Classroom Assessment in Malawi: Teachers' Perceptions and Practices in Mathematics

by

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ABSTRACT

This study investigated teachers' perceptions of classroom assessment in mathematics and their current classroom assessments practices. Specifically, the study sought to gain an understanding of the extent to which teachers use different classroom assessment methods and tools to understand and to support both the learning and teaching processes. The following three questions guided the study: 1) How do primary school teachers perceive classroom assessment in mathematics? 2) What kinds of assessment methods and tools do teachers use to assess their students in mathematics? 3) What is the influence of teachers' perceptions of classroom assessment on their classroom assessment practices? The study used a questionnaire to establish the teachers' perceptions of classroom assessment in mathematics, a lesson observation protocol, and pre-lesson and post-lesson observation interview protocols as main sources of data collection. The data collected through observations and interviews helped to map out patterns between perceptions of classroom assessment and the teachers' classroom assessment practices. Document analysis was used to triangulate the information collected through observations and interviews. In addition, document analysis provided first hand

information on the kind of written feedback students get and the nature of activities they do. A total of six teachers (three male and three female) were drawn from two primary schools in Malawi.

The data suggest that teachers perceive classroom assessment as tests that teachers give to their students at specified time intervals. What teachers said about their teaching was not reflected during their teaching. Since teachers perceived classroom assessment as tests, they showed limited ability to use different methods and tools to assess their students while teaching.

The teachers' perceptions of classroom assessment have influence on their classroom assessment practices. Five of the six teachers perceived assessment as testing, and classroom assessment practices were not clearly embedded in their teaching.

Teacher experience and teacher education program did not seem to contribute much to teachers' perceptions of classroom assessment; however, teacher's academic qualification seemed to influence teachers' flexibility to accept new ideas.

DEDICATION

To my loving parents, brothers, sisters, wife and sons with deepest gratitude and veneration.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Recent years have seen increased research on classroom assessment as an essential aspect of effective teaching and learning (Bryant and Driscoll, 1998; McMillan, Myran and Workman, 2002; Stiggins, 2002). It is becoming more and more evident that classroom assessment is an integral component of the teaching and learning process (Gipps, 1990; Black and Wiliam, 1998). The National Council of Teachers of Mathematics [NCTM](2000) regard assessment as a tool for learning mathematics. The NCTM contends that effective mathematics teaching requires understanding what students know and need to know. According to Roberts, Gerace, Mestra and Leanard (2000) assessment informs the teacher about what students think and about how they think. Classroom assessment helps teachers to establish what students already know and what they need to learn. Ampiah, Hart, Nkhata and Nyirenda (2003) contend that a teacher needs to know what children are able to do or not if he/she is to plan effectively.

Research has revealed that most students perceive mathematics as a difficult subject, which has no meaning in real life (Countryman, 1992; Sobel & Maletsky, 1999; Van de Walle, 2001). This perception begins to develop at the elementary school where students find the subject very abstract and heavily relying on algorithm, which the students fail to understand. This trend continues up to middle, high school and college. By the time students get to high school they have lost interest in mathematics and they cannot explain some of the operations (Countryman, 1992). According to Countryman (1992), the rules and

procedures for school mathematics make little or no sense to many students. They memorize examples, they follow instructions, they do their homework, and they take tests, but they cannot say what their answers mean.

Most research studies in both education and cognitive psychology have reported weaknesses in the way mathematics is taught. The most serious weakness is the psychological assumption about how mathematics is learned, which is based on the “stimulus-response” theory (Althouse, 1994; Cathcart, Pothier, Vance & Bezuk, 2001; Sheffield & Cruikshank, 2000). The “stimulus-response” theory states that learning occurs when a “bond” is established between some stimulus and a person’s response to it (Cathcart, Pothier, Vance & Bezuk, 2001). Cathcart et al.(2001) went further to say that, in the above scenario, drill becomes a major component in the instructional process because the more often a correct response is made to stimulus, the more established the bond becomes. Under this theory children are given lengthy and often complex problems, particularly computations with the belief that the exercises will strengthen the mind. Schools and teachers need to realize that great philosophers, psychologists, scientists, mathematicians and many others created knowledge through investigation and experimentation (Baroody & Coslick, 1998; Phillips, 2000). They understood cause and effect through curiosity and investigation. They were free to study nature and phenomenon, as they existed. Today, learning mathematics seems to suggest repeating operations that were already done by other people and examinations that seek to fulfill the same pattern (Brooks & Brooks, 1999).

