

AN INVESTIGATION OF BASIC EDUCATION TEACHERS DIPLOMA (BETD)
TEACHERS' ABILITY TO USE EVERYDAY CONTEXTS IN THE TEACHING OF
MATHEMATICS AT JUNIOR SECONDARY SCHOOLS IN WINDHOEK,
NAMIBIA.

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APPROVAL PAGE

This research project has been examined and is approved as meeting the required standards for partial fulfillment of the requirements of the Master of Education Degree.

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DEDICATION

I would like to dedicate this thesis to my little girl, Tsâbagu Naweses. Her curiosity expressed through questions like “Daddy, when are you finishing our book?” served as a motivating factor for me throughout this project.

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ABSTRACT

TITLE: AN INVESTIGATION OF BASIC EDUCATION TEACHERS DIPLOMA (BETD) TEACHERS' ABILITY TO USE EVERYDAY CONTEXTS IN THE TEACHING OF MATHEMATICS AT JUNIOR SECONDARY SCHOOLS IN WINDHOEK, NAMIBIA.

This study sought to answer the following research questions:

1. How do BETD Mathematics teachers define everyday contexts?
2. What types of everyday contexts are used by BETD Mathematics teachers?
3. How often do BETD Mathematics teachers present content in contexts that the learners already know?
4. What factors do BETD Mathematics teachers regard as affecting the contextualization of content in their Mathematics lessons?

The main aim of this study was to gain insight into how effectively BETD teachers used everyday contexts to facilitate a meaningful understanding of the Mathematics content by the learners. The secondary aim was to gain an in-depth understanding of the existing conditions concerning BETD teachers' use of everyday contexts in their Mathematics classrooms.

This study was a descriptive, naturalistic, qualitative research. Data were collected using non-participant observations, open-ended questionnaires and one-on-one interviews. Inductive data analysis was used to analyse the data collected.

The main results of this study were that:

1. All participants had a relevant working understanding of the concept of *everyday contexts*. However, their use of everyday contexts was very superficial and inadequate in Mathematics teaching.
2. Everyday contexts were mainly used in the introduction phase of the lessons and context use by the teachers was much more limited than previously thought by the researcher.
3. BETD teachers had an exaggerated view of their use of everyday contexts in Mathematics teaching.
4. Preference of procedural mathematical skills over conceptual understanding impeded the effective integration of everyday contexts in Mathematics teaching.
5. There was a lack of instructional materials which incorporate everyday contexts.
6. The BETD teachers did not plan lessons which included everyday contexts.
7. The BETD teachers regarded the use of everyday contexts in Mathematics as time consuming.

The results led to the conclusion that the benefits of integrating everyday contexts in Mathematics instruction were not reaped due to ineffective integration or total non-integration of everyday contexts in Mathematics teaching. Furthermore, the limited use of

everyday contexts in Mathematics teaching could also be ascribed to the lack of lesson planning that incorporated contextual teaching and learning strategies.

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LIST OF ACRONYMS

BETD	Basic Education Teacher Diploma
CTL	Contextual Teaching and Learning
DNEA	Directorate of National Examinations and Assessment
LCE	Learner-Centred Education
MBESC	Ministry of Basic Education, Sport and Culture
MEC	Ministry of Education and Culture
MoE	Ministry of Education
NIED	National Institute of Educational Development
PCK	Pedagogical Content Knowledge
UNAM	University of Namibia

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Teacher training for Basic Education was the responsibility of the former Colleges of Education in Namibia until the latter merged with the University of Namibia (UNAM) in 2010. Since 1993, the Colleges of Education have been offering the Basic Education Teacher Diploma (BETD) to train teachers for grades one to ten (Dählstrom, 1998). The first set of BETD teachers graduated in 1996.

Over the years there have been a lot of criticisms leveled against the BETD graduates in terms of their content knowledge and their ability to teach properly. Among the most persistent criticisms, Dählstrom (1998, p.10) identified the following:

1. The BETD is all about group work.
2. The BETD is low on content, especially in Mathematics and Science.
3. The focus is too much on methodology.
4. The BETD is not training teachers that we need in schools.

Such criticism is also leveled against the BETD teachers with very limited or no backing of empirical evidence. Given the above situation, the BETD teacher training process needs to be responsive to such criticisms in order to improve the professional skills and general public image of the BETD graduates, through proper and relevant training.

In discussing BETD graduates' quality of teaching, Clegg and Courtney-Clarke (2009) argue that learners in schools are simply taught to develop mathematical routines with little or no understanding of what the routines mean. Routine procedures and rules are taught and learnt as isolated bits of knowledge, not connected to real-life contexts or other topics in Mathematics. The researcher argues that it is the duty of the Mathematics teacher to use relevant contexts in his/her lessons to facilitate meaningful learning of content he/she teaches. This will enable the learners to view and understand the Mathematics they learn in the classroom in relevant real-life contexts.

Considering the teaching skills of Mathematics teachers in Namibia in general, the Report of a National Consultative Process on Improving Mathematics in Namibia noted that teaching methods advocated for Mathematics are not efficient. It argued that the teaching methods:

- lack application and contextualization;
- create little 'feel' for numbers;
- do not allow Mathematics to be visualized;
- emphasize procedural thinking (rote procedures); and
- are inadequate for problem solving (learners cannot apply skills to unfamiliar situations) (MBESC, 2002, p.7).

The above observation, among other issues, also highlights the inadequacy or limited application of contextual teaching as a necessary skill in Mathematics teachers in Namibia. It is therefore important to investigate the BETD graduates' use of contextual teaching of Mathematics in junior secondary schools.

The importance of contextual teaching of Mathematics cannot be overemphasized. In an attempt to answer the question, “why use contextual teaching?” Williams (2007, p.573) explains, thus:

Students are able to make connections between Mathematics concepts and real-world situations in contextual teaching as well as see the importance of the Mathematics they are learning and how it can apply to their future. This type of instruction also gives students responsibility for their own learning and has proven to lead to increased student achievement and motivation.

It is therefore important to investigate the BETD graduates’ use of contextual teaching with the aim of understanding how it is currently done, in order to meaningfully improve on it, if need be, and to ensure that the pre-service or in-service training they receive adequately equips them to use contextual teaching in Mathematics.

1.2 STATEMENT OF THE PROBLEM

Since the ability to meaningfully contextualize the content taught is one of the very crucial aspects in Mathematics teaching and learning, the researcher, as a BETD Mathematics teacher educator, is of the view that BETD graduates are well equipped through their pre-service training to properly contextualise the Mathematics they teach. However, in a recent report, Clegg and Courtney-Clarke (2009), suggest that BETD graduates lack knowledge of how to translate mathematical abstractions into a form that is comprehensible and familiar to the learners in order to enable their learners to relate the Mathematics taught to what they already know. In more concise terms they argued that the BETD graduates have a limited ability to use relevant everyday

contexts to help their learners to understand and relate the content taught to their prior knowledge and experiences.

The Directorate of National Examinations and Assessment (DNEA) (2009) recommended that Mathematics teachers should use Mathematics in practical situations and link it to real-life contexts in order for the learners to gain conceptual understanding of the content taught. The same recommendation was again aptly captured by DNEA (2010, p.159) with the statement “let learners do and touch Mathematics” in order for the teachers to make the content more relevant and practical to the learners. These recommendations were made with the understanding that such teaching will enable the learners to learn Mathematics conceptually and enable them to successfully apply the concepts mastered in unfamiliar problem-solving situations in the grade 10 external examinations.

In the Namibian education system, the teacher is naturally expected to use the learners’ experiences in his/her teaching, because teaching is supposed to take place in a learner-centred way. This point is clearly articulated in official Government documents, thus:

Our emphasis must be on quality and meaningfulness of learning. Hence, our teaching methods must strengthen and facilitate learning. Accordingly, any approach to teaching and learning should be learner-centred, which means that: the starting point is the learners’ existing knowledge, skills, interests and understanding, derived from previous experience in and about school, and the natural curiosity of all young people to learn to investigate and to make sense of a widening world must be nourished and encouraged by challenging and meaningful tasks (Ministry of Education and Culture, 1993, p.60).

This study therefore aimed at investigating the BETD teachers' ability to use everyday contexts in their teaching of Mathematics at local schools in Windhoek. The effectiveness of how such everyday contexts were utilized to ensure that relevant and meaningful learning took place was also explored in this study.

1.3 QUESTIONS OF THE STUDY

The present study sought to answer the following research questions:

1. How do BETD Mathematics teachers understand and define everyday contexts?
2. What types of everyday contexts are used by BETD Mathematics teachers?
3. How often do BETD Mathematics teachers present content in contexts that the learners already know?
4. What factors do BETD Mathematics teachers regard as affecting the use of everyday contexts in their Mathematics lessons?

1.4 SIGNIFICANCE OF THE STUDY

This study might lead to our understanding of the existing conditions in terms of the extent to which BETD teachers contextualise Mathematics content in their lessons. The findings might help Mathematics teacher educators at UNAM to effectively train pre-service teachers on contextualisation of Mathematics content.

The BETD Mathematics teachers might benefit from this study, as the findings might be used in their in-service training to enable them to contextualise Mathematics content

more meaningfully for their learners. Both the BETD Mathematics teacher educators and the BETD graduates teaching Mathematics might learn additional effective ways of contextualising Mathematics content in meaningful contexts for their learners.

This study might also be used to inform new Mathematics education programmes which might incorporate contextual teaching of Mathematics in the place of the BETD Mathematics programme that is in the process of being phased out at UNAM.

1.5 LIMITATIONS OF THE STUDY

Due to time and financial constraints the study was only carried out at three junior secondary schools which were easily accessible to the researcher in the Windhoek Education Region. The study was carried out in the third trimester of the 2010 school academic year and all participating Grade 10 teachers claimed to be doing revision only and hence they predominantly worked through old question papers with the learners instead of teaching.

The credibility of some participants as sources of reliable information was questionable since the information they provided in the open-ended questionnaires on their use of everyday contexts in Mathematics teaching was inconsistent with their actual practices observed in their classrooms. Therefore, teachers' own views about their practice might not have been accurate. The researcher used triangulation to cross-check the data collected through different research tools for regularities.

The researcher was the only data collector in this study. Therefore, his predispositions might have introduced distortions of the data collected, for example through observer bias. The researcher used standardised observation schedules to mitigate observer bias.

In Namibia not much research has been carried out in the area of this study. This limited the researcher in terms of relevant national information with regard to the literature review. However, relevant studies on contextual teaching and learning of Mathematics carried out in other countries in Southern Africa helped the researcher to fill that gap.

1.6 DELIMITATIONS OF THE STUDY

The present study was restricted to BETD graduates teaching Mathematics from Grades 8 – 10 at three selected junior secondary schools in Windhoek.

1.7 DEFINITION OF TERMS

The following definitions were used as defined below in this study:

Context meant “the real-world phenomena, settings or conditions from which data are drawn or to which data pertain” (Langrall, Nisbet, & Mooney, 2006, p. 1).

Contextual teaching meant “a methodology of teaching that connects academic concepts to real-world conditions and encourages students to see how what they learn relates to their lives” (Williams, 2007, p.572).

Pedagogical content knowledge meant the relevant knowledge of how to teach specific content in a flexible way to adapt to interests and abilities of learners during instruction.

Contextual teaching and *the use of everyday contexts* were used interchangeably in this study.

1.8 SUMMARY

This study investigated the BETD teachers' ability to use everyday contexts in the teaching of Mathematics at junior secondary school in Windhoek, Namibia. The purpose of this study was to gain an in-depth understanding of the existing conditions concerning the BETD teachers' use of everyday contexts in their Mathematics classrooms.

This study was necessitated by a need to investigate concerns raised in several reports of government commissioned studies (MBESC, 2002; Clegg and Courtney-Clarke, 2009; DNEA, 2009; DNEA, 2010) in terms of the use of contextual teaching and learning in school Mathematics. Moreover, the mismatch between the expressed policy guidelines (MBEC, 1993; NIED, 2003) according to which the BETD teacher training took place and the reported criticisms against the BETD teachers (Dählstrom, 1998) and their practices (MBESC, 2002; Clegg and Courtney-Clarke, 2009), prompted the researcher as a BETD teacher educator to investigate the BETD Mathematics teachers' ability to use everyday contexts in their teaching.

This study was important because it might benefit teacher educators, pre-service teachers, BETD Mathematics teachers and the Ministry of Education in various ways explicitly discussed earlier. In the next chapter the literature review is presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, a review of literature concerning the use of everyday contexts in the teaching of science in general and the teaching of Mathematics in particular is given. The chapter addresses the following aspects: theoretical framework; definition and the nature of contextual teaching and learning; types of everyday contexts used by Mathematics teachers; presenting Mathematics content using everyday contexts; factors that affect the contextualization of content; and benefits and challenges of using everyday contexts.

2.2 THEORETICAL FRAMEWORK

The general conceptual framework within which this study investigated the BETD teachers' ability to use everyday contexts in their teaching of Mathematics in junior secondary schools was provided by social constructivism (Vygotsky, 1978; Wheatley, 1991). Contextual teaching and learning (CTL) integrates philosophies of social constructivism and brain-based learning in a theory of learning that utilizes a student's experiences and interests to make connections between academic concepts and real-world applications. The social constructivist aspect of CTL is based on the connections between previous knowledge and collaborative learning environments; whereas the philosophies of brain-based learning state that the brain seeks challenges, patterns and meanings (Johnson, 2002). In addition contextual teaching uses meaningful work that

involves critical thinking to build on academic concepts and creates self-regulation among learners through creative outlets and nurturing environments (Johnson, 2002).

Social constructivism emphasizes that meanings and understandings grow out of social interactions. Ng and Nguyen (2006) argued that central to the constructivist learning theory was the belief that learners were active in shaping how new knowledge was taken in and shaped and that new understandings emerged progressively as learners developed own views, tested those views and re-shaped their understandings on the basis of their experiences. Moreover, learning was seen as a dynamic and social process where students brought into the classrooms strongly established views of the world, or prior understandings, which have been formed by experience. Those views were seen to have developed as a result of learners' own personal experiences in interacting with their environments (Ng and Nguyen, 2006).

In view of the role that the learners' experiences and prior-knowledge play, Ng and Nguyen (2006, p.41) elucidated teaching and learning in a constructivist setting thus:

'Hands-on' approaches are advocated in constructivist-based learning. By using contexts that incorporate real-life phenomena, students are provided with opportunities to review and assess their own world-views and be actively involved in the refining of the understandings held prior to the learning... [therefore] the role of the teacher is to guide the construction of 'new' understandings and meanings closer to a body of knowledge that has been accepted in the scientific community.

The knowledge a teacher needs to possess to teach effectively is always dependent on the interplay of a number of factors, over and above, the understanding of Mathematics content only. Shulman (2004) referred to such knowledge as pedagogical content knowledge. According to Shulman (1986), pedagogical content knowledge

. . . embodies the aspects of content most germane to its teachability. Within the category of pedagogical content knowledge include, for the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, the ways of representing and formulating the subject that make it comprehensible to others . . . [It] also includes an understanding of what makes the learning of specific concepts easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning (p. 9).

Shulman (2004) further posited that since there are no single most powerful forms of representation of reality (e.g. analogies, illustrations, examples, explanations and demonstrations) teachers must have various alternative forms of representation of the content they teach. He further pointed out that some of “these representations are derived from research whereas others are derived from the wisdom of practice” (p.203).

Cochran, De Ruiter, & King (1993) revised Shulman’s original model of pedagogical content knowledge to be more consistent with a constructivist perspective on teaching and learning. Their revised model was based on an integration of subject matter knowledge, pedagogical knowledge and two other components of teacher knowledge which separate teachers from subject matter experts. One component is teachers’ knowledge of students’ abilities and learning strategies, ages and developmental levels,

attitudes, motivations, and prior knowledge. The other component of teacher knowledge that contributes to Pedagogical Content Knowledge (PCK) is the teacher's understanding of the social, political, cultural and physical environments in which students are asked to learn. Teaching from a constructivist perspective should therefore proceed from a deeper understanding of subject matter knowledge, which includes key facts, concepts, principles, and explanatory frameworks of a subject, as well as the rules of evidence used to guide inquiry in the field, and pedagogical content knowledge, which consists of an understanding of how to present specific topics in ways appropriate to the students being taught.

The researcher believes that those appropriate ways of teaching, include among other things the contextual teaching of Mathematics. Therefore, the researcher argues that teachers with strong subject content knowledge and pedagogical content knowledge will be more inclined to use contextual teaching of Mathematics concepts more meaningfully than the ones who lack either or both of the knowledge domains.

