.
- Smith, C., & Carlson, B. E. (1997). Stress, coping, and resilience in children and youth. *Social Service Review*, 71(2), 231-256.
- Smith, J. & Prior, M. (1996). Temperament and stress resilience in school-age children: A within families study. *Journal of American Academy of Child and Adolescent Psychiatry*, 34(2), 1-2
- Smokowski, P. R., Reynolds, A. J., & Bezrucko, N. (1999). Resilience and protective factors in adolescence: an autobiographical perspective from disadvantaged youth. *Journal of School Psychology*, 37(4), 425-448.
- Smolka, M. N., Buhler, M., Schumann, G., Klein, S., Hu, X. Z., Moayer, M., et al. (2007). Genegene effects on the central processing of aversive stimuli. *Molecular Psychiatry*, 12, 307-317.
- Solo, L. (1997). School Success begins at home. *Principal*, 77 (2), 29-30.
- Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediated effects of the child development project. *Social Psychology of Education*, 4, 3-51.
- Solomon, D., Battistich, V., Il-Kim, D., & Watson, M. (1997). Teacher practices associated with students' sense of the classroom as a community. *Social Psychology of Education*, 1, 235-267.
- Solomon, D., Watson, M., Battistich, V., Schaps, E., & Delucchi, K. (1997). Creating classrooms that students experience as communities. *American Journal of Community Psychology*, 24(6), 719-748.
- Spradley, J. P. (1979). *The Ethnographic Interview*. New York: Holt Rinehart and Winston.
- Spruill, N. R. (2011). *Predicting Academic Achievement of Male Students*. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Steinberg, L., & Silverberg, S. B. (1986). The Vicissitudes of Autonomy in Early Adolescence. *Child Development*, 57(4), 841-851.
- Stevens, T., Olivarez, A., Lan, W. Y., & Tallent-Runnels, M. K. (2004). Role of mathematics self-efficacy and motivation in mathematics performance across ethnicity. *The Journal of Educational Research*, 97, 208-221. doi:10.3200/JOER.97.4.208-222

- Stewart, E. B. (2008). School structural characteristics, student effort, peer associations, and parental involvement: The influence of school - and individual - level factors on academic achievement. *Education and Urban Society*, 40(2), 179-204.
- Stolberg, A. L., & Mahler, J. (1994). Enhancing treatment gains in a school-based intervention for children of divorce through skill training, parental involvement, and transfer procedures. *Journal of Consulting and Clinical Psychology*, 62(1), 147-156.
- Sung, H., Padilla, A. M., & Silva, D. M. (2006). Foreign language education, academic performance, and socioeconomic status: A study of California school. *Foreign Language Annals*, 39(1), 115-130.
- Teijlingen Van, E. R. & Hundley, V. (2001). The importance of pilot studies. *Social research update*, 35. University of Surrey.
- Tierney, W. G., & Auerbach, S. (2005). Toward developing an untapped resource: The role of families in college preparation. In W. G. Tierney, Z. B. Corwin & J. E. Colyar (Eds.), *Preparing for College: Nine Elements of Effective Outreach* (pp. 29-48). Albany, NY: State University of New York Press.
- Thomsen, K. (2002). *Building resilient students: Integrating resiliency into what you already know and do*. Thousand Oaks CA: Corwin Press.
- Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology*, 86, 320-333.
- Unger, M. (2005). *Handbook for Working with Children and Youth*. Thousand Oaks, CA: Sage Publications.
- Valliant, G. (1993). *The wisdom of this age*. Cambridge, MA: Harvard University Press.
- Van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany: State University of New York Press.
- Wade, J. C., & Okesola, O. (2002). Racial peer group selection in African American high school students. *Journal of Multicultural Counseling and Development*, 30(2), 96 – 109.
- Waller, M. A., Okamoto, S. K., Miles, B. W., & Hurdle, D. E. (2003). Resiliency factors related to substance use/resistance: perceptions of native adolescents of Southwest. *Journal of Sociology Welfare*, 30(4), 79-94.
- Wang, M.C., & Kovach, J.A. (1996). Bridging the achievement gap in schools: Reducing educational segregation and advancing resilience-promoting strategies. In B. Williams (Ed.), *closing the achievement gap: A vision for changing beliefs and practices*. (pp. 37-55) ALEXINDRIA, VA: Association of Supervision and Curriculum Development.
- Wang, M. C., & Gordon, E. W. (Eds.). (1994). *Educational resilience in inner-city America: Challenges and prospects*. Hillsdale, NJ: Erlbaum.