The constructivist view is different from the positivist view and, therefore, calls for different

teaching approaches (Baroody & Coslick, 1998; Cathcart, et al., 2001; von Glasersfeld, 1995). The constructivist view takes the position that children construct their own understanding of mathematical ideas by means of mental activities or through interaction with the physical world (Cathcart, et al., 2001). The assertion that children should construct their own mathematical knowledge is not to suggest that mathematics teachers should sit back and wait for this to happen. Rather, teachers must create the learning environment for students and then actively monitor the students through various classroom assessment methods as they engage in an investigation. The other role of the teacher should be to provide the students with experiences that will enable them to establish links and relationships. Teachers can only do this if they are able to monitor the learning process and are able to know what sort of support the learners need at a particular point.

The main hypothesis of constructivism is that knowledge is not passively received from an outside source but is actively constructed by the individual learner (Brooks and Brooks, 1999; von Glasersfeld, 1995). Within this hypothesis lies the crucial role of the teacher. Today many psychologists and educators believe that children construct their own knowledge as they interact with their environment (Brooks and Brooks, 1999; Cathcart, et al., 2001; Hatfield, Edwards, Bitter & Morrow, 2000; von Glasersfeld, 1995). Unfortunately, classrooms do not seem to reflect this thinking. Some teachers still continue to teach in the way perhaps they themselves were taught because human beings naturally look back and claim that the past offered the best. If children construct knowledge rather than passively receive it, they must be offered the

opportunities to act on their environment, physically and mentally, to use methods of learning that are meaningful to them, and to become aware of and solve their own problems (Althouse, 1994). Althouse is in agreement with Baroody and Coslick (1998) who suggest that teaching mathematics is essentially a process of translating mathematics into a form children can comprehend. Teaching mathematics is providing experiences that will enable children to discover relationships and construct meaning. Students should be assisted to see the importance of mathematics not by rote learning but by investigating and relating to real-life situations. Giving students dozens and dozens of problems to solve does not help them to understand mathematics, if anything it frustrates them even more. The more they do things they cannot understand or explain, the more they get frustrated.

Background of the Problem

The world today recognizes the importance of achieving high levels of literacy and numeracy. Studies have shown that societies with high levels of literacy and numeracy have lower levels of poverty (Policy Investment Framework [PIF], 2000). It has been generally accepted that good education leads to economic growth hence reduced poverty and improved health (Ministry of Education [MOE], 1998).

The 1999 Monitoring Learning Achievements [MLA](MOE, 1999) survey conducted in eleven selected African countries including Malawi revealed that the level of numeracy in the eleven countries was very low. None of the eleven countries met the numeracy target set at the world conference in Jomtien, Thailand, in 1990(MOE, 1999). At the world conference it was agreed that 80% of a cohort should attain

or surpass a defined mastery level of learning achievement. For the 1999 MLA survey the desired mastery level was set at 73% performance score. All countries that participated in the study failed to achieve the target in numeracy. The countries did not just fail to achieve the numeracy target but were far from the target. Furthermore, students' performance scores in numeracy were lower than their scores in life skills and literacy. The mean score for Malawi in numeracy was 43% while in life skills it was 77%, which was above the set target of 73%.

Experience from earlier MLA surveys conducted in some 15 developed and developing countries between 1992 and 1998 revealed the same pattern, namely that students' performance in life skills was much higher than their performance in numeracy and literacy despite socio-economic, cultural and educational differences among the participating countries (MOE, 1999).

The 1999 MLA survey recommended that more attention should be paid to curriculum planning, teacher education and training and textbook development. In addition the survey registered a concern about the role of examinations, which the survey felt was merely a process of failing and passing students without proper diagnosis of their individual capabilities and weaknesses.