2.3 Definitions and the nature of contextual teaching

Contextual teaching and learning (CTL) has different definitions, each of which is based on different perspectives (Hayes, 1993; Granello, 2000). These different perspectives could include among others: realistic Mathematics education (RME), learner-centred education (LCE), critical education, and modeling. Contextual teaching and learning has been defined as a teaching methodology that relates academic concepts to real-world conditions and encourages students to see how what they learn

relates to their lives (Sears and Hersh, 1999; Williams, 2007). Contextual teaching and learning thus enables learners to connect what they learnt in class to real-life contexts in which the new knowledge and skills can be applied.

Berns and Erickson (2001) viewed CTL as a teaching and learning strategy that helps teachers to relate subject content to real-world situations and motivate students to make connections between knowledge and its applications to their lives as family members, citizens and workers. In agreement with that view Putnam (2000) reasoned that contextual teaching represents a concept that involves connecting the content with the context in which the content will be used. Mayer (1998) expanded further that view by noting that in CTL, learning is attached to the context in which the knowledge is constructed, and knowledge is seen as inseparable from the context and the activities within which it develops. Thus, connecting content with context is important to bring meaning to the learning process. However, in order for that connection to take place, a variety of contextual teaching approaches may be used. Before one gains insight into the various contextual teaching approaches, an understanding of the nature of contextual teaching is necessary.

Granello (2000) identified five fundamental components of CTL, which are indicative of its nature. Lessons presented from the CTL perspective should be grounded in the understanding of the following:

1. The situated nature of cognition, which holds that the environmental and the social context within which learning occurs are integral parts of the learning activity.
2. The social nature of cognition, which holds that each individual interprets knowledge based on his/her own previous experiences and social context.
3. The distributed nature of cognition, which holds that a particular individual cannot retain all the information to complete most tasks. Thus, apart from professional training that mostly focuses on individual competence, most tasks are collaborative in nature. Therefore, the teacher cannot possess complete expertise in an area he/she teaches. As a result, in teaching from a contextual perspective, teachers should serve as guides who help learners navigate through the available information on a topic.
4. Problem-based learning which holds that presenting students with real-world problems to solve develops their cognitive skills and enhances their long-term retention of subject content.
5. Authentic assessment, which holds that assessment should be based on authentic tasks that promote meaningful learning. Such assessment should be continuous in the classroom and could include items such as exhibits and portfolios (p. 277).

In order to integrate the five components proposed by Granello (2000) in contextual lessons, Williams (2007) recommends the REACT strategy to develop lesson plans and present lessons that incorporate CTL effectively. The acronym REACT represents the processes:

Relate – learning in context of one’s life experience or pre-existing knowledge.

Experience – learning by doing, or through exploration, discovery and invention.

Application – learning by putting the concepts to use.

Communication – learning in context of sharing, responding and communicating with other learners.

Transfer – using knowledge in a new context or authentic situation, especially one that has not been covered in class (p. 573).

The REACT strategy ensures active learner engagement in the process of knowledge construction. It also strives to enable learners to view what they learn in class as relevant to their lives and creates opportunities for the learners to interact and learn from each other.

In conclusion, contextual teaching and learning creates a classroom environment in which the pre-knowledge, opinions, perspectives and the life experiences of learners are valued in the process of teaching and learning of formal school Mathematics.

Conversely, in the traditional Mathematics classroom setting, learners' out-of-school experiences, opinions and perspectives are seldom integrated in the normal classroom discourse. Therefore, in the Namibian school system which is based on the learner-centred philosophy (Ministry of Education and Culture, 1993), an understanding of how BETD teachers integrate the conceptual and cultural knowledge that students bring with them to the classroom and how they employ relevant everyday contexts in Mathematics teaching is necessary.

2.4 Types of everyday contexts used by teachers

Gainsburg (2008) reported that the use of everyday contexts is very infrequent and cursory in Mathematics classrooms. However, she noted that a range of practices can be classified under the umbrella of real-world connections in Mathematics teaching and learning. They include: simple analogies, word problems, the analysis of real data, discussions of Mathematics in society, hands-on representation of Mathematics concepts, for example, through models of solids; and mathematically modeling real phenomena, for example, writing the acceleration of a car as a function of its velocity (Gainsburg, 2008). These practices are associated with different types of everyday contexts used in Mathematics teaching. Although this list of types of everyday contexts is indicative of practices in the Mathematics classrooms, a more extensive typology of contexts is provided by science education.

Mayoh and Knutton (1997) suggested a taxonomy of 12 categories of contextualized lesson episodes for science lessons. A summary of that taxonomy is presented in Table 1.

Table 1: Types of everyday contexts

1. Episodes referring to the mass media.
2. Episodes referring to personal experiences: telling stories.
3. Episodes referring to common out-of-school experiences.
4. Episodes referring to uncommon out-of-school experiences.
5. Episodes referring to common objects.
6. Episodes referring to images from out-of-school experiences.
7. Episodes referring to everyday knowledge.
8. Episodes referring to everyday words.
9. Episodes using analogies and metaphors based on everyday experiences.
10. Episodes using everyday contexts for classroom activities.
11. Episodes developing skills for everyday life.
12. Episodes referring to industry.

Source: Mayoh and Knutton (1997).

Although the above taxonomy was developed for classifying contexts in science lessons, it has also been useful in studying the use of everyday contexts in Mathematics lessons. In an earlier study carried out in Namibia, Makari (2007) investigated the extent to which contextual teaching and learning was applied in Grade 11 and 12

Mathematics classrooms in secondary schools in the Gobabis area. Makari (2007) used the above taxonomy to identify the types of contextualized lesson episodes in that study. The taxonomy can be viewed as sufficiently comprehensive since all episodes of everyday contexts observed by Makari could be classified in the taxonomy.

However, there were also other ways in which the types of contexts used in Mathematics classrooms were viewed by different researchers. Dowling (1998) posited that specific ways in which Mathematics and other cultural practices related formed a set of myths. The specific cultural practice that was of importance in this study was the teaching and learning of Mathematics in the classroom context in schools. Dowling identified six myths but only the three, the myth of reference, the myth of participation and the myth of ethnomathematics and emancipation were relevant to this discussion and will be presented here, since the rest dealt mostly with Mathematics construction as a professional intellectual pursuit.

The myth of reference

Sethole (2004) argued that school activities related to this myth prioritised the non-mathematical and limited explicit references to Mathematics. Mathematical tasks were conveniently disguised to emphasise the everyday aspects of the context used and Mathematics was presented as if it was about a particular practice and not itself. Dowling (1998, p.4) asserted in view of this myth that “Mathematics is mythologized as being, at least potentially, about something other than itself”. The myth of reference is characterised by foregrounding other (for example social) concerns of the everyday

contexts used over acquisition of mathematical skills and relatively neglected proper development of the Mathematics concept under consideration.

The myth of participation

This myth holds that Mathematics is a tool needed to engage in everyday activities, for example shopping and cooking. In order for an individual to fully engage in practice or culture Mathematics is a necessity (Dowling, 1998). Therefore, mathematical skills were preferred over the social aspects of everyday contexts used and the acquisition of those skills was viewed as more critical than using everyday contexts to put such skills in perspective. Foregrounding the mathematical goals may motivate teachers to recruit what may be considered dead-mock reality. In other words, everyday contexts may solely be treated as a disguise for the acquisition of mathematical skills (Sethole, 2004).

The myth of ethnomathematics and emancipation

An understanding of the concept of ethnomathematics is necessary to appreciate the implications of this myth. Ethnomathematics is generally defined in a variety of ways. D'Ambrosio (1985) broadly defined ethnomathematics as the Mathematics which is practiced among identifiable cultural groups, such as tribal societies, labour groups, children of a certain age bracket, professional classes and so on. Gerdes (1996) defines ethnomathematics as the cultural anthropology of Mathematics and mathematical education and explains that ethnomathematicians emphasise and analyse the influence of socio-cultural factors on the teaching, learning and development of Mathematics.

The emancipation aspect of this myth strives for the integration of ethnomathematics in the mainstream Eurocentric school Mathematics in the third-world Mathematics curricula. Such integration of ethnomathematics into Mathematics lessons might stimulate a realization and appreciation of the embedded Mathematics in traditional cultural practices and put Mathematics in familiar everyday contexts of the learners drawn from their cultural experiences (Dowling, 1998). This perspective is supported by Vithal and Skovsmose's (1997, p.133) view that "ethnomathematics, as an educational idea, suggests that the content of Mathematics education be rooted in the Mathematics implicit in the culture with which children are familiar."

Chapman (2006) suggested that word problems, in general, can be applied as an important aspect of learning Mathematics in context. He argued that word problems can serve as a basis of application of mathematical skills and a basis of integrating the real-world in Mathematics education. However, a common concern related to everyday contexts in word problems is that students solve the problems without associating them with real life practice (Greer 1997; Chapman, 2006). Greer (1997) noted that due to classroom culture which emphasizes executing mechanical calculations, there was a widespread tendency of children to disregard the reality of the situations described in the text of word problems. Therefore, the results obtained from their problem-solving approaches were sometimes meaningless in relation to the problem at hand.

Earlier studies (Kasanda, Lubben, Gaoseb, Kandjeo-Marenga, Kapenda, and Campbell, 2005; Makari, 2007) suggested that the nature or the type of the everyday context used

in class depended to some extent on the topic being taught. Makari (2007) observed that some types of everyday contexts were very limited or did not feature in the Mathematics lessons that he observed. He reported that episodes based on contexts from the media and industry were particularly very minimal.

The study by Makari (2007) was more focused on the types of everyday contexts and relevant pedagogical strategies used in senior secondary school Mathematics classrooms. There was a need to investigate the effectiveness of the everyday contexts used by Mathematics teachers, irrespective of the type and frequency of everyday contexts employed. The scope of the present study encompassed that concern. Furthermore, it is also important to note that Makari's study was the only study of its type carried out in Namibia thus far in terms of Mathematics instruction. Therefore, there existed a need for a deeper understanding of the use of everyday contexts from the unique Namibian junior secondary school perspective as well. The present study sought to supplement that understanding and also to contribute to the global debate on the use of everyday contexts in Mathematics instruction.

Irrespective of the perspective from which one views the type of everyday contexts used in Mathematics teaching (for example: analogies, myths, word problems, etc.) any type of context used should contribute to students' meaningful learning of content studied relative to their prior mathematical knowledge and their socio-cultural experiences. Thus any specific context should elucidate underlying processes and

structures of Mathematics, while simultaneously locating the mathematical knowledge in relevant real-life perspectives.

2.5 Presenting Mathematics content using everyday contexts

Lampen (2011) identified three perspectives from which the role of contexts in Mathematics teaching and learning has been debated. They are: modeling, critical education and contexts as an aid to sense-making. She argues that both critical education and modeling perspectives view context as the most important factor throughout an instructional experience. Thus, the context dictates all actions from the start of solving a problem to the end of interpreting and acting on the results. However, she points out that this important role of context is only minimally actualized in Mathematics classrooms because “where teachers do use contexts, they are cleaned-up, imbued with key-words that signal mathematical processes to the extent that they lead to actual suspension of real-life sense-making” (Lampen, 2011, p.52).

Mutemeri and Mugweni (2005) argued that from a constructivist perspective, students learn school Mathematics more easily if it is meaningful in their life and culture and it emerges from their experiences and their social life. Thus, using meaningful everyday contexts helps students to understand the nature and purposes of Mathematics. They reported that teachers used everyday contexts primarily in the introduction phase of their lessons and mostly as an aid to sense-making in terms of the meanings of new concepts taught.

Barnes and Venter (2008) contended that the need for teaching Mathematics using everyday contexts was necessitated by the shift in Mathematics education from an absolutist paradigm to a more social constructivist view which emphasizes Mathematics as a social construct. Ernest (1991) explicated that the absolutist view holds that Mathematics consists of absolute and unchallengeable truths that can be regarded as certain knowledge. Consistency and infallibility of two types of assumptions underpin the absolutist view of Mathematics. They are: the actual Mathematics based on axioms and definitions, and logic based on axioms, rules of inference, the formal language and its syntax. These two views suggest that teaching Mathematics from an absolutist perspective is not consistent with the constructivist view of learning. Zaslavsky (1998) challenges the absolutist view of Mathematics by arguing that Mathematics is fallible, changing, and like any other body of knowledge is a product of human inventiveness. The researcher is of the view that Mathematics instruction from an absolutist perspective will be more inclined to use content-driven, teacher-centred approaches, because mathematical knowledge will be presented as complete. However, Mathematics instruction from a social constructivist perspective, values the learners' interests, experiences and backgrounds and encourage exploration and collaborative learning (Johnson, 2002), and this in addition can create opportunities for the use everyday contexts.

Clarifying their insight into what it meant to teach Mathematics from and in contexts, Barnes and Venter (2008), suggested that learners should learn Mathematics by mathematising subject matter from real contexts and their own mathematical activity

rather than from the traditional view of presenting Mathematics to them as a ready-made system with general applicability. They further argued that those real situations could include contextual problems or mathematically authentic contexts for learners where they experience the problem presented as relevant and real.

Stears, Malcolm, and Kowlas (2003) considered how teachers and learners from townships and informal settlements in the Cape Flats area of Cape Town used local knowledge in the science classroom and how they made the shifts between formal science and everyday knowledge. They found that greater connectedness of school science with children's interests and experiences promoted deeper engagement for the children with each other and the content. They recommended that further research is required to gain deeper insight into learners' interests, since their results only showed that building learners' interests into the science lessons was fruitful. They also suggested that empowering teachers to design relevant curricula for specific communities required more attention than it has been given in the past.

Berns and Erickson (2001) proposed several approaches that can be used for implementing contextual teaching and learning. They are: problem-based learning, cooperative learning, project-based learning, service learning and work-based learning. These different approaches do not automatically result in contextual teaching and learning. In order to achieve that, they should include the characteristics of contextual teaching and learning discussed earlier. Berns and Erickson (2001) suggested that

lessons that successfully integrate one or more contextual teaching and learning approaches should be developmentally appropriate to the learners and provide environments that support learners to reflect on their own learning. Moreover, they advise that lesson preparation should consider the diversity of student interests in the lessons and strive to address multiple intelligences. Finally, they maintain that assessment tasks should be as realistic as possible and problem solving should focus on techniques that enhance higher order thinking skills rather than rote recall of factual information.

The need for teachers to be conversant with various approaches that will enable them to identify and meaningfully integrate everyday contexts that learners are familiar with in their Mathematics lessons cannot be over-emphasised. Such everyday contexts should be integrated with the understanding that there are considerable individual differences in the ways in which learners make links between their everyday knowledge and subject content in the classroom even though “particular group positions can be identified” (Stears, Malcolm, and Kowlas, 2003, p.116).

Such group positions should play a significant part of contextualized lessons in view of the socio-economically and culturally diverse backgrounds of learners in the Mathematics classrooms. Generally, the literature reviewed for the present study was silent on how to determine group positions of intersecting learner interests and experiences.

Contextual teaching and learning of Mathematics could be enhanced by the use of relevant teaching and learning materials (Williams, 2007). Bergson (2000) suggested that teaching and learning aids “help students understand mathematical concepts and processes, increase students’ flexibility of thinking, and can be used creatively as tools to solve new mathematical problems, and reduce students’ anxiety while doing Mathematics” (p.40). This view was amplified by Yushau, Mji, and Wessels (2005) with particular reference to the use of computers in Mathematics instruction by suggesting that computers foster creativity and have the potential to enable the teacher to create a challenging learning environment. They further argued that technology in general and computers in particular, if used effectively, can help in improving learners’ intellectual ability and lead to mathematical achievement.

English and Halford (1995) however, pointed out that several false assumptions were often made about the power of instructional materials. They cautioned teachers that first, teaching aids cannot impart mathematical meaning by themselves. Second, Mathematics teachers cannot assume that their students make the desired interpretations from the concrete representation to the abstract idea. Proper guidance by the teacher is required to ensure correct interpretations of contexts. And finally, the interpretation process that connects the teaching aids to the Mathematics content can involve quite complex processing. Therefore, contextual relevance of a teaching aid used does not automatically lead to understanding of concepts.

It is important to note that not everyone involved in Mathematics education is in favour of teaching Mathematics contextually. Venkat, Bowie, and Graven (2009), having reviewed 23 research papers to identify their positions and purposes in relation to the issue of contextualization in South Africa, suggested that those who oppose the teaching of Mathematics in and from context base their arguments on two key philosophical and theoretical considerations. They argue that first, the nature of Mathematics is incommensurate with the nature of everyday considerations and second, they draw on some empirical research in Mathematics classrooms which found a lack of skills on the ground amongst teachers who were attempting to integrate contextualised Mathematics teaching effectively resulting in a loss of focus on mathematical content.