- Wang, M. C., Haertel, G. D., & Walberg, H. J. (1994). Educational resilience in inner cities. In M. C. Wang & E. W. Gordon (Eds.), *Educational resilience in inner-city America: Challenges and prospects* (pp. 45-72). Hillsdale, NJ: Erlbaum.
- Washington, S. (2008). Contextualising Risk and Resilience: Using Narrative Inquiry with Female Adolescents in an Alternative High School Program. *The Journal of Classroom Interaction*, 43 (1), 14-33.
- Wasonga, T., Christman, D.E., & Kilmer, L. (2003). Ethnicity, gender and age: predicting resilience and academic achievement among urban high school students. *American secondary education* 32(1).
- Watt, N., David, J., Ladd, K., & Shamos, S. (1995). The lifecourse of psychological resilience: A phenomenological perspective of deflecting life's slings and arrows. *Journal of Primary Prevention*, 15, 209-246.
- Waxman, H. C., Gray, J. P., & Padron, Y. N. (2003). *Review of research on educational resilience*. Santa Cruz, CA: University of California, Center for Research on Education, Diversity, and Excellence. Retrieved from <http://www.escholarship.org/uc/item/7x695885>
- Wehlage, G., Rutter, R., Smith, G., Lesko, N., & Fernandez, R. (1989). *Reducing the risk: Schools as communities of support*. London, England: Falmer Press.
- Welman, J. C. & Kruger, S. J. (1999). *Research methodology for the business and administrative sciences*. Johannesburg, South Africa: International Thompson.
- Werner, E., & Smith, R. (1988). *Vulnerable but Invincible: A longitudinal Study of Resilient Children and Youth*. New York: Adams, Bannister, and Cox.
- Werner, E.E. & Smith, R.S. (1992). *Overcoming the odds: High-risk children from Birth to adulthood*. Ithaca: Cornell University Press.
- Werner, E., & Smith, R. (1982). *Vulnerable but invincible: A longitudinal study of resilient children and youth*. New York, NY: McGraw-Hill.
- WestEd. (2000). *California healthy kids survey*. Resilience Module. Spring 2000 Report, California USD.
- West, A., & Pennell, H. (2003). *Underachievement in Schools*. London. Routledge.
- Whit, E. J., Edison, M. I., Pascarella, E. T., Nora, A., & Terenzini, P. T. (1999). Interactions with peers and objective and self-reported cognitive outcomes across 3 years of college. *Journal of College Student Development*, 40(1), 61-78.
- Wigfield, A., & Eccles, J. (Eds.). (2002). *Development of achievement motivation*. San Diego, CA: Academic Press.

- Williams, T., & Williams, K. (2010). Self-efficacy and performance in mathematics: Reciprocal determinism in 33 nations. *Journal of Educational Psychology*, 102(2), 453-466. DOI: 10.1037/a0017271.
- Williams, J. M. (2011). *Home, school, and community factors that contribute to the educational resilience of urban, African American high school graduates from low-income, single-parent families*. Unpublished doctoral dissertation: University of Iowa. <http://ir.uiowa.edu/etd/1191>
- Windham, R. C., Hooper, L. M., & Hudson, P. E. (2005). Selected Spiritual Religious, and Family Factors in the Prevention of School Violence. *Counselling and Values*, 49 (3), 208-216.
- Wolin, S.J. & Wolin, S. (1993). *The resilient self: How survivors of troubled families arise above adversity*. New York, NY: Villard Press.
- Woolfolk, A. E. (1995). *Educational Psychology, 6th Ed*. Needham Heights, MA: Allyn & Bacon.
- Wright, T. (2013). "I keep me Safe": Risk and Resilience in Children with Messy Lives. *Kappan Professional Development Discussion Guide*, 95(2), 39-43.
- Wright, T. (2010). Learning to Laugh. A portrait of risk and resilience in early childhood. *Harvard Educational Review*, 80(4), 444-463.
- Wyman, P., Cowen, E., Work, W., & Kerley, J. (1993). The role of children's future expectations in self-system functioning and adjustment to life stress. *Development and Psychopathology*, 5, 649-661.
- Zimba, R. F., Mufune, M., Likando, G., & Febraury, P. (2013). *Journal for Studies in Humanities and Social Sciences*, 2(1), 169-186.
- Zimmerman, D. J. (2003). Peer Effects in Academic Outcomes: Evidence from Natural Experiment. *Review of Economics and Statistics*, 85(1), 9-23.
- Zimmerman, M. A., & Arunkumar, R. (1994). Resiliency research: Implications for schools and policy. *Social Policy Report of the SRCD*, 8, 1-17.

8. Appendices

Appendix 1

Learners' Interview Questions

Opening Remarks:

Thank you for agreeing to participate in this study. Before we begin, I would like to go over the consent form with you (bring two copies- keep one, give the other to the participant). During this interview I want you to talk about what it is like for you to perform academically well in mathematics. I do have some broad questions for you, but feel free to talk about anything you want to about your performance/ achievement in mathematics. You will note that at any time you can stop the interview. You can also refuse to answer any question and still be part of the study.

Are you comfortable if I record this interview?

Interview Questions:

Interview Phase 1: Focused Life History

How do Grade 10 learners at risk of school failure in the Khomas region display academic resilience in Mathematics and in what contexts do such resilient experiences occur?

- What level of education do your parents have?
- Can you tell me a little bit about your family and where you come from?
- What is the atmosphere at home regarding learning mathematics?