Malawi's system of education has been characterized as examination oriented with low internal efficiency (Kadzamira, Nthara and Kholowa, 2004). Progression from one grade to another is determined by examinations administered at the end of the academic year. These examinations do not take into account previous performance of the pupil in that academic year (Milner et al., 2001). Students that have failed to take the final examinations either due to

sickness or otherwise have been made to repeat the year. This shows how much value the system attaches to summative evaluation.

At the end of every term, schools rank the students and either announce their performance publicly in the presence of parents/guardians and all students or send reports to parents and guardians for them to see if their wards are making any progress. Progress means changing ranks, i.e. if a student was number 10 during first term, parents expect him or her to take a number between 1 and 9. The rank (position in class) is arrived at by comparing total marks a pupil scored in all subjects with total marks scored by individual students within the same class. There have been cases where a pupil with a total mark of say 395 would take position 8 in first term and the same student would take position say 4 in second term with but a total of 380 marks or less. A pupil's position is relative to how the rest of the students in class have performed and not necessarily how much progress the pupil has made in individual subject areas.

The primary education system in Malawi has significantly expanded over the past few years, resulting in a shortage of teachers, large classes, and shortage of classrooms and textbooks. It is not unusual to see classes being held under trees and students with no books. Dropout rate is high and it is estimated that one-third of all students drop out between grades 1 and 2, and that only one fifth of children entering primary school will complete within the allotted time (MOE, 2000). A survey conducted by Milner et al. in 2001 revealed that 62.6% of Standard 6 students had repeated at least a grade. Repetition could be understood either as weakness in assessment practices, as a

failure of the schools to effectively teach the students, inadequate teaching and learning resources or factors related to home environment.

Related studies have shown that dropout is high and that students in urban areas are more persistent than those in rural areas (MOE, 1998; Malawi National Statistical Office, 2002). Overall only about 10% of students proceed to secondary education and less than 1% of secondary school students proceed to university education (MOE, 2000).

However, Malawi is striving for quality education by advocating for teaching methods that make a positive impact on learners. The primary curriculum in Malawi is currently under reform with the objective of making it an outcome-based curriculum (MOE, 2004). It is hoped that the outcome-based curriculum will help to improve the internal efficiency of the system, which is currently said to be examination oriented. Through curriculum reform and in-service training courses, Malawi hopes to achieve high levels of literacy and numeracy.

Statement of the Problem

Although Malawi, like most developing countries, strives to improve the quality of education, the performance of students in mathematics both at primary school and secondary school remains poor (Hiddleston, 1996; Ministry of Education [MOE], 1999). In addition, classroom and whole school monitoring and assessment is infrequent and externally carried out (Hughes-d'Aeth, Chimombo, Kaperemera & Thomo, 1996). In the quest of trying to improve the quality and increase the number of teachers, Malawi has moved from one teacher training program to another. Some of the programs that Malawi has used to train

primary school teachers are the two-year conventional teacher training program, the Malawi special teacher education program (MASTEP), and the current Malawi integrated in-service teacher education program (MIITEP). Currently there is no empirical evidence to show whether or not any of the teacher training programs prepared teachers better than the rest. No comprehensive research has been done to find out how the teachers from the different programs perform in the classrooms.

Malawi realizes the need to support teachers. But without understanding what exactly happens in the classroom, all teacher support programs and efforts may not adequately prepare teachers to meet the challenges teachers face in the classroom. There are many facets of education that need to be understood and addressed if teachers are to support students to learn meaningfully, for instance classroom assessment. Malawi education is shifting towards the development of early numeracy and literacy, and this requires teachers who can ably conduct classroom assessment to inform teaching and learning. This study sought to understand the perception of mathematics teachers on classroom assessment and how they conduct classroom assessment.

Purpose of the Study

The way teachers perceive assessment may influence the way they teach and assess their students (Assessment Reform Group, 1999; Fennema and Romberg, 1999). This study was designed to investigate teachers' perceptions of classroom assessment in mathematics and their current classroom assessment practices. Specifically, the study sought to understand the methods and tools teachers use to assess

their students. The researcher studied closely how classroom assessment was being carried out in the classroom by focusing on the strategies and tools the teachers used to assess the learners. In addition, the researcher investigated teacher perceptions of the role of assessment in teaching and learning mathematics.