In favour of the incommensurability perspective, Davis (2003) argued that the 'everyday' and 'Mathematics' have two different structures. He further reasoned that contextualizing Mathematics content compromises the integrity of Mathematics. Therefore, foregrounding relevance in the teaching of Mathematics content undermines the very purpose of teaching Mathematics as an established discipline with its own structures. Drawing on Barton's (1996) view that ethnomathematics is not a mathematical study and that it is more like anthropology and history which implies an inherent relativism of ethnomathematics, Horsthemke (2006) also supports the argument that ethnomathematics and formal Mathematics are fundamentally different kinds of knowledge. He further criticised the body of ethnomathematics literature

as a whole for questionable attempts at integration of theoretical and practical knowledge.

However, Horsthemhe's (1996) view that ethnomathematics attempted to integrate formal theoretical knowledge and practical knowledge contradicted that of Zaslavski (1991) who as one of the original proponents of ethnomathematics suggested that the Eurocentric goals, contents and methods of Mathematics education were not sufficiently adapted to the cultures of the African peoples. Based on that perspective, she argued that many African children underperformed in Mathematics because they regarded Mathematics as a strange subject not necessarily related to their daily experiences. Consequently, Zaslavski (1991) suggested the introduction of multicultural, interdisciplinary perspectives into the Mathematics curriculum. Her rationale for the multicultural, interdisciplinary perspectives was to make the learners aware of the role of Mathematics in all cultures, help them to take pride in their own heritage and to become more interested in Mathematics. The multicultural approach to Mathematics teaching through ethnomathematics was not aimed at replacing the established formal theoretical Mathematics with anything else, but rather to use resources and methods familiar to African children to explain the Mathematics content to them more meaningfully.

2.6 Factors that affect the contextualization of content

Gainsburg (2008) argued that teachers primarily consider the importance of the mathematical topic and how real or familiar the context will be to students when

evaluating everyday context for classroom use. The significance of the context, authenticity of the mathematical task, and potential of the task to teach about the context are far less relevant. That could be ascribed to the belief that teachers' main goal is to impart mathematical concepts and skills, and that developing students' ability and disposition to recognize applications and solve real problems is of lower priority in the classroom. Therefore, contexts that enabled students to master concepts or procedures would be considered more critical and used more often.

Makari (2007) argued that the nature of Mathematics itself did not sometimes allow contextualisation to take place especially at senior secondary school level. The topics that he observed in his study namely, Algebra, Coordinate Geometry, Indices, Trigonometry, Polynomials and Graphs, he argued, might have had a bearing on the extent to which contextualization could have taken place. His findings corroborated those by Akpo (1999) who reported that secondary school teachers identified Algebra, Coordinate Geometry, Trigonometry and Graphs, among others as difficult topics to teach. Thus, one is more likely to find contextual teaching of topics that teachers regard as easier than those that they regard as difficult or challenging to teach.

Julie, Holtman, and Mbekwa (2011) claimed that it was widely recognized that affective domain issues such as beliefs, interests, motivation and perceptions were important determinants for effective teaching and learning. They argued that contextual situations that teachers preferred in their teaching were subjective. Therefore,

attitudinal orientations of teachers could also affect the use or non-use of everyday contexts in their Mathematics classrooms.

Over and above the attitudinal orientations of teachers, an interdependence of their beliefs, subject content knowledge and pedagogical content knowledge influences teachers' decisions about what to teach and how to teach it (Bransford, Brown, and Cocking, 2000). Thus, teachers' approaches to teaching are a reflection of what they think is important in Mathematics and how they think students best learn. Adler (2005) suggested that Mathematics teachers predominantly display mathematical and teaching practices emphasised in their teacher training. She argued that teacher training programmes predominantly emphasized procedural skills. However, the ability to demonstrate mastery of procedures does not necessarily guarantee underlying conceptual understanding. Shulman (2004) argued that successful integration of contextual teaching and learning is based on a deeper conceptual understanding of Mathematics and relevant pedagogical content knowledge.

Mutemeri and Mugweni (2005) reported that teachers believed that problem-solving in Mathematics involved routine procedures and that the learners should be taught how to apply such procedures correctly rather than teaching them through everyday contexts which might impede the learning of those procedures. They reported that teachers felt that they were supposed to teach formal methods without complicating them with learners' out-of-school experiences and informal problem-solving techniques. In support of that argument, Gainsburg (2008) reasoned that most teachers fear that

confronting students with the complexity of real world situations through ill-structured problems will lead to confusion and impede the learning of Mathematics. Consequently, teachers apply everyday contexts primarily to teach procedures and not to develop higher-order or mathematical ways of thinking.

Concerning aspects that affect the use of everyday contexts Stears, Malcolm, and Kowlas (2003) suggested that even when teachers made considerable effort to link the activities to learners' everyday experiences in their planning, they were generally less likely to grasp and build on learners' comments and ideas when such ideas arose unexpectedly in the classroom. They also reported that teachers did not wish to deviate from a planned lesson and focused on school content, rather than feeding the understanding of that content back to the learners' everyday knowledge and interests. That approach of teaching affected meaningful integration of everyday contexts in the classroom. Teachers also saw 'school science' as somewhat separate from learners' cultural lives and were unsure of how to handle diversity within each class considering the heterogeneous socio-cultural backgrounds of the learners.

Grounding her argument in the analysis of complementarity of Mathematics and context, Vithal (2008) pointed out that the caution against the use of context in Mathematics curricula derives primarily from a concern that a focus on context may deny particular groups of learners access into Mathematics itself as a self-referential system. Thus, she argues that context can also serve as a barrier to students' access into Mathematics. However, for some learners context serves as the medium through which

Mathematics is accessed by making connectedness and relevance of Mathematics clearer. How context and Mathematics obstruct or co-operate in a Mathematics lesson is determined by the choices that teachers and learners make in a classroom in response to the curriculum and other aspects (such as assessment, timetabling, available educational materials), and also their own ideologies, values, attitudes and positions about the teaching and learning of Mathematics (Vithal, 2008).

The above discussion implies that implementation of contextual teaching and learning in Mathematics instruction has its benefits and challenges. A consideration of those benefits and challenges is given below.

2.6.1 Benefits and challenges of using everyday contexts

2.6.1.1 *Benefits*

Two of the most common benefits of contextual teaching identified by several studies (Boaler, 1993; Boaler, 1994; Barnes, 2004; Kasanda et al., 2005; Mutemeri and Mugweni, 2005; Makari, 2007; Ng and Nguyen, 2006; Barnes and Venter, 2008; Gainsburg, 2008) were the improvement of motivation and learner engagement. The improved learner motivation and engagement were achieved as a result of everyday real-life examples and phenomena drawn from learners' environment and experiences that learners could relate to in the process of learning Mathematics. Classroom activities centred on familiar contexts were also associated with the development of critical thinking and problem-solving which lead to meaningful learning (Ng and Nguyen, 2006).

Boaler (1994) argued that contextual teaching and learning provided students with a familiar metaphor that served as a basis of mathematical enquiry and enhanced the transfer of mathematical learning through a demonstration of links between classroom Mathematics and its role in everyday life. Thus, the transfer of learning within Mathematics and between Mathematics and other real-life situations enabled learners to appreciate the utilitarian value of classroom Mathematics.

Barnes (2004) reported in her research with low-attaining grade 8 learners that those who made use of informal strategies based on contextual situation in the process of problem-solving could often identify and sometimes remediate errors in their own thinking independently. Thus, contextual teaching applied from Realistic Mathematics Education (RME) perspective which informed her study played a role in eliciting and addressing learners' alternative conceptions through the application of the principle of guided reinvention (Barnes, 2004).

Kaiser and Schwarz (2010) reported that students find authentic modeling problems realistic, interesting, and challenging. They reported that learners claimed that authentic modeling problems sometimes left them feeling helpless, insecure and lacking strategies, but that they however achieved high learning outcomes through contexts used to model real-world phenomena. Thus, the application of modeling as a contextual teaching approach was regarded as beneficial to the learning of Mathematics. That view was supported by Lehrer, Strom, and Pligge (2001) who

posited that authentic modeling tasks enhanced learners' understanding of nonmathematical phenomena.

2.6.1.2 *Challenges*

Boaler (1993, p.15) argued that “a constructivist perspective suggests that no one task context can offer a universal application which is familiar and, more importantly meaningful for all students”. Some contexts extracted from the adult world could either be alien to the learners or the learners' lived experiences might not include such contexts. In support of Boaler's (1993) argument, Barnes and Venter (2008) cited the diversity of cultures and practices within the society as factors that posed a challenge to relevant and culture-sensitive ways to use contexts in Mathematics teaching. These views suggest that there are multitudes of ways in which to contextualise the same content. The fundamental concern for the teacher in that regard is thus selecting relevant everyday contexts that will ensure maximum learner involvement and meaningful learning of content through contexts.

Major challenges that Ng and Nguyen (2006) identified were that sometimes students are unable to deal with contextualised problems if they are not already familiar with the subject content under consideration. They also reported that teachers have indicated that using everyday contexts ‘took time away from teaching content’ (Ng and Nguyen, 2006, p.40). Thus, teachers regarded the integration of everyday contexts as time consuming (Ng and Nguyen, 2006; Makari, 2007; Barnes and Venter, 2008; Gainsburg, 2008) and an impediment to their pace of completion of the prescribed curriculum.

Van Etten and Smit (2005) argued that where the curriculum was designed to emphasise a more formal approach to teaching Mathematics, the quality and consistency of contextual teaching were compromised. Moreover, they claimed that if the curriculum demanded that time was spent on Mathematics that was not relevant to everyday life, it offered little motivation to learners. They contended that in multilingual classes where learners are often not learning Mathematics in their first language, the language itself becomes a challenge in addition to the Mathematics that is to be learnt contextually.

Several researchers (Boaler, 1993; Julie and Mbekwa, 2005; Vithal and Gopal, 2005) contended that what may be regarded as relevant everyday contexts might not be the same for teachers and learners. Julie and Mbekwa (2005) pointed out that their results from a study investigating grade 8 and 10 learners' preferred contexts, showed that learners' preferred everyday contexts in Mathematics were commensurate with their future career aspirations. For instance, learners who aspired to become engineers were more interested to know how exactly Mathematics is applied in engineering.

The final challenge discussed here relates to teacher training. Teachers who were not explicitly trained in the use of everyday contexts in Mathematics teaching find it difficult to contextualise the content they teach effectively (Adler, 2005; Gainsburg, 2008; Venkat, Bowie, and Graven, 2009). Venkat, Bowie, and Graven (2009) posited that successful contextual teaching of Mathematics is seen as dependent on teachers and the support they get to understand and translate into practice the demands of

integrating everyday contexts. Such support refers to both pre-service training programmes and in-service interventions. Gainsburg (2008) argued that the professional development teachers receive should clearly demonstrate how real-world connections can build mathematical mastery in order to enable teachers to use contextual teaching more effectively.

2.7 SUMMARY

The theory of social constructivism (Vygotsky, 1978; Wheatley, 1991) provided the general conceptual framework for this study. Social constructivism emphasizes social interactions that serve as platforms for learning or the development of new meanings and understandings through reviewing and reshaping of earlier views established through experience in dynamic social processes (Johnson, 2002; Ng and Nguyen, 2006).

Different definitions have been given for contextual teaching and learning, and each definition is based on a different perspective (Hayes, 1993; Granello, 2000). These different perspectives could include among others: realistic Mathematics education (RME), learner-centred education (LCE), critical education, and modeling.

Gainsburg (2008) regarded simple analogies, analysis of real data, discussions of Mathematics in real-life, representations of Mathematics concepts and modeling as different types of everyday contexts used in Mathematics lessons. Contextualised lesson episodes referring to everyday contexts (Mayoh and Knutton, 1997; Makari,

2007), different types of myths (Dowling, 1998) and word problems (Chapman, 2006; Gainsburg, 2008) were also used by researchers to identify and/or classify types of everyday contexts employed in Mathematics lessons.

According to Lampen (2011), the need for presenting Mathematics content using everyday contexts have been argued from the perspectives of modeling, critical education and context as an aid to sense-making. Moreover, Barnes and Venter (2009) argued that the move away from an absolutist perspective of Mathematics to a social constructivist perspective necessitated contextual teaching of Mathematics.

Some Mathematics educators (Burton, 1996; Davis, 2003; Horsthemke, 2006) do not support the use of everyday contexts in Mathematics instruction. Venkat, Bowie, and Graven (2009) suggested that those who opposed the use of everyday contexts in Mathematics teaching argued that the nature of Mathematics was incommensurate with the nature of everyday considerations, or that teachers were not competent enough to teach Mathematics effectively using everyday contexts.

Several factors affect the use of everyday contexts in Mathematics instruction. The nature of the topic (Kasanda et al, 2005; Makari, 2007; Gainsburg, 2008), the attitudinal orientations of the teachers (Julie, Holtman, and Mbekwa, 2011) and an interdependence of teachers' beliefs, subject content knowledge and pedagogical content knowledge (Bransford, Brown, and Cocking, 2000) have been identified as

some of the factors that determine if and how teachers use everyday contexts in their Mathematics lessons.

Literature suggest that the use of everyday contexts is beneficial in the teaching of Mathematics. Improvement of learner motivation and engagement (Boaler, 1993; Boaler, 1994; Barnes, 2004; Kasanda et al., 2005; Mutemeri and Mugweni, 2005; Makari, 2007; Ng and Nguyen, 2006; Barnes and Venter, 2008; Gainsburg, 2008), enhancement of transfer of learning between Mathematics and its real-life applications (Boaler, 1994; Stears, Malcolm, and Kowlas, 2003), encouraging guided re-invention of mathematics principles by the learners (Barnes, 2004) and enhancement of learners' understanding of mathematical phenomena (Lehrer, Strom, and Pligge, 2001) are some of the benefits identified in the literature.

However, some challenges were also identified in terms of the use of everyday contexts in Mathematics instruction. Sometimes the everyday contexts used by the teacher created a barrier to the understanding of the Mathematics taught if the contexts were unfamiliar to the learners (Boaler, 1993; Ng and Nguyen, 2006; Vithal, 2008). Furthermore, finding relevant culture-sensitive ways to contextualise content was difficult in heterogeneous classrooms where learners came from different social and cultural backgrounds (Barnes and Venter, 2008).

Where the curriculum demanded a more formal approach to Mathematics teaching, the use of everyday contexts was compromised (Van Etten and Smit, 2005). The language

of instruction sometimes limited the effectiveness of everyday contexts used if Mathematics was taught in a language which was not the mother tongue of the learners (Van Etten and Smit, 2005). Everyday contexts that teachers regarded as relevant were sometimes not necessarily viewed as such by the learners, and therefore the contexts could not produce the desired learning outcomes (Julie and Mbekwa, 2005; Vithal and Gopal, 2005). Finally, teachers were not able to successfully use everyday contexts in their Mathematics teaching if the training they received did not adequately equip them to use contextual teaching (Adler, 2005; Gainsburg, 2008; Venkat, Bowie, and Graven, 2009).

In view of the literature surveyed for this study, the researcher concludes that the use of everyday contexts in Mathematics teaching could prove to be beneficial to both teachers and learners in Namibia. The next chapter presents the research methodology employed in this study.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methods that were used in the present study to collect and analyse the data. The chapter addresses the research design, sample and sampling procedures, the research instruments, pilot study, data collection procedure, the methods of data analysis and ethical considerations.

3.2 RESEARCH DESIGN

This study was a descriptive, naturalistic qualitative research. The researcher intended to gain an in-depth understanding of the BETD teachers' use of contextualization of content in their teaching and hence to describe the current situation concerning the effectiveness of contextual teaching of Mathematics by the BETD teachers. The study was naturalistic and qualitative, because predominantly narrative data, behaviours and opinions were collected and the greater part of the data collection process occurred in natural classroom settings which were not researcher-controlled (Creswell, 2009). According to Sax (1979, p.33), "the purpose of descriptive research is to describe current conditions without their being influenced by the investigator". The researcher did not interfere with the research setting but merely collected data in great detail to understand the situation studied. An emergent research design was used to afford the researcher flexibility to make an in-depth exploration of the use of everyday contexts by the participants (Patton, 2002).

3.3 SAMPLE AND SAMPLING PROCEDURES

The sample for this study comprised nine junior secondary school BETD teachers of Mathematics from three purposively selected schools in Windhoek. The information concerning the deployment of Mathematics teachers in secondary schools in Windhoek was obtained from the Education Management Information Systems (EMIS) directorate of the Ministry of Education. The selection of the schools was based on the fact that at least three BETD teachers who taught grades 8, 9 and 10 could be found at the school. Consequently, three teachers each teaching a specific grade in the junior secondary phase were included in the sample from each of the three schools to ensure that the entire junior secondary phase was covered per school. Thus, three junior secondary school BETD Mathematics teachers for each of the grades 8, 9 and 10 comprised the sample.