How do the Grade 10 learners concerned understand and make sense of their experiences of academic resilience in Mathematics?

- Tell me what it was like for your first lesson in mathematics?
- At what point did you start performing well in mathematics? How did that happen?

How are individual differences reflected in the learners' accounts of their experiences of academic resilience in Mathematics?

- What were your experiences as a young child learning mathematics? How did your primary school experience in mathematics influence your academic performance in mathematics at secondary school level?
- Can you describe the moment in which you knew you wanted to academically excel in mathematics?
- What is it like for you going to class and doing mathematics school work?
- Did you experience any teacher that stand out for you in learning/teaching mathematics? Good teachers? Bad teachers? An influential teacher? What make them stand out?

What model could be used to promote academic resilience in Mathematics amongst learners in the Namibian context?

- What kind of things did you do to prepare yourself for mathematics examination during grade 10 national examinations?

This is all the questions I have. Is there anything else you would like to share that you did not get a chance to speak about?

Thank you and we will meet again for our second phase of the interview.

Appendix 2

Interview Phase 2: Details of Experience

How do Grade 10 learners at risk of school failure in the Khomas region display academic resilience in Mathematics and in what contexts do such resilient experiences occur?

- What do you do when you are learning mathematics?
- Now that you have been performing so well in mathematics, how would you describe the experience?
- What has been the biggest challenge for you thus far? How have you addressed this challenge?
- What has your relationship been like with your mathematics teachers?
- How would you characterize your interactions with your mathematics teacher?
- How often do you get to meet with him or her? What is a typical conversation like...?

How do the Grade 10 learners concerned understand and make sense of their experiences of academic resilience in Mathematics?

- How would you describe your interaction with your peers, with reference to learning mathematics
- If you could structure your own early learning experience in mathematics, what would it include?
- How have you seen your learning of mathematics change from primary school to secondary school?

How are individual differences reflected in the learners' accounts of their experiences of academic resilience in Mathematics?

- What were your expectations of learning mathematics as you entered secondary school grades?
- What were your expectations of mathematics teachers? How did you arrive at them?
- What informs your expectations? Prior experience? Conversations with other learners?
- What do you see as your role in achieving those expectations?
- Let's think about the highlights of experience of learning mathematics over the years... what would you describe as highest point thus far? What would you consider as one of the low points?
- How does your relationship with your mathematics teacher match your expectations?

What model could be used to promote academic resilience in Mathematics amongst learners in the Namibian context?

- What is a good lesson of mathematics? What happens in a lesson when you leave and say to yourself; “that was a good one...”
- What kinds of supports are available to you? What supports do you feel that you need that are currently unavailable?
- What is your impression of your school's support towards learning and mathematics achievement?
- If you could customize your relationship with your mathematics teacher (in an ideal world, what would that relationship be like...?
- Are there any particular tips for passing mathematics well that stand out to you?

Is there anything else you would like to add? I look forward to our next session of the interview.

Appendix 3

Interview Phase 3: Reflection on the Meaning

How do Grade 10 learners at risk of school failure in the Khomas region display academic resilience in Mathematics and in what contexts do such resilient experiences occur?

- How would you finish this sentence: My academic performance in mathematics in grade 10 was...?
- How would you describe your relationship with your mathematics teacher this year? If you had to do it over, what would you change about your relationship with him or her? Is there anything you would ask for that you did not receive?
-

How do the Grade 10 learners concerned understand and make sense of their experiences of academic resilience in Mathematics?

- What would you describe as one of the defining experiences of learning mathematics?
- If you had to think back on the highlights of your academic performance in mathematics, could you describe one of the best times? Could you describe one of the more challenging moments?
- If you had to think about your successes and challenges in learning mathematics, what do you think contributed to successes? What would you describe as your biggest challenges? Can you describe these facilitators and barriers?

How are individual differences reflected in the learners' accounts of their experiences of academic resilience in Mathematics?

- How did your experience compare to your expectations at the beginning of the school year?
- If you had to do mathematics at grade 10 again, what would you do differently?

What model could be used to promote academic resilience in Mathematics amongst learners in the Namibian context?

- If you were asked to speak to a group of Grade 10 learners who are preparing for mathematics national examination, what advice would you give them? Things to look out for...? Things to ask for...? Things to check on..?
- How would you describe your relationship with your mathematics teacher this year? If you had to do it over, what would you change about your relationship with him or her? Is there anything you would ask for that you did not receive?
- What has this experience taught about learning mathematics?

This is the end of our interview and I sincerely thank you for your participation and time.

Appendix 4

David Interview Transcript Phase 1

Phase 1: Focused Life History

1. What level of education do your parents have?

David: My mother ended in grade 10, she failed grade 10 and my father, I don't really know cuz I just knew him when I was small.

2. How is your relationship with your parents? With your mother?

David: It is very good. I am living with my mother, my sisters, my brothers and cousins. I am living in Havana.

3. What is/was the atmosphere at home regarding learning mathematics?

David: Sometimes it is but maybe in the night when people are asleep, jah then its okay. During the day no, people are just walking around drinking and playing music (jukebox), there is a bar in the house.