Research Questions

This study investigated the current classroom assessment practices of primary school mathematics teachers in two selected schools in Malawi. The following questions guided the study:

1. How do primary school teachers perceive classroom assessment?
2. What kinds of assessment methods and tools do mathematics teachers use to assess their students?
3. What is the influence of teachers' perceptions of classroom assessment on their classroom assessment practices?

Significance of the Study

Classroom assessment is one of the tools teachers can use to inform their teaching and the learning of their students. Unfortunately, the purpose of classroom assessment in most schools seems to be confused and, therefore, not supporting learning (Ainscow, 1988; Stiggins, 2002; Swan, 1993). The term assessment in some schools means testing and grading (Stiggins, 2002).

This study investigated teachers' perceptions of classroom assessment and their current practices. The results may assist primary school teachers but also college

instructors, curriculum developers in Malawi and the Education Methods Advisory Services [EMAS]. Schools may use the information to develop assessment guidelines for their respective schools. Jere (2000) recommends the training of classroom teachers in how to assess students and believes that this training would improve and enhance the quality of primary education. The training of teachers on classroom assessment is a good proposal but can only be effective if the designers of the training program know what teachers are already doing and what they are not doing well. Research in this area can inform the design of the training program.

The Malawi Institute of Education, which is responsible for the professional development of in-service teachers, may use the results to develop an in-service course on classroom assessment. The Institute has never offered such a course before to primary school teachers.

The results from this study also add to the existing literature on classroom assessment practices. Research studies on classroom assessment have mainly focused on assessment and grading and not assessment and learning (McMillan, 2001; McMillan, Myran & Workman, 2002; Morgan & Watson, 2002). “The stubborn problems in assessment reform have to do with a pervasive thoughtlessness about testing and failure to understand the relationship between assessment and learning” (Wiggins, 1993; p.3). This study focused on assessment methods that teachers use everyday in the classroom to collect information in order to understand the learning difficulties of the students. It is hoped, therefore, that this study will add a different dimension to literature on classroom assessment.

Limitations of the Study

There are about 5,286 primary schools in Malawi (Malawi Ministry of Education, 2004) and yet only 2 primary schools participated in this study. This study used purposeful sampling in order to include most of the variables of interest (gender, years of experience, type of teacher education program, school location and grade level). Although untrained teachers make about 20% of primary school teachers in Malawi, they were not included in this study.

The sample size, sample frame and sampling method make it difficult to generalize the results to the whole population of teachers and schools in Malawi. However, the results are generalizable to the schools sampled and give an insight of what the picture could be like if more participants and other sampling methods were used.

Assumptions

It was assumed that an equal representation of participants in all the identified categories would be achieved so that there was a fair comparison of the groups by (gender, years of teaching experience, nature of teacher training program, and location of the school and grade level). It was also assumed that behaviors of both the teacher and students did not change because of the researcher’s presence.

Definitions of Terms

Assessment: The process of collecting information purposefully using different methods/strategies and tools for the purposes of informing decision.

Assessment practice: A manner of conducting assessment for instance observation and diagnostic interviews.

Classroom assessment: Any planned method or strategy used in the classroom to establish the level of students' difficulties or understanding of a particular concept or idea with the purpose of helping students to succeed in learning (Ainscow, 1988; Pophan 1999).

Infant: A section of a primary school comprising standards 1 and 2. A full primary school has standards 1 to 8. Recently a preparatory class will be introduced and will be called "P class" and the standards will go up to 7.

JCE: Junior Certificate of Education is awarded to candidates that have completed two years of secondary school education and have passed public examinations at that level.

Junior: A section of a primary school comprising standards 3 and 4. A full primary school has standards 1 to 8. Recently a preparatory class will be introduced and will be called "P class" and the standards will go up to 7.

Lesson plan: Teachers in Malawi are by policy required to prepare for any lesson they have to teach and the plan must be written down. A written plan indicating topic, date, grade level, duration of the lesson, objectives to be achieved, what will be covered (content, mostly examples and activities that pupils will perform), and a section requiring the teacher to evaluate the lesson after he/she has taught the lesson. This written plan is called a lesson plan. Every teacher in Malawi must have a lesson plan in front of him/her to follow as he/she teaches.