Purposive sampling was used to select the research participants. Participants were selected based on their BETD qualifications with at least one year teaching experience and their willingness to be part of the study, after the purpose and the essence of the study were explained to them. Therefore, the fact that the sample only consisted of participants who took part in the study out of their own free will, was partly a way of ensuring their maximum co-operation.

Novice teachers were not included in the sample for this study. Only teachers with at least one year teaching experience were included in the sample. The requirement of more than one year teaching experience was necessitated by the fact that novice

teachers in their first year of teaching usually rely on the guidance given to them by experienced teachers in the choice of teaching approaches, types of teaching-learning aids and type of assessment to mention but a few. Thus, novice teachers might lack total professional independence that experienced teachers have and their actions might not totally be reflective of their own professional choices and decisions.

3.4 RESEARCH INSTRUMENTS

The data were collected using observations, interviews and questionnaires. These are described next.

3.4.1 Observations

Observations were used to accurately record and describe the setting, the participants and the actual behaviours and practices of the participants (Patton, 2002). Moreover, participants were also observed in their natural classroom environments, thus enabling the researcher to gain a deeper understanding of the contexts within which they interacted with their learners (Patton, 2002; Creswell, 2009).

Five lesson presentations were observed per participant. From the pilot study, the researcher learned that five lessons were sufficient to build trust with the participants to ensure a full and honest self-representation by the teachers in order for the researcher to collect data in a real natural setting. Nonparticipant observation was used to ensure that the researcher remained as un-intrusive to the setting and uninvolved with the participants as possible during the observation sessions (Gay, Mills, and Airasian,

2009). A standardized observation schedule (Appendix A on page 116) was used to capture the sequence and the nature of the events that took place in the Mathematics classes. Field notes were used to capture information about the description and the understanding of the research settings and the participants. A digital voice recorder was also used to audiotape the classroom proceedings.

3.4.2 Interviews

Interviews were used to collect information that could not be obtained through observation alone, from a participant's unique personal perspective (Boudah, 2011). The interviews allowed participants to express their opinions, experiences, values and attitudes (Alvesson, 2011) towards the use of everyday contexts in the teaching of Mathematics.

Structured open-ended interviews (Appendix B on page 118) were used with each participant a week after the last classroom observations and the interviews were digitally audiotaped, with the permission of the participants. The nature of the interviews enabled the researcher to gain insight into the participants' contextualisation of the content in the observed lesson presentations. Open-ended questions were used to allow the participants greater freedom in responding and the interviewer freedom to probe further depending on the responses given by the participants.

3.4.3 Questionnaires

Questionnaires were used in addition to the two research instruments discussed earlier, to increase the trustworthiness and consistency of the data collected by using multiple sources of data collection (Boudah, 2011). Furthermore, the questionnaire afforded an opportunity to those participants who could not express themselves effectively orally, to write down their opinions.

Immediately after the interview, a questionnaire was administered to the participants. The questionnaire dealt with information required, which might not have been adequately addressed through observation and interviews. For example, challenges the BETD teachers faced in contextualizing the Mathematics content they taught. Questionnaires with structured and open-ended questions (Appendix C on page 120) were used to obtain information from the nine respondents concerning their personal approaches to and their successes or failures in contextual teaching of Mathematics. The participants were given a day to complete the questionnaires before the researcher collected the completed questionnaires.

3.5 PILOT STUDY

A pilot study was carried out to refine the research instruments and to ensure that they were valid and reliable to provide appropriate information concerning the research questions (Gall, Gall, and Borg, 2007). Additional procedures, for example the length of the interviews, were also determined using the pilot study.

The pilot study was carried out in one secondary school in the first two weeks of the third school trimester in the 2010 academic year in the Katutura suburb of Windhoek. The sample of the pilot study comprised three BETD Mathematics teachers each of which taught a specific grade from grade 8, 9 and 10. Katutura was chosen because it had more secondary schools than any other suburb in Windhoek and selecting one school from Katutura still left a large number of secondary schools which could be included in the main study. The school used in the pilot study was excluded from the main study to avoid contamination of the data collected in the main study.

The research instruments and procedures (for example, digitally recording interviews) used were found to be appropriate in adequately collecting the data intended to be obtained by the researcher. Hence, the research instruments were not revised.

3.6 DATA COLLECTION PROCEDURES

A letter was written to the Permanent Secretary of the Ministry of Education requesting permission to conduct the study in secondary schools in Windhoek (Appendix D on page 123). The letter stated the purpose and the significance of the study. Written permission was obtained from the Permanent Secretary of the Ministry of Education to conduct the study in secondary schools in Windhoek. A letter was also written to the Regional Director of Education for the Khomas Region seeking permission for the study and written permission was also obtained from the Regional Director of Education for the Khomas Region for the same purpose (Appendix E on page 125).

Letters were also hand-delivered to the principals of the participating schools with copies of both permission letters from the Permanent Secretary and the Director, and with the research instruments attached to seek their permission to conduct the study in their schools (Appendix F on page 127). All three principals gave oral consent to the researcher to conduct the study in their schools.

The data collection process for the main study started in the third week of the third school term in 2010, after completion of the pilot study and proceeded for the next four weeks. Only one school was visited on a particular day and all three participants at that school were observed.

Since the researcher was the only data collector in this study, standardized observation schedules were used to mitigate observer bias. To put the observer effect in perspective within the present study, the reactions of the participants to the presence of the researcher were recorded, described and analyzed as part of the research. That was done since the presence of the researcher might have affected the participant's ability to teach naturally. The researcher followed established procedures for validating and verifying data analyses (Shank, 2006; Boudah, 2011) so as to reduce any distortions that could have been introduced by the researcher's predispositions. For example, providing alternative explanations for research findings and including detailed reports on the findings. Digitally captured audio data were initially transcribed verbatim by the researcher in order to ensure that he did not miss information that was critical to the study.

During the observations, the researcher took field notes on the behaviour and activities of the participants in the classrooms. The non-participant observer status employed was useful for the researcher in exploring classroom practices that were uncomfortable for the participants to discuss in the interviews. Face-to-face interviews were conducted with the participants in the seventh week of the term, the week after the last classroom observations. The purpose of the interviews was to obtain the participants' views and opinions on contextual teaching of Mathematics. The interviews were conducted from Monday to Wednesday, one day per school. Questionnaires were administered immediately after the interview with a participant and he/she was expected to have the questionnaire completed and ready for collection by the researcher within one day. That ensured a prompt and timely return of questionnaires by the participants.

3.7 DATA ANALYSIS

Inductive data analysis was used to capture meaning from the collected data. The inductive approach allowed the researcher to formulate themes that emerged from the data (Creswell, 2003; Gay, Mills & Airasian, 2009). The data from interviews and questionnaires were coded and progressively narrowed down into few important groups of key categories. From those categories, themes which could be interpreted and discussed were identified through further analysis. That was necessary because open-ended questions were used in the interviews and questionnaires. Due to the emergent nature of the research design, even the exact approach for analyzing the themes associated with the data became apparent during the analysis itself and was not

predetermined as in the case with a deductive approach (Creswell, 2003; Gay, Mills, and Airasian, 2009).

Observation schedules were arranged per participant and the data were read several times to enable the researcher to develop a clear overall picture. Observation data were coded into meaningful categories, enabling the researcher to organize text and discover patterns that would be difficult to detect by just reading through the observation schedules. The relationships noticed among different categories were carefully noted. A diagram was also used to keep track of those relationships. Since codes were not always mutually exclusive, a phrase was assigned to several related codes. Finally, focused coding was done to combine coding categories and the researcher looked for repeating ideas and larger themes that connected the codes. After that, a list was made to assign each code an abbreviation and a description to draw ready connections with identified themes. Finally, the messages communicated by the data concerning the actions, experiences of the participants were analysed. The data were condensed in a short summary format and different links were established between the research questions and the summary findings derived from the data.

Methodological triangulation of the data was achieved through the use of the three methods of data collection discussed earlier (Shank, 2006; Boudah, 2011). That enabled the researcher to cross-check the data from different sources to search for regularities and dissonance in the data (Shank, 2006). The analysed data were organized by research question in order to ensure that all relevant issues of concern to

the researcher were synthesized and all the data from the various research instruments were integrated to give a collective insight into the research problem. This ensured that patterns, themes and relationships were explored conveniently and clearly.

3.8 ETHICAL CONSIDERATIONS

The nature and the purpose of the present study were explained to the participants to ensure that they would not feel coerced or compelled to participate in the study (Shank, 2006). Furthermore, it was explained that the information collected in their classes would be used for the purposes of the study only and would be treated with confidentiality and not be shared with any third party (Creswell, 2009). No personal information of the participants was collected for this study. Participants were assured that they could withdraw from the study at any time of their choosing if they so desired.

3.9 SUMMARY

The present study was a descriptive, naturalistic qualitative research. The study was qualitative in nature since predominantly narrative data, behaviours, practices and opinions were collected and the greater part of the data collection process occurred in natural classroom settings which were not researcher-controlled. The current situations concerning the effectiveness of contextual teaching of Mathematics by BETD teachers was investigated with the aim of describing it with no intention to generalize the results.

Nine purposively selected BETD Mathematics teachers from three secondary schools in Windhoek comprised the sample for this study. The participants were selected on the basis of having a BETD qualification and at least one year teaching experience. Data were collected using observations, interviews and open-ended questionnaires explicitly discussed earlier.

Written permission was obtained from the Permanent Secretary of the Ministry of Education (Appendix G on page 129) and the Director of the Khomas Education Region (Appendix H on page 130) to conduct this study in secondary schools in Windhoek. All three principals of the schools where the study was conducted gave the researcher oral consent to carry out the study in their schools.

The data collection started in the week after the completion of the pilot study. Five classroom observations were conducted per participant. Standardized observation schedules and field notes were used to capture the classroom proceedings. In addition, classroom proceedings were digitally audiotaped. Face-to-face interviews were conducted with the participants a week after the last classroom observations. Finally, questionnaires were administered after the interviews.

Inductive data analysis was used to interpret the data collected (Creswell, 2003; Gay, Mills & Airasian, 2009). The data were coded and organized into categories. Then, more focused coding was done to combine coding categories and to search for repeating ideas and larger themes connecting the codes. The data were summarized and

the summary findings were linked to the research questions. Triangulation of the data was achieved through the use of three different data collection instruments, namely, observations, interviews and questionnaires (Shank, 2006; Boudah, 2011). Triangulation was also used to improve the trustworthiness of the data collected.

The nature and the purpose of the study were explained to the participants (Shank, 2006). The participants were assured that the data collected would only be used for the purposes of the study and that it would not be shared with any third party (Creswell, 2009). Participants were assured that they could withdraw from the study at any time if they decided to do so. The next chapter deals with the presentation and discussion of the results of this study.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF THE RESULTS

4.1 INTRODUCTION

In this chapter the results are presented under the following headings according to the research questions: definition of everyday contexts by the BETD Mathematics teachers, the types of everyday contexts that are used by the BETD Mathematics teachers, how often the BETD Mathematics teachers present content in contexts that the learners already know, and the factors that the BETD teachers regard as affecting the use of everyday contexts in their Mathematics lessons. Each of the headings is followed by the discussion of the results presented. A brief description of the biographical information of the participants precedes the presentation of the results.

4.2 Biographical information of the Research Participants

Nine Junior Secondary School Mathematics teachers from three schools in Windhoek participated in this study. All participants were holders of the BETD qualification and none of them had any post-diploma qualification although two male participants at a specific school were busy with further studies.

Three participants were females and six were males. Three of the participants taught Grade 8, while four taught Grade 9 and two taught Grade 10 Mathematics. Their teaching experience of Mathematics at a particular grade level ranged from two to 15

years.

All participants were in possession of the latest Mathematics syllabus for Grades 8 to 10 that was implemented in the year 2007 and also a textbook for the grade they taught. The *Maths for Life* series of textbooks written by Courtney-Clarke were used in all grades at all three junior secondary schools. The classes the participants taught ranged from 37 to 48 learners in size.

4.3 The BETD Mathematics teachers' definition of everyday contexts

Varying definitions of everyday contexts were given by the participants in terms of Mathematics teaching. The quotations here highlight these individual definitions:

Teacher 1: *"Taking learners' pre-knowledge and integrating it into your lessons."*

Teacher 2: *"The use of relevant examples to help the learners to relate the classroom Mathematics to their home and other environments."*

Teacher 3: *"Using relevant examples that are in learners' everyday lives or real-life situations that we can relate to the content in Mathematics."*

Teacher 4: *"Use of real-life situations that we can relate to the content in Mathematics or simply applying Mathematics in our daily lives by using practical experiences of the learners in the Mathematics classroom."*

Teacher 5: *"Using relevant examples from the learners' everyday lives."*

Teacher 6: *"Applying Mathematics in our daily lives by using practical things that are happening in learners' lives in the Mathematics classroom."*

Teacher 7: *“Using contexts that learners are familiar with or just everyday problems that learners can relate to in your teaching.”*

Teacher 9: *“Taking what the learner already knows, his experiences, and implementing them in the Mathematics lessons.”*

Teacher 8 stated that using everyday contexts referred to *“teaching Mathematics in a practical way.”* On further probing, he explained that *“it means to integrate learners’ experiences and constant use of media in your teaching”*. The most frequent views were those of integrating learners’ pre-knowledge into Mathematics lessons referred to by Teachers 1, 7 and 9 and using relevant examples from the learners’ everyday lives referred to by Teachers 2, 3 and 5.

4.4 Discussion of the BETD Mathematics teachers’ definition of everyday contexts

The teachers’ definitions and/or explanations of everyday contexts in Mathematics teaching highlighted the aspects of integrating learners’ experiences, pre-knowledge, environment and the teaching of Mathematics in practically relevant ways. Their definitions were consistent with the understanding that the use of every day contexts or contextual teaching and learning (CTL) in general, related academic content to real-world situations or contexts in which the new knowledge and skills could be applied (Putnam, 2000; Berns and Erickson, 2001; Williams 2007).

According to Hayes (1993) and Granello (2000), different definitions of CTL are informed by different perspectives. The researcher expected that the teachers’ definitions of everyday contexts would be based on learner-centred education (LCE),

since BETD Mathematics teachers were trained to teach guided by a learner-centred philosophy. The Broad Curriculum for the BETD outlines what is expected of teachers in terms of LCE thus:

Learner-centred education presupposes that teachers have a holistic view of the learners, valuing the learner's life experience as the starting point for their studies. Teachers should be able to select content and methods on the basis of a shared analysis of learner's needs...and thus develop their own and the learners' creativity. A learner-centred approach demands a high degree of learner participation, contribution and production (NIED, 2009, p.2).

The data from the present study suggest that the teachers' definitions of everyday contexts were consistent with a learner-centred education perspective in line with the Broad Curriculum for the BETD. The opinion "*I use many different learner-centred teaching methods and the use of everyday contexts is just one of them*" by Teacher 5 attests to the teachers' perceived link of contextual teaching with LCE.

The teachers' views on contextual teaching of Mathematics are within the broad parameters of the constructivist view of learning in line with Johnson's (2002) view that contextual teaching and learning (CTL) incorporates social constructivism to employ students' experiences and interests to relate academic concepts and real-world applications. However, the teachers' views were generally limited to integrating learners' experiences, pre-knowledge and environment into the Mathematics lessons. Pedagogical considerations of how the actual teaching and learning proceed under CTL are lacking in teachers' definitions/explanations of everyday contexts.

4.5 Types of everyday contexts used by BETD Mathematics teachers

The researcher observed five lessons per participant which resulted in a total of 45 lesson observations. Four out of nine teachers used everyday contexts with variable consistency that resulted in a total of 17 episodes only of the use of such contexts in 14 lessons. The rest of the participants' lessons only displayed a format where either the textbooks were followed page by page or old question papers were worked through focusing on procedural skills only. The primary focus in the lessons not using everyday contexts was mostly on getting the right answer following explicitly structured algorithms only.

It is important to note that there was not a single lesson preparation available for all 45 lessons observed. The teachers used only the textbook as a guide. Hence, the observed 17 incidences of the use of everyday contexts in 14 lessons out of 45 cannot be viewed as a result of planning, but merely as a reaction to the topic at hand, relying on common sense only. The marking of the previous day's homework was normally used as a sort of an introduction to the new lesson. The everyday contexts which, when used, and predominantly employed only in the introduction, were mainly utilized to explain the meaning of the topic after the latter had been written on the board. Consequently, the content taught by the participants who used contexts was not made relevant to the learners' life experiences.