4. Do you have members in the family that are very good in mathematics?

David: I don't think so, maybe. In the house I think it's only me and my sister who was here at Hage grade 11 and the others are, one failed grade 12, one is in grade 7 I think and the others are just grade 2, 3 there. And there is a big one that I think dropped off school long time ago.

5. How your family did influenced your achievement in mathematics?

David: No, just myself. I used to study at night like Mathematics, I really like Mathematics when I was a kid because when you come to kinder garden for the first time they start teaching you Maths even in grade 1, the subject is always there. So when

I came to grade 10 there. So when I came to grade 10 there I started liking Math I was putting more effort on Mathematics, 50% Math and the other 50% is for other subjects.

6. How did your neighborhood influence, if in any way you're learning of Mathematics?

David: No, they did not, just my teachers.

7. How would you describe your relationship with your peers at home and at school?

David: I think it's one, he's just like he is not really a neighbor he lives a bit far. He failed grade12 this year, now he is doing NAMCOL. Whenever I like have a problem, I go to him. He assists where he can. Friends in Hage? How is the relationship with them? We don't help each other here not really, it's just about joking and teasing each other and laughing together is all.

8. Did all your friends like Mathematics or were there any indifference?

David: The only friend I have I think he likes mathematics is Kanyeme, this other guy, I think you also interviewed him. He is the only one I know he likes Mathematics. The rest no, maybe other subjects. They say it's too hard.

9. How did you experience learning Mathematics in the beginning and how has it changed over time?

David: At that time neh (primary school) when you know Maths you are like the smart one in the class at primary so I always wanted to be there and now the smart people's group so whenever I was studying Maths I just felt good.

There is no improvement; I think I went down, because in high school you meet different kinds of friends, they just like joking, playing around and playing soccer, that's all. Maybe if you get time to study these days is when you are writing a test and when you are writing exam that all now , that's why my marks went down a bit.

10. At what point did you start performing well in Mathematics? How did that happen?

David: Grade 3, maybe because I just decided to work harder. Because I was like, I always wanted to be in the smart peoples group, and then I just started performing well

in Math. It's like the teacher divided us like the smart people this side especially in Maths.

11. What were your experiences as a young child learning mathematics? How did that experiences influence your performance at secondary?

David: When I came to high school, I forgot everything about primary. I just decided, jah, I thought about Math because I am good at it. Ja it's just, I concentrate on it more and the other subjects I also concentrate on them but Math, that was like the subject I concentrated on more.

12. Can you describe the moment when you first academically excelled in Mathematics?

David: It was tests, jah, when... I felt proud when I passed the first time Math in grade 3, and we were divided. I felt very good; I felt like tah, I am the smartest person in the class. We were like given a test out of 20 and then all those people who got 18 out of 20 and then go to another table and then those with 17 down to maybe 12 another table and 11 downwards another table. Now whenever, you are like at the table were people are like the lowest, you just don't feel good. Now whenever you pass tests and you are at the smart peoples table you feel proud.

13. What is it like for you to go to class to do Mathematics school work?

David: I just feel like, whenever Math is next, we are going to get something interesting to work out. Every day I am just like, are we having Math today? If not, Nooo! Because Math is my favorite subject. You know when you have your favorite subject you always want to have it cuz you have fun when you are doing it or being taught.

14. How do you feel when you are working out Mathematics work?

David: I am not like those other people who when you are given homework about Math and then you start getting worried, how will I do this work now? I just, I always feel like there is no like if you are given a question, there always must be an answer to that question. The sir cannot give you like a question that cannot be answered. I always feel like there is an answer to any problem In Math, so I just work out until when is see that okay this is the final answer, then I try to get help if it's not the final answer. I just say

don't tell me the answer; I will go work it out again until I get it. If I don't get it then I just go get my correction tomorrow.

15. Did you have any Mathematics teacher that stood out as a role model for you to learning mathematics?

David: My grade 3 teacher, she made me like realize that Math is like better than other subjects because she started up this idea of smart people and the other just standard people that side then she just started like... I just felt like I must be the best in Maths. She was the one who just like raised my feelings towards Maths. We liked her a lot because she knows that she will do this to you so that next time you can improve, she knows that you cannot do it so next time when you fail she will discourage you a bit so next time you do better.

PQ: How did she teach?

She was like a serious kind of teacher. She always get to a point. If you don't understand, she will ask, "don't you understand? Where? Tell me where". Then you will say I don't understand this and this and if you don't understand she will use the slowest terms now so you can understand.

16. What kind of things did you do to prepare yourself for the mathematics examination during grade 10...?

David: I didn't relax because I didn't know what to expect. Maybe you will say, I already know this, I already know this but the things that you think won't come in and you don't know are the ones that are going to come in. so I started studying like 2 months before the exams when i knew like the exam is in May , I will study 2 months before May. So I know, when the exam come I will not panic, I will not go rush to my books like uh uh! Because with Maths, if you start studying like you are writing tomorrow then you study today, you won't catch anything because there might be some problems that are too difficult for you to solve at that time. So you will be trying to solve them and then when you come tomorrow you already forgot wh

Appendix 5

Mercia Interview Transcript Phase 2

Phase 2: Details of the Experience

1. How do you learn/ study Mathematics?

Mercia: Most of the times, I practice, I do practical sums, you know, some people (learners) just look at the formulas and stuffs. But for me actually I had to take... maybe on one topic I will take three exercises and I would complete it (them) on my own. Those (exercises) that kind look hard, but then when you know the formulas and stuffs you will definitely see that okay this is something easy. I actually practice math.

2. Already answered!

3. Already answered!

4. What has been the biggest challenge of learning Mathematics thus far? How have you addressed this challenge?

Mercia: Ahmn, I don't think that I was faced with any challenge, except maybe... I do not have any challenges. The challenge was only that she preferred doing her math at school rather than at home.

5. How would you characterize your interactions with your mathematics teacher?

Mercia: Let me say he was hmn, he is a teacher until today he is very nice teacher, think he is a great mathematician. And then like, in spite of that, being a good mathematics teacher, he was as well a father to all of us. He didn't have any favoritism (who he like) and stuff. You know, he is a person who like... I mean he cared about people (learners) and then there was even a time whereby he, like on his birthday, he spend N\$ 200 and something dollars on like... for us to buy something for the whole class and then he is really a nice teacher, he is a very kind, he knows how to talk to people and some teachers really want to be seen as strict and that teacher really I don't know... this one is a teacher who likes people whether you are naughty or whatever. As long as you keep... the only thing he wants is like, the only that may upset him is when maybe people (learners) fail. That is the only thing that upset him. And then also

like, he does not like... he doesn't care if someone even if you are naughty but you passed... there only thing he wants is that people to do well in math. He is a great teacher, apart from being a teacher he shows fatherly love to everyone. No favoritism.

6. How often do you see your mathematics teacher for consultation?

Mercia: Ahh, I think maybe like most of the times if I don't understand something. If I don't understand maybe ja, like during the exams, ja and before we write a test or something, that is when I consult.

Consultation:

Actually maybe if he is in class, maybe I will come in with the rest of my group or friends. And go, "oh sir, how are you and stuff". After greeting him then we say sir would please explain this for me, I do not understand. Then that is when he will start explaining this. No, he always has time for anyone like even however busy he is, he just maybe say... if he is extremely busy he will tell you to wait maybe 15 minutes or so. And he would ask you to come at a certain time, he never fails you no no, he always has time to help someone, like that maybe when he is busy he will tell you "I will be with you now". Sometimes if he is not too busy, he explains and then continues (with his work after).

7. How would you describe your interaction with yours peers, with reference to learning Mathematics?

Mercia: Aah, actually for us we don't really seems like, okay currently, right now, we don't really study together, cuz everyone study on his/her own. This one will study the way she is studying and the other one, and maybe if you... like I have two friends right now and they don't come and ask me anything because I don't know, they have brains (clever), sometimes I take away my pride then I don't understand something I will go to one of them. But for them they stick to... and then they explain to themselves I think.

8. If you could structure your own early learning experience in mathematics, what would it include?

Mercia: Actually, let me say that the class should be attractive and the environment... it should be clean, the teacher should be kind, loving and you know, hyper, you know not a lame teacher, a math teacher, a lame teacher explains like "thiis and that" no one

will really get interested, people will sleep, so the teacher should make the classroom interesting and you know, people should be awoken by the teacher. If the teacher is lame people will be sleeping and no one will understand anything.

9. How have you seen your learning of Mathematics change from primary school to secondary school?

Mercia: Okay, let me say primary school until grade 7 I was not good in math. But in grade 7, that is when I said ok math is really easy. And then in grade 8, 9 the math teacher was not good, I was trying things on my own and stuffs here and there. Asking people here and there, you know that the highest symbol I got in grade 8 and 9 was a C and grade 10, that is when you know I really improved, in grade 10 first term I got a B and then second term and the final result I got A's in math. There is really, really a big change.

10. What were your expectations of learning mathematics as you entered secondary school grade?

Mercia: Actually I was thinking math would be really hard, because I was, like I see my sister's notes you know, seeing those graphs it really scared me, you know. The graphs and the things were looking so complicated and I had no clue how they did it. So ja, when I was at primary school I thought (learning) math was extremely hard. But when I got here (secondary school) I found out that these things (graphs) I saw in my cousins and sisters books were not that complicated; only if you know how it is done then you are good to go.

11. What were your expectations of mathematics teacher? How did you arrive to them?

Mercia: Actually, when I was in grade in primary school I thought, you know, high school teachers were, you know these teachers that I see on tv, you know, like really fun, you know, and you know hyper-active and all that stuff. I was expecting math teachers to be strict maybe you know, ja. When I got to high school I found out that our math teacher must be really funny, and he really liked "vulgar" jokes or something,

which I didn't personally like cuz he was insulting in class and stuff. And when I saw other math teachers they were really nice, friendly and stuff.