The classification of contexts used in the Mathematics lessons was based on the typology proposed by Mayoh and Knutton (1997) who distinguished 12 categories of

contextualization of lessons based on the type of the everyday context used (see Table 2).

Table 2. Frequencies and types of everyday contexts used by teachers

Type of everyday context used	Observed frequency of use
1. Referring to the mass media	2
2. Referring to personal experience: telling stories	0
3. Referring to common out-of school experiences.	0
4. Referring to uncommon out-of school experiences.	0
5. Referring to images from out-of-school experiences.	0
6. Referring to everyday knowledge.	4
7. Referring to common objects	5
8. Referring to everyday words.	3
9. Using analogies and metaphors based on everyday experiences.	0
10. Using everyday contexts for classroom activities.	0
11. Developing skills for use in everyday life.	1
12. Referring to industry.	2

Each of the everyday contexts that were used is discussed in detail below in descending order of frequency. However, it is important to note that the researcher regarded a particular everyday context as used in a lesson, if it was mentioned at least once during the lesson. The ways in which the everyday contexts were integrated in the lessons were carefully observed and recorded for analysis. The four participants who used

everyday contexts were labeled Teacher 1 through to Teacher 4 to ensure a clear exposition of the observations. Teacher 1 and 4 taught Grades 8, 9 and 10; Teacher 2 taught Grades 9 and 10 and Teacher 3 taught Grade 10 only.

Episodes referring to common objects

Five out of 14 lessons using everyday contexts made reference to common objects. Both Teacher 1 and Teacher 2, at two separate schools teaching the topic Transformation Geometry in Grade 9 referred to mirrors to explain the concept of reflection. Teacher 1 explained reflection thus:

“When you look in a mirror you see your own face and other objects in the room as well. The objects in the mirror are called mirror-images of real objects, or in Mathematics we call them reflections. So, a reflection of an object is the same distance away from the mirror or the mirror-line if we draw the objects.”

Teacher 1 then continued and drew a square and its image separated by a mirror-line emphasizing that the two objects are always the same distance from the mirror-line.

Teacher 2, on the other hand, asked learners if anybody had a mirror. One female learner had a small mirror in her bag. He took the mirror and holding it directly across his face at arm length asked the learners *“what do you think I see if I look in this mirror?”* Using the learners’ answer that he will see his face he explained that *“my face that I see in the mirror is called a reflection”*. He emphasized that a reflection is not a real object but just an image of the real object. He then explained that *“the mirror-line can be taken as the surface of the mirror and therefore objects on both sides of the mirror are the same distance apart”*.

When dealing with the concept of rotation Teacher 1 used the example of a wheel that “*goes around in a circle when a car moves*”, but Teacher 2 used an example of the propeller of a helicopter. The following exchange took place in Teacher 2’s class:

Teacher 2: Many things in life can rotate. Can you give me an example?

Learner: A wheel [Shouting]

Teacher 2: Yes, but also like the propeller of a helicopter, isn’t it?

Learner: Yes Sir.

This topic produced the possibility for ready use of everyday objects. However, sometimes objects referred to were logically irrelevant to explain the concept taught. Teacher 1’s attempt to use an example of a balloon to explain the concept of enlargement was far from meaningful as shown in the following excerpt.

Teacher 1: You know like when you blow up a balloon, it gets bigger
and bigger. That is also enlargement. Do you understand?

Learners: Yes Sir [Chorusing].

Learner: But Sir, you said it must look the same.

Teacher: Yes, it is still the same balloon, but now it is only filled with air.

It was confusing for those learners who grasped the essence of the concept of enlargement, to accept the teacher’s explanations because a balloon in an un-inflated state looks different from an inflated one. Consequently, he took another example and referred to 1kg box of Omo washing powder as an enlargement of the 500g box. All of these references to everyday objects, by both Teacher 1 and Teacher 2, were only made during the introductory phase of the lessons. No integration of the everyday objects

took place beyond that point not even as part of an activity, for example, to measure the side lengths of the two Omo boxes to calculate the scale factor of enlargement. No realia or models of real objects were used in the lessons, except the mirror that Teacher 2 obtained from a learner. The everyday objects were predominantly only referred to verbally.

Episodes referring to everyday knowledge

Four out of 14 lessons using everyday contexts made reference to everyday knowledge. Teacher 3 referred to rail tracks as an example of “*two lines that will never meet*” using it as an analogy for parallel lines in a Grade 10 revision lesson on Geometry. She also used the shapes of three letters U, X and Z as some sort of mnemonics to enable learners to remember some types of angles formed between two parallel lines and a transversal namely, co-interior angles, opposite angles and alternate angles. In all lessons that made use of everyday knowledge the learners were familiar with the knowledge referred to by the teachers and no confusion arose as a result of the use of such knowledge. Hence, the everyday knowledge was effectively used to form a link between the learners’ experiences and the new concepts or as a tool to recall aspects of concepts that were already taught.

Episodes referring to everyday words

Two out of 14 lessons using everyday contexts made reference to common words and three episodes of such references were observed. In explaining the concept of enlargement, Teacher 2 used the example of a balloon that could be inflated with air to

become big or from which air can be released to become small. The common words “big” and “small” were used appropriately in that case, but when the teacher explained that the image of an enlarged object can be big or small, learners were confused.

Teacher 2: In language “enlargement” means making bigger, but in Geometry it can mean making bigger or smaller. We only calculate the scale factor of enlargement.

Learner: But Sir, how can we enlarge if we make smaller.

Teacher 2: If the factor of enlargement is bigger than one, the size of the image is bigger than that of the object. But if the factor of enlargement is a fraction, like one-half, the image is smaller.

Learner: What if it is negative, Sir?

Teacher 2: No, that’s another story. Now, we are only dealing with positive numbers.

Learners: Yes, Sir.

Teacher 2: We can also call the smaller image a reduction. Reduction is an enlargement where the image is smaller than the object. Is it clear to everyone now?

Learners: Yes, Sir. [Chorus in a clearly unconvinced manner.]

Trying to clear the confusion arising from his explanation that the image can be small, he explained that it can also be called reduction. That explanation implied that the concepts of enlargement and reduction could be used synonymously. It in turn resulted in a contradiction with the learners’ intuitive understanding of the common word

reduction. However, the teacher did not make any further attempt to clarify the concept of reduction more meaningfully.

In another lesson where the concept of transformation was explained, Teacher 3 mentioned that *“transformation means the change in position or shape of an object”*. The two common words position and shape were explained as *“position is where something is located on earth”* and *“shape is the form of an object”*. These two explanations were relevant and meaningful in terms of the concept studied and they contributed to the learners’ understanding of what the concept transformation deals with. Furthermore, the common meaning of the phrase “to transform” as “to change” was also highlighted, but the teacher emphasized the mathematical meaning of the topic for the day. That was achieved by emphasizing that *“when dealing with transformations in Mathematics we study the changes in either the position and/or the change in the shape of an object”*.

After the explanation in the introduction only questions from old Grade 10 examination papers were worked out. However, it was observed that common words when used appropriately and unambiguously were effective in helping learners to understand (new) concepts meaningfully. That observation was made because learners did not have any questions concerning the meaning of a concept once it was properly explained using common words they were familiar with in all instances where common words were used to explain the essence of a concept.

Episodes referring to mass media

Reference to mass media only occurred in one lesson, out of 14 lessons using everyday contexts, when the concept of graphs was introduced. Teacher 4 emphasized the importance of graphs by saying that they are used in many areas of everyday life.

Teacher 4: Graphs are always used in newspapers to explain economic news.

Do you people see graphs in newspapers?

Learners: Yes, Sir.

Teacher 4: On some news channels on the television graphs are also used to show economic variables.

Learner: Sir, what are economic variables?

Teacher 4: Economic variables are things like the prices of oil and gold that we see on the NBC news every day.

Clear references were made to mass media in terms of newspapers and television, however the underlying concept of economic news was implicitly assumed as common knowledge. This type of explanation, where only some examples of constituent parts of a whole are listed in an attempt to explain the nature of a whole was observed in four out of the 14 lessons in which everyday contexts were used.

Episodes referring to industry

Reference to industry occurred only in one revision lesson, out of 14 lessons using everyday contexts, taught by Teacher 3 on the concept of Volume. In both cases the references occurred in questions the teacher gave as part of class activities. The two questions were:

1. If a mine has to process 100 m^3 of rock to get 5 g of gold, how many m^3 of rock must it process to get 50 kg of gold?
2. Why is it important for Namibia Breweries to know the difference between volume and capacity?

Everyday contexts that appeared in questions and activities in textbooks were not regarded as contexts used by the teacher in this study. Against that background the two questions above showed some level of creativity by the teacher concerned since the teacher asked them spontaneously and they appeared in neither the textbook nor the 2009 examination paper the learners were working through that day. Question one was an individual exercise, but question two was done in groups of five and very interesting results were reported by the groups after six minutes. The teacher only gave the definitions of capacity and volume respectively, yet she never answered question two comprehensively. Teacher 3's only response concerning question 2 was the statement *"volume is the amount of space an object occupies while capacity means the amount of liquid an object can contain."*

Expressing the question in terms of an everyday context and giving the answer without any reference to that context limited the learners' grasp of the practical importance of the concepts referred to in the question. Clearly, the definitions did not explain the importance of the two concepts. The two questions asked by Teacher 3 marked the only instance observed where the use of everyday contexts occurred beyond the introduction phase of a lesson.

Episodes referring to developing skills for use in everyday life

Only one incidence of this episode was observed, in one lesson out of 14 lessons using everyday contexts, where Teacher 2 explained why the learners needed to know how to calculate the total surface area of cubes and cuboids. He pointed out that *“one day if you want to paint your house, you can calculate the total surface area of your walls and buy enough paint”*. The learners were not afforded any opportunity to seek clarifications on the teacher’s statement concerning painting a house since the teacher immediately took an example on how to calculate the total surface area of a cuboid. All six problems dealt with in the lesson, including the example, made no reference to any context, but only gave dimensions of cubes and cuboids whose total surface areas had to be calculated. For example, two of the problems given were:

1. Calculate the total surface area of a cube with a side-length of 10 cm.
2. Calculate the total surface area of a cuboid with length = 15cm,
breadth = 10cm and height = 12cm.

However, the importance of total surface area was put in acceptable real-life perspective through the reference to painting of a house. Contexts aimed at developing skills for use in everyday life were the most underutilized in view of the national rationale and aims for teaching Mathematics at Junior Secondary phase in Namibia, which among other things strives to:

- provide learners with the skills to understand, interpret and make sense of everyday situations in mathematical terms,
- develop the learners’ ability to apply Mathematics in contexts of everyday situations,

- provide the learners with the skills and competencies to improve their own lives and lives of people around them (NIED, 2007, p. 2 - 3).

4.6 Discussion of the types of everyday contexts used by BETD Mathematics teachers

The types of everyday contexts used in the lessons observed were identified using the taxonomy developed by Mayoh and Knutton (1997) (See Table 1). Not all types of everyday contexts in the taxonomy were used in the lessons observed. This could be explained on the basis of the fact that the taxonomy was developed for use in science classrooms and not necessarily in Mathematics classrooms. Furthermore, the taxonomy was developed in the United Kingdom and not in Namibia (Kasanda et al., 2005) therefore differences relative to culture, teacher training, availability of resources and access to resources could be responsible for the observed usage of certain contexts and not others.

All episodes of everyday contexts that were used in the lessons observed were familiar to the learners. Despite that, no pictures, models of the objects or realia were used in the lessons to elucidate the contexts. That could be ascribed to the fact that lessons were not planned and thus no purposeful decisions were made on the use of media. In addition, taking the wrong example to explain a concept which led to confusion of the learners could also be explained as a result of no proper lesson planning.

Everyday contexts were predominantly used in the introduction phase of the lessons. This finding is corroborated by Mutemeri and Mugweni (2005). All episodes referring to common objects were used as aids to sense-making and were only utilised to explain the meaning of the concept studied, whereas episodes referring to everyday knowledge were mainly used to enable learners to recall aspects of the concepts that were already taught. That, highlighted an inconsistency between teachers' views on the important role everyday contexts can play in the teaching of Mathematics and their actual classroom practices as observed by Mutemeri and Mugweni (2005) and Makari (2007).

The observed classroom practices viewed through the lens of Dowling's (1998) set of myths clearly align with the myth of participation. In all instances mathematical skills were foregrounded and the contexts were immediately discarded after the introduction and explanation of the concepts to be taught. That is in line with Sethole's (2004) view that in the myth of participation, the acquisition of mathematical skills is viewed as more critical than using everyday contexts.

The only time contexts were used beyond the introduction phase was when word problems containing episodes referring to the industry were incorporated in class work activities. Consistent with Chapman (2006) the word problems were used as a platform for the application of mathematical skills. However, reaffirming the views of Gainsburg (2008) the two word problems were only used to teach procedures and not to develop higher-order or mathematical ways of thinking. That resulted from the fact that the teacher was primarily interested in getting the correct numerical result in the

first word problem with no further reference to the context in the word problem. In the second word problem the teachers' focus was on giving the textbook definitions of volume and capacity without putting them in perspective with the question.

The limited use of the contextual teaching and learning approach did not ensure a meaningful integration of learner-centred education and by extension social constructivist learning. The emphasis on procedural skills, predominantly approached from a teacher-centred practice compromised the integration of learners' lived experiences and skills during knowledge construction. That could be ascribed to the fact that the presentation or development phase of lessons were mostly characterized by working on problems from the textbook or working through questions in previous years' external examination question papers. The teaching approaches used did not provide any platform for collaborative learning, even though the desks in the classrooms were arranged in groups, the learners mostly worked on class work problems individually. Therefore, the learners were not provided with opportunities to be actively involved in their own learning with opportunities for exploration, discussion and group work.

The ineffective integration of different types of everyday contexts by the teachers in their Mathematics lessons could be viewed as a consequence of lack of relevant pedagogical content knowledge. For example, the taking of a wrong example to explain the concept of reduction which contradicted the learners' everyday understanding of the concept of enlargement by one participant and not using (relevant) media at all,

except in one lesson, could be ascribed to the participants' lack of relevant pedagogical content knowledge (PCK). Shulman (2004, p.203) noted that "*PCK also includes an understanding of what makes the learning of specific topics easy or difficult...teachers need knowledge of strategies most likely to be fruitful in reorganizing the understanding of the learners, because those learners are unlikely to appear before them as blank slates*". In view of that, the participants lacked essential strategies to meaningfully integrate contexts throughout the learning experience for their learners.

4.7 Frequency of the BETD Mathematics teachers' presentation of Mathematics in contexts that the learners already know

The above subheading was explored by considering the following aspects:

1. Teachers' pre-service exposure to the use of everyday contexts.
2. Factors teachers viewed as determinants for the use of everyday contexts.
3. Necessity of using everyday contexts in Mathematics lessons.
4. Teachers' actual versus self-reported use of everyday contexts.

Teachers' pre-service exposure to the use of everyday contexts

All nine participants stated that they were exposed to the use of everyday contexts in their training. All of them claimed that their training sufficiently equipped them to understand the concept of everyday contexts and how to use it in their teaching of Mathematics. Teacher 6 stated "*we mostly focused on higher level Mathematics at the College and it was not that context-based, but I guess we also learned how to use everyday contexts*". In an attempt to elaborate on the level of exposure to the use of

everyday contexts in his pre-service training, Teacher 9 stated *“I have been exposed to the use of everyday contexts, maybe 30% of the time, although I don’t make use of them in my lessons”*. Only one other participant, Teacher 5 also expressed the level of her exposure to the use of everyday contexts in quantifiable terms, by stating *“we only used everyday context roughly 20% of the time in our training”*. Asked if she deemed such exposure as sufficient in enabling her to teach using everyday contexts, she claimed *“I use many different learner-centred teaching methods and the use of everyday contexts is just one of them.”*

Despite all the participants’ claims of exposure to the use of everyday context in their pre-service training, the researcher observed that only four out of the nine respondents used everyday contexts in their lessons. Naturally exposure to a teaching approach in training does not necessarily automatically translate into its application in a teachers’ practice. Therefore, additional factors that teachers viewed as determinants for the use of contexts were investigated.

Factors teachers viewed as determinants for the use of everyday contexts.

The factors identified were:

1. The type of topic.
2. The pre-knowledge and interests of the learners.
3. Capturing the learners’ interest and making Mathematics content easier.
4. Relevance of the available teaching aids to the content.

The different factors are discussed below.