12. What informed your expectations? Prior experience? Conversations with other learners?

Mercia: Her expectations were informed by TV and notebooks of siblings.

13. What do you see as your role in achieving those expectations?

Mercia: Ja, you know, like being ahead of the teachers that is what I was told, by my cousins, you should always be ahead of your teacher and your notes and stuffs. And then you know, respect is the most important thing in the relationship of teacher and learner and respect ja. Maybe I should be the one asking questions from teachers.

14. What would you describe as highest point and low points thus far in mathematics?

Mercia: Although it started in grade 7 it become a reality for you in grade 10.

15. How does your relationship with your mathematics teacher match your expectations?

Mercia: Actually she is person who does not like short-cuts, actually she knows, she is a person that wants people to know that how this thing(solution) is found, like I mean how this answer was arrived at (derived). And this person, during tasks, you know, people, for us we are used to you know, if you know something (the answer to a mathematical problem), you just write it down without showing your calculations) using a short-cut. But she wants people to have a formula, that way you will have full understanding of the topic, you know, she is really a good teacher, you know, I mean I love her so much, she very good. She is an extreme good teacher, you know. I got to learn things you know that I didn't know. Maybe things that I usually get by using a short cut, like the answers I will get just by short cuts, with her I learned the original method or something like that. She does not like shortcuts. And she actually someone who will (expect)" any questions- like with anyone like naughty people, what people, quiet people she can accommodate them both. And then ja, I ask questions if I don't understand she answer me in a good way. We have a good relationship, so her expectations been met.

16. What is a good lesson of mathematics? What happens in a lesson when you leave and say to you “that was a good one”?

Mercia: It like hmm, let me take, whereby everyone you know, there was a time, I think it was this year that, you know where everyone, most of the learners did not understand and you know the miss, actually when she was done explaining she gave us something (reinforcement activity) to do and then I was the only one who got it (the activity) right and I was feeling so happy and they kept on asking me. And as I was explaining for them (peers) you know I gained more knowledge, you know and stuffs. And then I felt so good you know, with understanding.

17. What kinds of support are available to you? What supports do you feel you need that are currently not available?

Mercia: Friends, teachers, no extra classes are a waste of money, like you have a text book, you have teacher, like we have different math teachers at school and if you do not understand a particular teacher you can go (consult) another teacher, so why pay for... you know I have seen a lot of people paying tutors and stuff, yet they fail you know I had... different math teachers are there, you know, we have different textbooks, we have learners in class, so why not you know ask people (teachers & learners). Ask math teachers different math teachers if your math teacher does not explain very well, there are other math teachers (at the school) so ja.

18. What impression of your schools support towards learning and achievement?

Mercia: There is support for passing math, because you know the teachers speaks highly of math and gives me and that encourages me a lot. Like and also the learners who were here before, they say were good in math. If you know math and people come and ask you for math and stuffs, you feel important and you know like at school, the math teachers speak highly of math and that encourage people to study harder for math. Even the learners, if you are good in math like the other time you know, I was explaining to this boy something he did not understand and it makes you feel important. They, I think there is a huge support in learning math at this school.

19. If you could imagine an excellent relationship with your mathematics teacher (in an ideal world). What could that relationship be like?

Mercia: Answered.

20. Are there any particular tips for passing Mathematics well that stood out well to you?

Mercia: Math is all about; let me say there are no secrets to (passing) math. Math is only thing to do is to listen in class when the teacher is teaching. If you do not understand you must try to work it out on you own. If you still do not understand or you do not obtain the correct answer, you know we have teachers, we have different math teachers at school, then you know, we have learners in the class who might understand better than you, so you can go and consult for assistance.

Appendix 6

Aina Interview Transcript Phase 3

Phase 3: Reflection on the meaning of academic resilience in Mathematics

- 1. How would you finish the following sentence: My academic performance in Mathematics in grade 10 was...?**

Aina: It was excellent because it also created (placed) a smile on my father's face because she was not like expecting me to get an A in Math, so it was really good for me and my family.

- 2. Given what you said about your life before you become successful, how do you understand Mathematics in your life?**

PQ: Do you think it is important to have a good grade symbol in Math?

Aina: yes Miss, because I think Math is like compulsory in all the careers and it is also good to know math because even though you are not working or you are just a mother in the house it helps you to budget and also to plan.

PQ: Does it (mathematics) make sense to you?

Aina: Yes miss, when I understand it.

PQ: Do you think it is important to have good symbol in mathematics?

Aina: Its means a lot because like for, like if you wanna like go to the school of medicine you have to at least a good symbol (grade) in Mathematics.

- 3. What are you going to become in the future? You believe a doctor needs to have mathematics? Why?**

Aina: Yes Miss.

- 4. If you had to think about your success and challenges in learning Mathematics, what do you think contributed to success. What would you describe as your biggest challenges?**

Aina: I like always concentrate in the class, I really don't make noise in class. I, and I always focus on the teacher and I do a lot of practice. I changed my attitude towards mathematics being difficult.

- 5. How did your experience compare to your expectations at the beginning of the school year?**

Aina: I expected to get a C in math and I ended up scoring a B. I expected a C because I had that mentality of math being difficult and I was not really good and also because my teacher did not like explain in a better way so I thought the next teacher will also be the same.

6. If you had to do mathematics at grade 10 again, what would you do differently?

Aina: I would want to practice Math more because rather than watching TV because I used to watch a lot of TV, so I did not really like get a lot of time to study Math.

7. If you were asked to speak to a group of grade 10 learners who are preparing for the mathematics national examination, what advice would you give them?

Aina: I would tell them that you cannot like study mathematics like overnight, and you must also keep practicing math for you to know it and also seek help where you don't understand.

8. What has this experience taught you about learning mathematics?

Aina: For you to learn math, have to be a hard worker, you must have a positive attitude towards math, you must always pay attention to the teacher whenever he/she is teaching. And it also requires you to like practice more.

Appendix 7

UNIVERSITY OF NAMIBIA

Private Bag 13301, 340 Mandume Ndemufayo Avenue, Pionerspark, Windhoek, Namibia



The School of Postgraduate
Studies
P.Bag13301
Windhoek, Namibia
Tel: 2063523

E-mail: cshaimemanya@unam.na

Date: 25-11-2013

TO WHOM IT MAY CONCERN

RE: RESEARCH PERMISSION LETTER

1. This letter serves to inform that student: Kashinaua Faustina Neshila (Student number: 200125478) is a registered student in the Department of Mathematics, Science and Sport Education at the University of Namibia. Her research proposal was reviewed and successfully met the University of Namibia requirements.
2. The purpose of this letter is to kindly notify you that the student has been granted permission to carry out postgraduate studies research. The School of Postgraduate Studies has approved the research to be carried out by the student for purposes of fulfilling the requirements of the degree being pursued.
3. The proposal adheres to ethical principles.

Thank you so much in advance and many regards.

Yours truly,

for Name of Main Supervisor: Dr. Helena Miranda

Signed: -----

Dr. C. N.S. Shaimemanya

Signed: -----

Director: School of Postgraduate Studies

Appendix 8



REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION

Enquiries: Mr C. Muchila
E-mail: Cavin.Muchila@moe.gov.na
Tel: +264 61 2933200
Fax: +264 61 2933922

Private Bag 13186,
WINDHOEK
Namibia

File no: 11/1/1

Date: 08 September 2014

To: Ms Kashinaua Faustina Neshila
Windhoek,
Cell: 0812953217
fneshila@unam.na

Dear: Ms Neshila

SUBJECT: PERMISSION TO CONDUCT A RESEARCH STUDY IN KHOMAS REGION

Your correspondence regarding the subject above, seeking permission to conduct a research study in the schools of Khomas Region has reference.

Kindly be informed that the Ministry does not have any objection to your request to conduct a research study at identified schools in the region concerned.

You are, however, kindly advised to contact the Regional Council Office, Directorate of Education, for authorisation to go into the schools and for proper information coordination.

Also take note that the research activities should not interfere with the normal school programmes. Participation by either teachers or learners should be on a voluntary basis. Should you involve minors in your research activities, consent for participation should first be obtained from the parents/guardians of the minor(s).

By copy of this letter the Regional Education Director are made aware of your request.

Sincerely yours


.....
Mr. Alfred Ilukena
PERMANENT SECRETARY
cc: Directors of Education, Khomas

All official correspondence must be addressed to the Permanent Secretary

Appendix 9



REPUBLIC OF NAMIBIA
KHOMAS REGIONAL COUNCIL
DIRECTORATE OF EDUCATION

Tel: [09 264 61] 293 4410
Fax: [09 264 61] 231 367/248 251
Enquiries: Ms. H. Imene

Private Bag 13236
WINDHOEK
14 October 2014

Ms Kashinaua Fraustina Neshila
Windhoek
Cell: 0812953217
fneshila@unam.com

Dear Ms Neshila

Re: PERMISSION TO CONDUCT RESEARCH IN KHOMAS SCHOOLS

Your letter dated 22 September 2014 is hereby acknowledged.

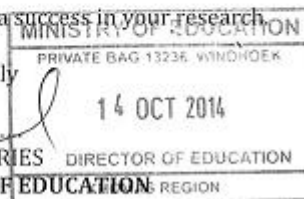
Permission is hereby granted to you to do research on academic reliance in mathematics amongst grade 10 learners at Ella Du Plessis Secondary School, Augustineum Secondary School, Eldorado High School, Dawid Bezuidenhout Secondary School, Cosmos High School, Acacia High School, Khomastura High School, A. Shipena Secondary School, Immanuel Shifidi Secondary School, Jacob Marengo Secondary School, Jan Jonker Secondary School and Hage Geingob Secondary School with the following conditions:

- ❖ The school Principal must be contacted before time and agreement will be reached between you and the principal.
- ❖ The school programme should not be interrupted.
- ❖ Teachers and learners who will take part in this exercise will do so voluntarily.
- ❖ School should not be forced to take part in the programme.