The type of topic

All participants shared the view that some topics lent themselves readily for the use of everyday contexts (for example, Money and Finance, Percentages and Measurements) while they regarded others as difficult to contextualize meaningfully (for example, irrational numbers and trigonometric ratios). This view was captured by Teacher 4's comment that *"some Mathematics concepts cannot be transformed into everyday contexts because they are abstract"*. Teacher 1 also pointed out that *"topics like Money and Finance are related to the learners' daily experiences and therefore my use of everyday contexts is also guided by the learners' own experiences"*. The participants regarded such topics as conducive to the use of everyday contexts.

The pre-knowledge and interests of the learners

Only Teachers 1 and 2 discussed pre-knowledge and learners' interests as part of the factors determining the use of everyday contexts. Teacher 1 stated that if learners were already familiar with a concept taught and they were interested in a topic, the teacher could easily use contexts that learners could associate with. How such contexts would be identified and integrated was not explained. However, Teacher 2 expressed the concern that as teachers they might not be able to find out what the learners already know about a topic and what their interests are in order to use relevant everyday contexts in their teaching. Teacher 9 stated that *"if I have almost 50 learners [in the Mathematics class] how will I know what everyone's interest is? Therefore I decide by myself how to use contexts. You cannot please everyone"*. He also used this opinion to

justify why learners' interests could not be considered when deciding on everyday contexts to be used in the Mathematics lessons.

Capturing the learners' interest and making Mathematics content easier

All nine participants felt that everyday contexts were mainly used to make the content easier for the learners to understand. The participants felt that the real-life connections used in everyday contexts made Mathematics relevant to the learners' experiences, pre-knowledge and skills and thus easier to understand. The opinions "*the use of everyday contexts makes the concepts more interesting and clear to understand*" (Teacher 1) and "*learners understand content better and become interested in Mathematics*" (Teacher 4) are examples of how teachers viewed the role of everyday contexts.

Relevance of the available teaching aids to the content

Teachers 5 and 9 felt that where ready-made teaching aids were available and relevant to the content, they could be used to teach Mathematics contextually. Teacher 5 stated "*if I have the right teaching aids, I can use everyday contexts in all my lessons*" while Teacher 9 explained "*I can use everyday contexts if I have proper teaching aids, but right now I am not using them because we do not have teaching aids here*". However, the participants did not provide explanations as to how to determine the relevance of available teaching aids to the content.

Necessity of using everyday contexts in Mathematics lessons

This question implicitly explored the advantages and the disadvantages of the use of everyday contexts. Participants suggested several advantages of using everyday contexts. Their views are captured in the quotations below.

Teacher 1: *“Learners appreciate the practical importance of Mathematics, because the content I teach them can be linked to their real life. Learners will appreciate the subject more.”*

Teacher 2: *“Learners will be able to solve real-life problems more effectively because of the link formed between classroom Mathematics and their environment.”*

Teacher 3: *“It forms a linkage between the learners’ skills and what they have learned in their daily lives.”*

Teacher 4: *“It’s interesting and captures the learners’ attention. It also helps the learners to relate to what is happening in the classroom.”*

Teacher 5: *“The learners will understand more and they will love Mathematics and appreciate what they are doing in the Mathematics class.”*

Teacher 6: *“Learners understand content better. It also makes my lessons meaningful from my side.”*

Teacher 7: *“Learners won’t see Mathematics as a so-called difficult subject. They will see it as part of their everyday communication language and their everyday lives. If they link Mathematics to their real lives, the learners will remember it for a long time.”*

Teacher 8: *“It links prior knowledge and understanding of concepts to what is taught. It gives relevance to the Mathematics content we teach.”*

Teacher 9: *“It makes the subject interesting and it also makes the content easier to understand.”*

Teachers 1, 2, 3 and 4 stated that the use of everyday contexts had no disadvantages at all. It was interesting to note that those four teachers were the ones observed to use everyday contexts in their lessons. Although all four of them pointed out that the use of everyday contexts could be time consuming, they did not regard it as a disadvantage. Teacher 4 stated that “you need more time to use everyday contexts in Mathematics, but I don’t think that is a disadvantage” while Teacher 2 stated “yes, it will takes lot of time to teach lessons using everyday contexts, but that’s not a disadvantage because some learners need more time”.

Teachers 6, 8 and 9 out of the five respondents who pointed out the disadvantages of using everyday contexts, mentioned that the use of everyday contexts could be time consuming. Teachers 5 and 7 expressed their concern that although the use of everyday contexts was crucial, teachers should maintain a balance between using everyday contexts and developing learners’ procedural skills so that the everyday contexts do not dominate and overshadow the Mathematics taught. Teacher 5 stated in the interview that: *“if it [the use of everyday contexts] becomes a trend, learners would only want to know what they perceive to have applications in everyday life and if that is your only teaching style, anything that is theoretical they would not regard as important. And also you cannot transform every Mathematics concept into an everyday context”*. Teacher 7 stated that *“you cannot always use stories in Mathematics. Learners should learn how to do calculations. They should master mental arithmetic for example. Otherwise, they will only remember the contexts, but they will not know how to do calculations. That’s why you must not just focus on everyday contexts all the time”*.

Teachers' actual use of everyday contexts versus self-reported use of everyday contexts

Figures 1 and 2 below display the actual use of everyday contexts by the teachers as observed and their perceived use thereof as reported in the questionnaire. The parameters for the frequency of use of contexts were used as follows: “always” meant that the teacher used everyday contexts in each and every lesson observed, “frequently” meant that everyday contexts were used in every second lesson, “seldom” meant at most one out of five lessons used everyday contexts and “never” meant that no everyday contexts were used at all in all five lessons observed.

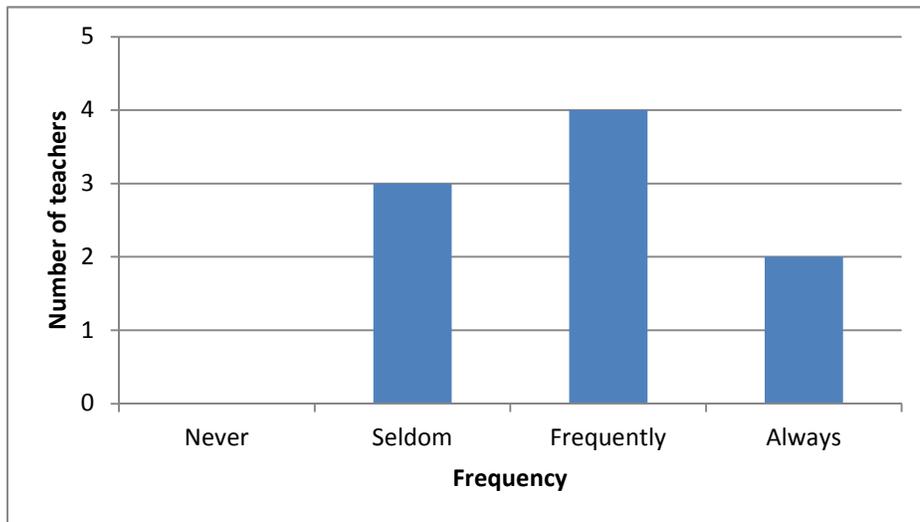


Figure 1. Teachers' self-reported frequencies of their use of everyday contexts

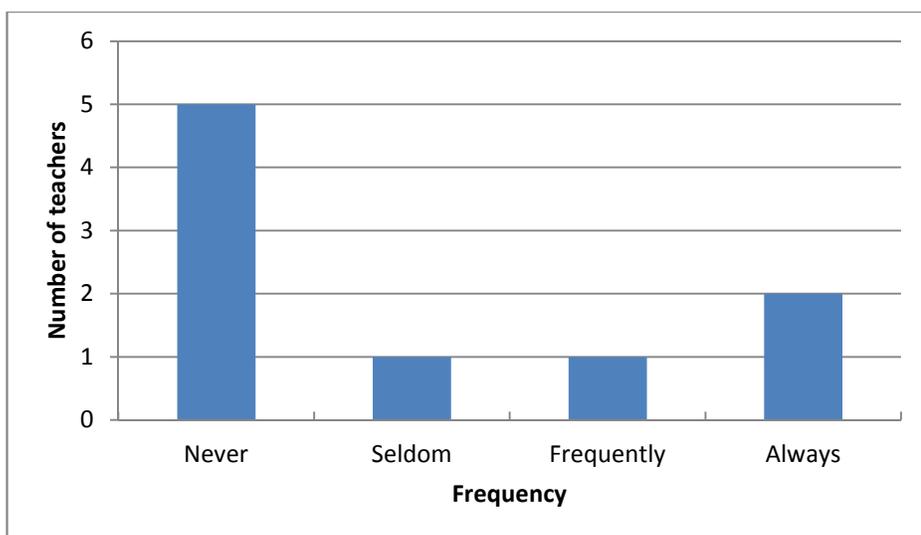


Figure 2. Observed frequencies of teachers' use of everyday contexts

In expressing how often they used everyday contexts in their Mathematics lessons, none of the participants said “never”, three said “seldom”, four said “frequently” and two said “always” (See Fig. 1). There was a clear discrepancy between the participants’ own perceived use of everyday contexts in Fig. 1, based on the information collected through questionnaires and the actual frequencies collected through classroom observations (See Fig. 2).

From Figure 2 it was observed that five out of the nine teachers never made any use of everyday contexts in all five lessons observed for each teacher. Teacher 4 used such contexts seldom, Teacher 1 used them frequently and Teachers 2 and 3 used them in all the lessons observed. Out of a total of 45 lessons observed only 14 employed everyday contexts. Thus, only 31% of the lessons utilized everyday contexts. Moreover, only Teachers 1, 2, 3 and 4 used everyday contexts one or more times in the five lessons

observed per participant. Teachers labeled from Teacher 5 to 9 did not use everyday contexts at all.

4.8 Discussion of the frequency of the BETD teachers' presentation of Mathematics content in contexts that the learners already know

All the teachers claimed to have pre-service exposure to the use of everyday contexts in Mathematics instruction. They regarded that exposure as sufficient enough to enable them to integrate everyday contexts in their teaching.

Consistent with the findings of earlier studies (Akpo, 1999; Makari, 2007), teachers regarded some topics like trigonometry difficult to contextualise. Surprisingly, even topics that the teachers claimed to be easy to contextualise like Money and Finance were not meaningfully contextualised or contextualised at all. The possible reasons for that could be that because much of the teaching that took place in the classes during this study were geared towards revision of content and concentrated on procedural mathematical skills that the teachers viewed as important for the year-end examinations. In line with Bransford, Brown, and Cocking (2000) the teachers' attitudinal orientations and their beliefs determined their decisions about what to teach and how to teach it. Thus, the focus on procedural skills through teacher-centred approaches emphasised correct application of algorithms.

Participants felt that the lack of relevant teaching aids compromised their use of contextual teaching. The lack of ready-made, content specific teaching aids like

Mathematics sets for the teaching of concepts like geometrical constructions was highlighted. Primarily, the inadequate support from the educational authorities, particularly the National Institute of Educational Development (NIED) was regarded as a contributing factor to the limited use of everyday contexts. Participants felt that NIED did not distribute the required curriculum materials, including necessary teaching aids to the schools.

Although the pre-knowledge and interests of the learners were viewed as important factors in determining the use of everyday contexts, identifying them before a concept was taught was viewed as difficult. Unfavourably large teacher-learner ratios (the largest class observed had 48 learners), different socio-cultural backgrounds of the learners and diverse individual interests of learners were viewed as factors that confounded the problem of identifying the pre-knowledge and interests of the learners. That sentiment was underscored by Stears, Malcolm, and Kowlas (2003) that the identification of everyday contexts and their meaningful integration requires special teacher skills concerning individual learner interests and possible intersections of such interests that can serve as group positions. The opinion *“if I have almost 50 learners [in the Mathematics class] how will I know what everyone’s interest is?”* by Teacher 9 demonstrated that concern. The problem could be ascribed to inadequate initial teacher training in terms of contextual teaching and learning (CTL) in the BETD Mathematics curriculum which might not have enabled the BETD Mathematics teachers to be sufficiently competent in the use of CTL in their teaching. On the other hand, CTL could be viewed as an approach which is not necessarily commensurate with the

teachers' own philosophical orientation of how Mathematics should be taught. Therefore, the teachers might not be interested in using CTL.

The key advantages highlighted by the teachers were: making the subject interesting and the content easier for learners to understand content, forming a link between learners' pre-knowledge and skills and the new content and finally emphasizing the utilitarian value and practical application of Mathematics in the learners' everyday lives. These findings are consistent with findings from earlier studies (Boaler, 1994; Barnes, 2004; Ng and Nguyen, 2006; Makari, 2007; Gainsburg, 2008) in terms of the benefits of contexts in Mathematics teaching. Inherently, all advantages mentioned above were geared towards enabling learners to develop desired knowledge about Mathematics consistent with Shadish's (1995, p. 423) view that social constructivism "refers to constructing knowledge about reality, not constructing reality itself." In this case Mathematics can be viewed as the reality under consideration.

In the questionnaire, all nine participants answered "yes" to the question "*do you make provision for the use of everyday contexts in your lesson planning?*" However, the researcher observed that none of them had lesson plans for all lessons observed. Thus, participants did not plan lessons whether they included everyday contexts or otherwise. Considering the question "*how often do you use everyday contexts in your Mathematics lessons?*" all the participants' claimed frequency of use of everyday contexts ranged from "seldom" to "always". Comparing Figure 1 and Figure 2, from classroom observations, five teachers (Teachers 5, 6, 7, 8 and 9) never used everyday

contexts in their teaching. However, in their self-reported use of contexts, all teachers claimed to use everyday contexts. That situation even contradicted the assertion by Teacher 9 that *“I have been exposed to the use of everyday contexts, maybe 30% of the time, although I don’t make use of them in my lessons”* when explaining his pre-service exposure to the use of everyday contexts.

Based on the above discussion it is evident that teachers have an exaggerated view of their use of everyday contexts. That could be ascribed to the fact that teachers regarded contexts in textbooks and earlier years’ external examination question papers as teacher-initiated contexts, probably because they directed the teaching- learning situations in their classrooms and decided on which activities should be focused on during a lesson, for example, exercises to be worked on from the textbook.

In the study by Makari (2007), contexts in textbooks and past years’ external examination question papers were regarded as part of teacher-initiated contexts. In this study, only contexts introduced by the teachers were regarded as teacher-initiated. Only four out of nine teachers (Teachers 1, 2, 3 and 4) used everyday contexts with variable consistency that resulted in a total of 17 episodes of the use of everyday contexts in 14 lessons. Thus, 31% of lessons used everyday contexts. That meant an average of 0.3 episodes of everyday contexts per lesson, which is much less than Makari’s average of 1.8 episodes of everyday contexts per lesson. Therefore, context use in secondary school Mathematics lessons was much more limited than previously thought. Apart from teacher factors determining the use of everyday contexts, the time of year this

study was carried out (last trimester of the school academic calendar) also might have played a role in the limited use of everyday contexts especially in grade 10 classes. All three grade 10 teachers were primarily focused on working through old question papers throughout this study as preparation of their learners for the external examinations.

4.9 Factors affecting the BETD teachers' use of everyday contexts in their Mathematics lessons

This aspect was investigated in terms of challenges the teachers faced in the use of everyday contexts in their Mathematics lessons with respect to: the learners, the nature of Mathematics, the presence of teaching-learning aids and the classroom environment.

The learners

The nine participants felt that most learners viewed Mathematics as a difficult subject and were not interested in it irrespective of the teaching methods employed and that the use of everyday contexts was no exception. The quotations that follow demonstrate the teachers' views concerning the learners:

Teacher 2: *“Most learners are conditioned to believe that Mathematics is very difficult and they don't concentrate even if you teach using interesting methods.”*

Teacher 4: *“Learners find Mathematics very challenging and it does not help to use everyday contexts.”*

Teacher 5: *“Learners are not able to link content to their own experiences.”*

Teacher 6: *“If learners are not aware of the contexts I use to teach them, they will not understand the topic.”*

Teacher 9: *“It is sometimes hard for the learners to really accept that Mathematics is in everything we do and therefore they*

don't understand contexts the teacher uses in his lessons."

Therefore, the participants argued, they were de-motivated to use innovative teaching methods including everyday contexts. They also contended that the learners did not always understand the contexts used to explain the content. Teacher 8 articulated that concern by stating, *"If I use an everyday context, were the learners really exposed to it outside the class and how will I know? It might be something new to them, therefore it's better to teach the content directly from the textbook to be fair to all"*. The teachers felt that, if the learners were not familiar with the context used by the teacher, no learning would take place and the learners would end up confused as a result of the everyday context used. The learners were not always able to interpret and solve easy application questions which made use of familiar contexts since the teachers were occasionally unable to link content to the learners' experiences. Teacher 3 stated that, *"my learners cannot solve simple word problems using contexts from their environment, like marbles and sweets, but they can solve the same problem if I remove those things. Therefore everyday contexts can be confusing for the learners."*

The nature of Mathematics

All nine participants regarded the utilisation of everyday contexts in Mathematics as time consuming both in preparation and during lesson presentation. The concern was clearly raised through direct statements like *"using everyday contexts is time consuming!"* (Teacher 5) and subtle ones like *"preparing to teach using everyday*

contexts can take up the whole afternoon and one is left with no time for marking and other things” (Teacher 9).

All nine participants argued that certain topics in the Grade 8 – 10 Mathematics syllabi which were too abstract and could not necessarily be aligned to the learners’ everyday experiences, impeded their use of everyday contexts. Teachers 3 and 5 gave the topic of irrational numbers as an example of a concept that could not be taught using everyday contexts. Teacher 5 stated that *“some topics are too abstract and you as the teacher just don’t know how to relate it to the learners’ experiences, for example irrational numbers”*. Teacher 3 explained that *“most topics can be taught using contexts, but some like irrational numbers are too abstract and you can only teach them directly”*. When asked what teaching directly meant, Teacher 3 pointed out that it meant *“following the textbook page by page”*. Topics that the participants believed to be too abstract were regarded to pose an inherent challenge to using everyday contexts when teaching them.

Teaching-learning aids

Teachers 3 and 8 claimed that sometimes the teachers’ ability to use everyday contexts in their Mathematics lessons is undermined by the unavailability of teaching-learning aids. Their respective statements were *“sometimes I cannot use everyday contexts if I don’t have the right teaching aids” (Teacher 3)* and *“you need teaching aids to use everyday contexts in Mathematics” (Teacher 8)*. On further probing to clarify the impact of unavailability of teaching-learning aids on the use of everyday contexts,

Teacher 8 stated that *“you do not possibly expect me to develop teaching aids for all my learners? Those things must come from NIED [National Institute for Educational Development]. We cannot just improvise everything.”*

Furthermore, the general lack of teaching aids for specific topics that could bring out the practicality, relevance and utility of Mathematics to the learners was also highlighted. Teacher 6 stated that *“the unavailability of relevant teaching aids makes teaching and learning difficult”*. Teacher 9 remarked that *“there are not enough [ready-made] teaching aids available for Mathematics. We cannot improvise graph boards, compasses and computers”*. All participants pointed out that sometimes a topic requires specialized instruments. For example, geometrical construction needs pairs of compasses and dividers, set squares and rulers. However, in the absence of such instruments learners will not fully grasp the essence of the concept. This concern was underscored by Teacher 2 who explained that *“when I am teaching circumference and diameter of a circle and I draw sketches with freehand because the school doesn't have compasses, what I am teaching won't be accurate”*.

Teacher 4 stated that *“lack of creativity and initiative”* on the part of the teachers resulted in the underutilization of the few resources that were available. Developing own teaching-learning aids was considered, but regarded as time consuming and counter-productive as the teacher needed to inevitably use his/her own financial resources in the process. Teacher 4 further remarked that *“there is a lack of teaching*

aids in government schools, but making teaching aids is costly and as teachers we are sometimes not willing to make teaching aids with our own money”.

The classroom environment

All participants felt that overcrowded classrooms affected their ability to contextualise Mathematics content meaningfully. Teacher 6 stated that *“classrooms are overcrowded and too noisy and demonstrations do not equally benefit all learners”*. Teacher 9 remarked that *“overcrowded classrooms do not allow teachers to use everyday contexts or learner-centred teaching because the classes are too noisy and learners don’t concentrate”*. Two more issues concerning the classroom environment were: *“disciplinary problems and overcrowded classrooms do not allow one to have a learner-centred teaching approach in teaching Mathematics”* (Teacher 5) and *“some classrooms lack desks and chairs and learners stand or sit on the floor an entire period therefore they are not be able to concentrate on Mathematics”* (Teacher 8). Although overcrowded classrooms was a feature at all three schools (Schools A, B and C) visited, the lack of classroom furniture for learners was very acute at School B only.

4.10 Teachers’ views on the enhancement of the use of everyday contexts in junior secondary school Mathematics instruction

This question was aimed at eliciting teachers’ opinions on addressing challenges that they identified in terms of contextual teaching of Mathematics. The following two sub-questions were used to explore those challenges.

1. What can BETD junior secondary school Mathematics teachers do to contextualise the content they teach more effectively?
2. What should be done to encourage junior secondary school Mathematics teachers to use everyday contexts in their teaching?

The first question was asked in the interviews and the second one was part of the open-ended questionnaire. Information collected in terms of each question is given below.

What BETD junior secondary school Mathematics teachers can do to contextualize the content they teach more effectively

Teacher 2 suggested that teachers should ensure that they understood the learner-centred education in general and the use of everyday contexts in particular in order to integrate learners' experiences in their teaching. This could supposedly be achieved by *"having a general discussion lesson about a topic, before a new topic is started in order to find out what the learners already know"* concerning the topic according to Teacher 2. Teacher 1 suggested that teachers should start designing their own questions and not rely on textbooks and old question papers only and that they should be involved in the writing of Mathematics textbooks that used Namibian contexts. Teacher 1 explained that view thus:

"I think also that teachers must start writing Mathematics textbooks. That's one action that we can take. Teachers must start writing Mathematics textbooks that are based on the Namibian context. This is something that we are not doing. And teachers must also start designing their own questions. Not just copying from text books or old question papers. And I think there should be maybe a workshop or kind of a refresher course where teachers are taught how to design a problem in Mathematics."

This opinion was amplified by Teacher 7 who said *“the textbooks are not written according to everyday contexts. The math syllabus does not also consistently integrate the use of everyday contexts. Therefore, as teachers we should be involved in the writing of textbooks”*.

The formation of peer teaching groups with neighbouring schools to assist one another and to share best practices concerning the use of everyday contexts was also mentioned. Teacher 4 explained as follows:

“Forming peer teaching groups with neighbouring schools to assist each other will help but I don’t know who will organize it: circuit or regional office. Teachers should come together at least once a term and discuss content that is giving them tough time in their teaching. There should be constant communication between schools. There is no proper platform to assist teachers. Mathematics workshops should be organized so that teachers can share ideas. In the classroom teachers need to emphasise the learner-centred approach.”

Teacher 3 felt that the cluster system did not assist teachers sufficiently. He suggested that *“teachers should be enabled to rotate or go to other schools and interchange experiences at cluster level because right now, the cluster system is useless”*. Teacher 6 mentioned that *“the formation of Mathematics Clubs in clusters, where teachers can share experiences and discuss the use of everyday contexts will help us a lot”*.

Despite the fact that the aspect dealt with possible ways of improving classroom practice concerning the use of everyday contexts, most of the responses did not address the issues raised by the questions at all even though the researcher rephrased the questions several times to clarify it. Six responses highlighted a need for Mathematics

workshops where teachers could share ideas and get assistance in terms of the use of everyday contexts. The need for continuous professional development activities focusing on general refresher courses and “*new techniques like using everyday contexts*”, as Teacher 6 put it, were stated. The establishment of Mathematics and Science Clubs which the teachers could join in order to share ideas amongst members on teaching approaches and best practices was a common suggestion. Another idea that was viewed as a basis for successful contextual teaching was suggested by Teacher 4 who stated, “*we need Mathematics laboratories similarly equipped as science labs, for the teaching of topics like conversion of units of measure with standard concrete materials rather than improvised stuff that may not be accurate.*”

The researcher noted with concern that even though all participants stated that they had some pre-service exposure to the use of everyday contexts five participants (Teachers 5, 6, 7, 8 and 9) felt that a training intervention was needed for the teachers on how to use everyday contexts.

What should be done to encourage junior secondary school Mathematics teachers use everyday contexts in their teaching

The opinions expressed by the respondents under this question highlighted the training needs of the teachers; involvement of the advisory services to improve quality classroom practices; teacher involvement in the development of teaching and learning materials and teacher involvement in the Mathematics Clubs.

Training needs of the teachers

The opinions below pointed out the teachers' expressed need for training to enable them to use everyday contexts in their teaching.

Teacher 5: *"Teachers should be informed about the importance of teaching Mathematics in contexts, and then they will start using it in their lessons."*

Teacher 6: *"Workshops should be organized to guide teachers on new ideas and new teaching methods."*

Teacher 9: *"The Ministry should train teachers on the use of everyday contexts and how to implement it."*

Involvement of the advisory services to improve classroom practices

The need for the involvement of the Advisory Service to ensure quality teaching was expressed by some participants as follows:

Teacher 4: *"Advisory teachers should meet with Mathematics teachers to look at challenges and to help us to solve problems".*

Teacher 6: *"Subject advisors should train teachers on how to use everyday contexts. Some teachers were not taught how to use everyday contexts at the College. How can they use something they don't know?"*

The participants felt that the Advisory Service has a great role to play in helping them to improve the quality of their teaching. However, they felt that the Advisory Service did not afford them the necessary assistance they needed. Teacher 6 stated *"I am at this school for three years, but I have never seen the Subject Advisor of Mathematics here, maybe he goes to other schools"*. The same sentiment was echoed by Teacher 9 who

stated *“I don’t even know who the subject advisor of Mathematics is or where to contact him or her with my problems”*.

Teacher involvement in the development of teaching and learning materials

Three participants (Teachers 1, 2 and 7) felt that if they were involved in the writing of textbooks and the development of teaching and learning materials they would be able to use everyday contexts more effectively in their teaching. The opinions expressed in this regard are given below:

Teacher 1: *“More teachers should be responsible for the writing of Mathematics textbooks for the different grades so that textbooks should be upgraded to have more examples of everyday contexts.”*

Teacher 2: *“Teachers should be part of the people at NIED who develop study guides and other teaching aids.”*

Teacher 7: *“Teachers should be encouraged to write textbooks and to design their own questions which make use of learners’ everyday contexts.”*

Teacher involvement in Mathematics Clubs

Organizing *“Mathematics Clubs that teachers can join to share ideas”* was expressed by Teacher 3. He further explained that *“teachers can learn from one another how to use everyday contexts in their Mathematics lessons”*. That suggestion encouraged the creation of a platform where teachers could share best practices and collaborated to address common problems.

4.11 Discussion of the factors the BETD Mathematics teachers regard as affecting the contextualization of content in their Mathematics lessons

The learners' perception that Mathematics is a difficult subject and that the use of innovative teaching methods like everyday contexts did little to change that perception was pointed out. The teachers' view that learners did not always understand the contexts used to explain the content with, could be analysed from two perspectives. First, the teachers might not be able to implement or integrate everyday contexts in their lessons effectively in view of Mayer's (1998) argument that in contextual teaching and learning, learning is attached to the context in which the knowledge is constructed, and knowledge is intertwined with the context and the activities within which it develops. The superficial integration of everyday contexts, which were only used in the introduction, except in one lesson, attested to that view and that situation could have limited the clarity of the connectedness between contexts and classroom activities.

Teachers expressed the concern that if learners were not familiar with the context used by the teacher, no learning took place and the learners ended up confused as a result of use of that everyday context. This view is supported by Boaler (1993) and Ng and Nguyen (2006) who argued that learners are sometimes unable to deal with contextualised problems if they are not already familiar with the subject content under consideration. Boaler (1993) further pointed out that in such a situation the context itself became an additional challenge because learners lived experiences did not include it. It is important to note that all contexts used in all lessons observed for this study

were familiar to the learners. Confusion about the contexts only arose from the teachers' explanations and in particular from the teachers taking wrong examples to clarify the concepts taught. Such situations suggested that the teachers' ability to contextualise Mathematics content needed improvement. It also pointed to a possible lack of relevant pedagogical content knowledge in some teachers.

All teachers felt that topics that were too abstract could not be taught contextually. However, data collected in this study suggested that the teachers viewed teaching page-by-page from a textbook as a safer and faster alternative to teaching contextually. That approach was regarded safer, since no contexts which could cause confusion were used and it was regarded as faster, because contextual teaching was seen as time consuming. That finding was consistent with Gainsburg's (2008) opinion that most teachers feared that contextual teaching through ill-structured problems could lead to confusion, impede learning and compromised the learning of Mathematics.

Unavailability of relevant ready-made teaching aids was viewed as a compromising factor for the use of everyday contexts. Developing own teaching aids was seen as counterproductive since teachers had to use their own financial resources to achieve that. Lack of creativity and stagnation in the comfort zone of only following the textbook religiously could have contributed to the limited use of teaching aids and non-use of everyday contexts.

Overcrowded classrooms and associated disciplinary problems were also viewed as factors affecting the use of contextual teaching. Even when the same teachers taught in classrooms with a reasonable teacher-learner ratio and all learners had access to a chair, a desk and textbook, everyday contexts were not used by the same teachers. Therefore, it's safe to conjecture that the attitudinal orientations of the teachers played a major role in whether or not to use everyday contexts in their teaching.

Teachers 1, 2, 7 and 9 also suggested that the use of everyday contexts might improve if in-service training and teaching aids were provided with a focus on contextual teaching of Mathematics. This implied that the initial teacher training was not sufficient in enabling the teachers to successfully integrate everyday contexts in their lessons.

4.12 SUMMARY

Teachers' definitions of everyday contexts were consistent with those found in literature. Their definitions of everyday contexts were mostly informed by the learner-centred education philosophy (Hayes, 1993; Granello 2000).

The taxonomy proposed by Mayoh and Knutton (1997) was used to identify types of everyday contexts used in the lessons observed. Not all types of everyday contexts in that taxonomy were used in the lessons observed. All everyday contexts used by the teachers were familiar to the learners and the learners did not experience any difficulty in relating to the contexts. Consistent with findings of earlier studies, everyday contexts were only applied superficially when used (Mutemeri and Mugweni, 2005; Lampen,

2011) and they were mostly employed in the introduction phase of the lessons only (Mutemeri and Mugweni, 2005) as aids to sense-making (Lampen, 2011). The ineffective use of everyday contexts observed might suggest that some teachers lacked the relevant pedagogical content knowledge. In line with the views of Chapman (2006) and Gainsburg (2008), the acquisition of procedural mathematical skills enjoyed preference over social aspects of everyday contexts used.

Consistent with Gainsburg's (2008) view that the use of everyday contexts was infrequent in Mathematics classrooms, only four out of nine participants used everyday contexts in the Mathematics lessons observed. Everyday contexts were used in only 14 lessons out of a total of 45 lessons observations. Teachers regarded the type of topic, the pre-knowledge and interests of the learners, capturing the learners' interest and making Mathematics content easier and the relevance of the available teaching aids to the content as factors that determined if and how they used everyday contexts.

The limited use of everyday contexts could be ascribed to several reasons. Teachers did not plan lessons at all, hence there were no conscious efforts made in planning to use everyday contexts in Mathematics lessons. Overemphasis on the teaching of procedural mathematical skills left little room for the use of everyday contexts. Teachers regarded contextual teaching as time-consuming. Initial teacher training might not have sufficiently enabled teachers to use everyday contexts in Mathematics instruction.

Teachers identified several factors that were impeding their use of everyday contexts in Mathematics lessons. Learners' perception of Mathematics as a difficult subject, unfamiliarity of some contexts to the learners, overcrowded classrooms and unavailability of relevant ready-made teaching aids were identified as some of the main reasons why teachers did not use everyday contexts in their Mathematics lessons. English, as the language of instruction was also regarded as having a limiting influence on the use of everyday contexts, since most learners were not satisfactorily conversant with English and were unable to understand some contexts.

The need for in-service training and more collaboration amongst teachers in the same school clusters to share best practices were expressed in order to improve the use of everyday contexts in Mathematics instruction. The need for in-service training might be indicative of the fact that initial teacher training did not sufficiently equip the teachers to use everyday contexts in their Mathematics lessons. Alternatively, the need for in-service training might point to a need for refresher courses to regularly update the teachers with skills concerning teaching approaches like the use of everyday contexts.

The next chapter presents a summary of the results, conclusion and the recommendations, emanating from the findings of this study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents a summary of the results, conclusion and the recommendations, emanating from the findings of this study.

5.1 SUMMARY

This study investigated the BETD teachers' ability to use everyday contexts in the teaching of Mathematics at junior secondary school in Windhoek, Namibia.

The study sought to answer the following research questions:

- How do BETD Mathematics teachers understand and define everyday contexts?
- What types of everyday contexts are used by BETD Mathematics teachers?
- How often do BETD Mathematics teachers present content in contexts that the learners already know?
- What factors do BETD Mathematics teachers regard as affecting the use of everyday contexts in their Mathematics lessons?