We wish you a success in your research.

Yours sincerely


GERARD N. VRIES DIRECTOR OF EDUCATION
DIRECTOR OF EDUCATION REGION



Appendix 10

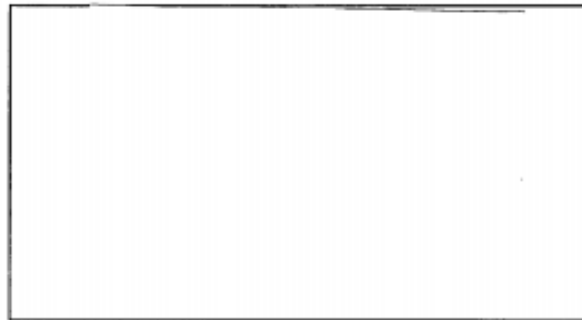
PERMISSION MEMO BY THE SCHOOL PRINCIPALS

I have granted Ms. K.F. Neshila (a PhD student at UNAM) the permission to conduct research at our school on the basis that she has already obtained that permission from the Permanent Secretary of the Ministry of Education and the Regional Director of Khomas Education Region. The permission is thus granted on condition that it does **not disturb the academic activities of the school.**

Signature: 

DATE: 21/01/2015

Principal of



Appendix 11



INFORMATION LETTER

ATT: School Principal (s)

Teachers

Learners

Parents

Research Topic: ACADEMIC RESILIENCE IN MATHEMATICS AMONGST AT-RISK GRADE 10 LEARNERS IN THE KHOMAS REGION

Purpose of the study

Persistent poor performance in Mathematics at Grade 10 level in the Khomas region has been observed over the years. In 2012 for example, only 32.7% of the Grade 10 learners who sat for the national examinations in Khomas region performed well in Mathematics by obtaining grades of A to D (DNEA, 2012). One intriguing manifestation of this record of performance is that there are some learners who may be considered to be at risk of school failure but excel in Mathematics. **These are learners with low social economic status, who come from poverty stricken families and communities ravaged by crime, violence, parents' unemployment and substance abuse.** Notwithstanding these circumstances, these learners manage to excel academically in Mathematics (Martin & Marsh, 2006). The main task of this study is to understand the

1

conceptual, experiential and practical ramifications of resilience displayed by such learners. Academic resilience is here defined as high level of achievement, motivation and performance that some learners display in spite of adversities they face in life (Alva, 1991).

Nature of the study

It is a phenomenological study aimed at describing the lived experiences of the Grade 10 learners at risk of school failure. Specifically, the researcher's interest is in the first-hand accounts and impressions of Grade 10 learners at risk of failure who display academic resilience in Mathematics. **As a selection criterion, resilient learners should have obtained a B grade or better in Mathematics in the national Grade 10 formal examinations and are considered as at-risk learners.** *Resilient learners will be identified with the help of Mathematics teachers, life skills teachers and Khomas regional school counsellors.* Selected learners will be interviewed after school.

Roles & Rights of the research participants

- Participation in the interview is entirely voluntary.
- They are free to refuse to answer any question at any time.
- They are free to withdraw from the interview at any time.
- The interview will be kept strictly confidential and data will be used for research purposes only.
- Excerpts of the interview will be part of the final research report, but names or identifying characteristics will **not** be included in the report.

Your willingness to participate in this study is highly appreciated, thank you.

Yours faithfully



Ms. K. F. Neshila



Parental Permission for Child's Participation in Research

Title of Project: Academic resilience in mathematics amongst at-risk grade 10 learners in the Khomas region

Name of Researcher: Ms. Kashianuua Faustina Neshila

I, _____ have read the information letter and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I give permission for my child, _____ to participate in the research study and will receive a copy of this Parental Permission form after I sign it.



Signature of Parent/Guardian

2015/04/03


Date

MS. K.F. NESHILA

Researcher

31 03.15

Date



Signature



Consent Form for Learners

Title of Project: Academic resilience in mathematics amongst at-risk grade 10 learners in the Khomas region

Name of Researcher: Ms. Kashinaua Faustina Neshila

1. I confirm that I have read and understand the Plain Language Statement in the information letter for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. *Other clauses*
 - *consent to interviews being audio-taped,*
 - *acknowledgement that copies of transcripts will be returned to participant for verification,*
 - *participants to be referred to by pseudonym (fake name)*
4. I agree / do not agree (underline your choice) to take part in the above study.

Name of Participant Date Signature

Researcher Date Signature



VERIFICATION

Research Title: Academic resilience in Mathematics amongst at-risk Grade 10 learners in the Khomas region

Name of Researcher: Neshila Kashinauua Faustina

I the undersigned hereby confirm that the information contained in this interview transcript is a true reflection of what occurred during the interview.

Interviewee Signature: _____

DATE: _____