The sample for this study comprised nine junior secondary school BETD teachers of Mathematics from three purposively selected schools in Windhoek. Classroom observations, open-ended interviews and open-ended questionnaires were used to

collect data. Methodological triangulation of the data was achieved through the use of the three methods of data collection referred to earlier. Triangulation enabled the researcher to cross-check the data from multiple sources to search for regularities and dissonance in the data. Data were analysed using analytic induction.

The main findings of this study were:

All BETD teachers had a working understanding of the concept of everyday contexts. The BETD teachers had a satisfactory understanding of the use of everyday contexts expressed in terms of definitions and/or explanations. Their definitions of everyday contexts were relatively consistent with those found in the literature on contextual teaching and learning and are informed by the learner-centred education philosophy.

The BETD teachers had an exaggerated view of their use of everyday contexts. Although their actual use of contextual teaching was very limited, five teachers felt that their use of contextual teaching was much higher (See Figures 1 and 2) than the observed frequency. Despite being able to meaningfully define contextual teaching, the teachers might not be able to translate that understanding into meaningful classroom practice that integrates everyday contexts. Alternatively, the BETD teachers might have regarded the contexts in teaching-learning materials, like textbooks and past years' question papers, as teacher-initiated contexts and credited themselves with the use of contexts in those materials in this study.

The BETD teachers did not plan lessons which included everyday contexts. The wide-ranging practice of not planning lessons limited the opportunities the BETD teachers could use to teach Mathematics effectively in general and to teach Mathematics contextually in particular.

Everyday contexts were mainly used in the introduction and context use was much more limited than previously thought. This finding is two-fold since it can be viewed from the limited use of everyday contexts in lessons when it was applied and limited use of everyday contexts in comparison to findings from earlier studies. First, the BETD teachers used everyday contexts predominantly in the introduction phase of their lessons and exclusively as an aid to sense-making in terms of meanings of (new) topics/concepts that were taught. Second, only 31% of all lessons observed used everyday contexts. That translated into 0.3 episodes of everyday contexts per lesson which was much lower than the average of 1.8 episodes per lesson reported by Makari (2007).

Preference of procedural mathematical skills over conceptual understanding impeded the effective integration of contextual teaching. The BETD teachers overemphasized the acquisition of procedural skills practiced through the application of well-defined algorithms in problem-solving. Conceptual understanding of topics that were studied was not prioritised. Hence, if the students could solve problems using those algorithms, they were regarded as having mastered the content. Contextual teaching was hardly used in the process of actual knowledge construction. This might

suggest a possible lack of relevant pedagogical content knowledge in terms of contextual teaching and learning on the teachers' part.

There was a lack of instructional materials which incorporated everyday contexts.

There was a lack of ready-made instructional materials which could aid teachers to teach Mathematics concepts in and from everyday context at all schools in the study. For example, the lack of geoboards in the teaching of transformation geometry and the lack of protractors, compasses, set squares and rulers in the teaching of geometrical constructions limited the teachers' options of demonstrating the everyday applications of such concepts.

The BETD teachers viewed the use of everyday contexts as time consuming. The BETD teachers regarded contextual teaching as time consuming in terms of both lesson planning and lesson presentation. Therefore, even though teachers were aware of the advantages of contextual teaching, they neglected its implementation in their practice.

5.2 CONCLUSION

The present study investigated the BETD teachers' ability to use everyday contexts in the teaching of Mathematics at junior secondary school in Windhoek, Namibia. The study found that even though the teachers had a clear understanding of the essence of contextual teaching of Mathematics and its advantages, most of them did not implement it in their lessons. Furthermore, those teachers who used everyday contexts in their teaching only implemented them superficially.

Most of the findings of this study are consistent with findings of earlier studies on the use of everyday contexts (Shulman, 2004; Kasanda et al., 2005; Makari, 2007; Ng and Nguyen, 2006; Gainsburg, 2008). However, what is unique to this study is the finding that teachers did not plan lessons at all, and that some teachers regarded themselves as using everyday contexts in their teaching while they actually were not.

Finally, this study was limited to three schools in Windhoek. Therefore, the findings should not be generalized to other schools and should be treated with caution in that regard. However, the findings might be indicative of the current situation in Namibian junior secondary schools concerning contextual teaching of Mathematics.

5.3 RECOMMENDATIONS

In view of the findings reported in this study, the following recommendations are made. These recommendations are directed at Mathematics teachers, teacher educators, the Ministry of Education and other stakeholders of Mathematics education in Namibia.

Mathematics teachers

1. In order to ensure consistency and accuracy in the teaching of Mathematics concepts, Mathematics teachers should ensure that their teaching is guided by clear and extensive lesson plans integrating everyday contexts. Therefore, teachers must always plan lessons.

2. Mathematics teachers should strive to promote conceptual understanding of Mathematics in their teaching and should not only focus on procedural skills. When revision of Mathematics concepts is done, it should be accompanied by relevant teaching of concepts integrating real-life connections instead of working through past years' external examination question papers or textbook exercises only.
3. Mathematics teachers should ensure the integration of everyday contexts throughout their lessons and not restrict their application to the introduction phase of the lessons only. In fact, everyday contexts when used should play a crucial role in the process of knowledge construction to enable learners to appreciate the real-life applications of the Mathematics concepts.
4. Mathematics teachers should make a conscious effort to invest time in the planning and presentation of lessons that integrate everyday contexts. The advantages of using everyday contexts as a learner-centred teaching strategy justify the additional investment in time.

Teacher educators

5. There is a need to focus on the use of everyday contexts in pre-service teacher training. Mathematics teacher educators should implement explicit and meaningful integration of Mathematics teaching using everyday contexts in the initial teacher training programmes. Such training might enable teachers to

appreciate the importance of contextual teaching and to implement it in their teaching successfully.

6. Mathematics teacher training programmes should integrate contextual teaching and learning as an essential strategy of learner-centred teaching from a constructivist perspective to fully motivate and enable teachers to use everyday contexts in their teaching.

Ministry of Education

7. The Ministry of Education should provide targeted continuous professional development interventions to train teachers on the use of everyday contexts. Such activities should be aimed at enabling teachers to integrate contextual teaching and learning in their lessons more successfully.
8. The Ministry of Education should provide necessary curriculum materials such as teaching aids to enable teachers to integrate everyday contexts more effectively in their lessons.

Advisory teachers

9. Advisory Teachers of Mathematics should be more involved in guiding the teachers who might experience problems in teaching some Mathematics topics or using some teaching strategies like the contextual teaching and learning approach.

Further research

10. Further research is needed to find more practical ways to enhance the use of contextual teaching and learning in Namibian junior secondary school Mathematics.

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APPENDIX A

Observation Schedule

OBSERVATION SCHEDULE

Name of school: _____

Number of Teacher: _____

Topic: _____

Date: _____

Time: _____

Grade: _____

Number of learners: _____

<p>Note teacher's use of everyday contexts in explaining content.</p> <p>Introduction:</p> <p>Presentation:</p> <p>Conclusion:</p>	
<p>Note teacher's use of everyday contexts in classwork and homework exercises</p>	

Note teacher's use of everyday contexts in clarifications resulting from learners' questions.	
Note use of everyday contexts in teaching and learning materials used.	

APPENDIX B

Interview Guide INTERVIEW GUIDE

Interview number ____

1. Name of school: _____
2. At which grade levels do you teach Mathematics? _____
3. How many years teaching experience of junior secondary school Mathematics do you have? _____
4. What do you understand by using everyday contexts in Mathematics teaching?
5. Were you exposed to the use of everyday contexts in your pre-service training?
Yes No
6. Do you think it is necessary to use everyday contexts in your Mathematics lessons?
Yes No
Give reasons for your answer.

7. What are the advantages of using everyday contexts in your Mathematics lessons?

8. What are the disadvantages of using everyday contexts in your Mathematics lessons?

9. Explain why it is difficult for teachers to use everyday contexts in the teaching of Mathematics in Namibian schools.

10. What can junior secondary school Mathematics teachers do to contextualize the content they teach more effectively?

Thank you for taking time to participate in this interview.

APPENDIX C

Questionnaire

QUESTIONNAIRE for:

Grade 8-10 BETD Mathematics teachers' use of everyday contexts.

Please answer the following questions honestly and truthfully. Should you need extra space to answer any question, use the additional page attached to this questionnaire.

1. Tick the appropriate box for your gender.

Female Male

2. How often do you use everyday contexts in your Mathematics lessons? Tick your answer.

Never Seldom Frequently Always

3. How do you use everyday contexts in your Mathematics lessons?

4. How does the use of everyday contexts enable your learners to understand the content in your Mathematics lessons?

5. Do you make provision for the use of everyday contexts in your lesson planning?

Yes

No

Give reasons for your answer.

6. What are the factors that determine the use of everyday contexts in your Mathematics lessons?

7. What challenges do you face in the use of everyday contexts in your Mathematics lessons with respect to:

7.1 The learners?

7.2 The nature of Mathematics?

7.3 Teaching-learning aids?

7.4 Classroom environment?

8. What should be done to encourage junior secondary school Mathematics teachers to use everyday contexts in their teaching?

Thank you for taking time to complete this questionnaire.

APPENDIX D

Letter to the Permanent Secretary

P O Box 64076
Windhoek
Namibia

12 July 2010

The Permanent Secretary
Ministry of Education
Private Bag 13186
Windhoek
Namibia

Dear Mr. Ilukena

Subject: Request for permission to carry out my M.Ed. study in schools in Windhoek

I am a Master of Education student at the University of Namibia. As a partial fulfillment for my M. Ed. studies, I am required to complete a thesis in Mathematics Education. The above-mentioned study bears the title: “An investigation of BETD teachers’ ability to use everyday contexts in the teaching of Mathematics at junior secondary schools in Windhoek.”

This study is a reaction to existing concerns about the BETD Mathematics teachers’ ability to teach Mathematics effectively and meaningfully. Consequently, this study intends to look at: types of everyday contexts BETD teachers use in their teaching of Mathematics; how often they present content in contexts that the learners already know and factors affecting contextualization of content in their Mathematics lessons.

This study might lead to our understanding of the existing conditions under which the BETD teachers contextualise Mathematics content. The findings might help teacher educators to effectively train pre-service teachers on contextualization of Mathematics content. The BETD teachers might benefit from this study, because the findings might be used to inform their practice to enable them to contextualise Mathematics content more meaningfully in their teaching to enhance learners’ grasp of the subject content. National Institute for Educational Development (NIED) might also use the findings to inform their continuous professional development programmes for Mathematics teachers to enhance the teachers’ ability to contextualize the Mathematics content they teach more effectively.

Three types of instruments will be used to collect data in this study. They are: observation schedules, interviews and questionnaires. All data collected will be treated as confidential and the information will only be used for the purposes of this study.

The planned visit to the schools will take place from 21 July 2010 to 25 August 2010. I trust that you will give this request a favourable consideration at your earliest convenience.

Thanking you in anticipation,

Yours sincerely,

Naweseb, F. T. (081 274 0039)

Appendix E

Letter to the Director

P O Box 64076
Windhoek
Namibia

9 August 2010

The Director
Khomas Educational Region
Ministry of Education
Private Bag 13186
Windhoek
Namibia

Dear Mr. Udjombala

Subject: Request for permission to carry out my M.Ed. study in schools in Windhoek

I am a Master of Education student at the University of Namibia. As a partial fulfillment for my M. Ed. studies, I am required to complete a thesis in Mathematics Education. The above-mentioned study bears the title: “An investigation of BETD teachers’ ability to use everyday contexts in the teaching of Mathematics at junior secondary schools in Windhoek.”

This study is a reaction to existing concerns about the BETD Mathematics teachers’ ability to teach Mathematics effectively and meaningfully. Consequently, this study intends to look at: types of everyday contexts BETD teachers use in their teaching of Mathematics; how often they present content in contexts that the learners already know and factors affecting contextualization of content in their Mathematics lessons.

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Three types of instruments will be used to collect data in this study. They are: observation schedules, interviews and questionnaires. All data collected will be treated as confidential and the information will only be used for the purposes of this study.

Based on the availability of BETD graduates teaching Mathematics in grades 8 to 10, the following schools were identified for inclusion in the study [redacted] [redacted] gh School.

The planned visit to the schools will take place from 7 September 2010 to 8 October 2010. I trust that you will give this request a favourable consideration at your earliest convenience.

Thanking you in anticipation,

Yours sincerely,

Naweseb, F. T. (081 274 0039)

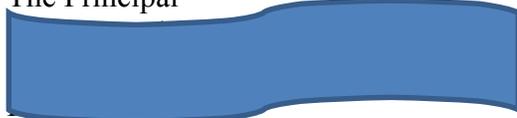
APPENDIX F

Letter to the Principals

P O Box 64076
Windhoek
Namibia

23 August 2010

The Principal



Windhoek

Dear Mr.



Subject: Request for permission to carry out my M.Ed. study in your school

I am a Master of Education student at the University of Namibia. As a partial fulfillment for my M. Ed. studies, I am required to complete a thesis in Mathematics Education. The above-mentioned study bears the title: “An investigation of BETD teachers’ ability to use everyday contexts in the teaching of Mathematics at junior secondary schools in Windhoek.”

This study is a reaction to existing concerns about the BETD Mathematics teachers’ ability to teach Mathematics effectively and meaningfully. Consequently, this study intends to look at: types of everyday contexts BETD teachers use in their teaching of Mathematics; how often they present content in contexts that the learners already know and factors affecting contextualization of content in their Mathematics lessons.

This study might lead to our understanding of the existing conditions under which the BETD teachers contextualise Mathematics content. The findings might help teacher educators to effectively train pre-service teachers on contextualization of Mathematics content. The BETD teachers might benefit from this study, because the findings might be used to inform their practice to enable them to contextualise Mathematics content more meaningfully in their teaching to enhance learners’ grasp of the subject content. National Institute for Educational Development (NIED) might also use the findings to inform their continuous professional development programmes for Mathematics teachers to enhance the teachers’ ability to contextualize the Mathematics content they teach more effectively.

Three types of instruments will be used to collect data in this study. They are: observation schedules, interviews and questionnaires. All data collected will be treated as confidential and the information will only be used for the purposes of this study. Your school has been selected for inclusion in this study based on the availability of at least three BETD graduates teaching Mathematics in grades 8 to 10 in the 2010 academic year.

The planned visits to the school will take place from 7 September 2010 to 8 October 2010. A maximum of five classroom observations will be conducted per teacher in the entire period stated above. I trust that you will give this request a favourable consideration at your earliest convenience.

Thanking you in anticipation,

Yours sincerely,

Naweseb, F. T. (081 274 0039)



REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION

Tel: 264 61 2933200

Fax: 264 61 2933922

E-mail: mshimho@mec.gov.na

Enquiries: MN Shimhopileni

Private Bag 13186

Windhoek

NAMIBIA

19 July 2010

File: 11/2/1

Mr F. T. Naweseb
P. O. Box 64076
WINDHOEK

Dear Mr Naweseb

RE: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH AT SOME SCHOOLS IN KHOMAS REGION

Your letter dated 12 July 2010 requesting permission to conduct a research at some Junior Secondary schools in Khomas Education Region.

Kindly be informed that the Ministry does not have an objection to your request to carry out a research at some schools in Khomas Region.

However, you are advised to approach the Regional Education Office for permission to carry out your study in schools. It is advisable to have schools you intend to visit identified already before you approach the Regional Office for permission. This will assist with proper communication and coordination for the necessary arrangements at the selected schools.

Kindly take also note that your research activities should not interfere with the normal school programmes.

By copy of this letter the regional director is made aware of your request.

Yours faithfully

A Ilukena

PERMANENT SECRETARY

cc: Regional Director: Khomas Education Region





REPUBLIC OF NAMIBIA

**KHOMAS REGIONAL COUNCIL
DIRECTORATE OF EDUCATION**

Private Bag 13236, Windhoek, Tel. 264 61 2934329/231948, Fax. 264 61 248251

Enq: Josia S Udjombala
E-mail: tatemadala@yahoo.com
Ref: SP

Mr F T Naweseb
P O Box 64076
Windhoek

July 21, 2010

Dear Mr Naweseb

**RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT SOME SCHOOLS
IN THE KHOMAS REGION**

I write to refer to your letter to Permanent Secretary of the Ministry of Education regarding the above subject matter, and wish to advise as follows, that:

Permission to conduct research at some schools of your choice in the Khomas Region is hereby granted on the following conditions: (1) normal school programmes are no way to be disrupted, (2) participation by subjects in the research process is voluntary, (3) prior arrangements have to made with school principals well advance before the actual date of your visit to the schools and (4) a copy of your study report is to be deposited with our regional office.

I wish you success in your studies.

Thank you


.....
JOSIA S UDJOMBALA
DIRECTOR: EDUCATION
KHOMAS REGION