MASTEP: The Malawi Special Teacher Education Program was introduced in 1990 to respond to critical shortages of teachers in primary schools in Malawi. This was a three-

year program and ran for only three years. The program had two components, residential and distance learning. MASTEP students went to college when the two-year program students were on holiday.

MIITEP: Malawi Integrated In-service Teacher Education Program. MIITEP is a two-year pre-service teacher education program, combining residential training in primary teacher training colleges with on-the-job training and distance education. The actual training starts with three months of residential training in the colleges, followed by 20 months of self-study and attendance at zonal seminars, and supervision by the head teacher and Primary Education Advisor (PEA). Finally the students go back to college for one month of revision and final examinations administered by the Malawi National examinations Board (MANEB).

MSCE: Malawi School Certificate of Education is awarded to candidates that have completed four years of secondary school education and have passed public examinations at that level.

Perceptions: Views or opinions held by an individual resulting from experience and external factors acting on the individual.

Primary: Early years of schooling beginning from standard (grade) one to standard (grade) 8.

Schemes of work: Malawi Ministry of Education requires teachers to plan work for the whole term or semester or academic year by writing down the topics that will be taught in the order they will be taught and when the topic will be taught. The plan also shows how much time will be spent on each topic and the reference books to be used. A written systematic presentation of the plan is called schemes of work. Every teacher in Malawi must have this

plan and the head teacher or any designated teacher must check it.

Senior: A section of a primary school comprising standards 5 to 8. A full primary school has standards 1 to 8. Recently a preparatory class will be introduced and will be called “P class” and the standards will go up to 7.

Overview of Subsequent Chapters

This study was designed to investigate teachers’ perceptions of classroom assessment and their classroom assessment practices. The study gained an understanding of the extent to which teachers use different classroom assessment methods and tools to understand the learners strengths and weaknesses in learning mathematics.

The introduction chapter has stated the research questions and set them in context. The succeeding chapters present the review of the literature (Chapter two), the methodology of the study (Chapter three), findings of the study (Chapter four) and a discussion of the findings, conclusions and recommendations (Chapter five).

CHAPTER II

LITERATURE REVIEW

This chapter is divided into four main sections. The first section gives an overview on how primary school children learn mathematics and the second section reviews studies that have been conducted on classroom assessment. Section three describes relationships between perceptions and practice while section four is a brief description of primary education in Malawi.

How Children Learn Mathematics

For many years now researchers have investigated children's mathematical ideas and conceptions as well as their development (Althouse 1994; Even and Tirosh, 2002). Most of the results of these studies suggest that learning mathematics is complex, takes time and is often not understood by many teachers (Even & Tirosh). Attempts to develop theories that describe how students learn mathematics continue to evolve. A prominent example is the van Hiele theory, one of the most comprehensive theories formulated concerning geometry learning. Pierre and Dina van Hiele developed the theory almost half a century ago (Even & Tirosh, 2002). The theory states that when students learn geometry they progress from one discrete level of geometrical thinking to another. This theory contributed to the learning of geometry by proof. The van Hiele theory also suggests phases of instruction that help students progress through the levels of geometry.

In addition to Even and Tirosh (2002) some researchers have approached theory building differently from the van Hiele approach. They have attempted to construct theories

to guide the teaching and learning of mathematics in general and not for specific mathematical domains (Even and Tirosh, 2002; Sfard, 1991). Some researchers (e.g., Sfard, 1991) have claimed that operational conceptions are, for most people, the first stage in the acquisition of new mathematical concepts. A related claim is that processes performed on certain abstract objects turn into new objects that serve as inputs to higher level processes (Even & Tirosh, 2002).

Although mathematics educators have taught mathematics based on different learning principles, today most educators believe that knowledge is not and cannot be placed inside learners' heads; rather learners construct their own knowledge by selectively using experiences around them (Althouse, 1994; Cathcart, et al., 2001; von Glasersfeld, 1995).

Grant (1996) views learners not as passive receivers of knowledge, but as active participants who construct knowledge for themselves and filter it through their existing knowledge. This view has implications about how teachers teach and monitor the learning process.

Teachers of young children know that children enter school with some knowledge of mathematics (Baroody and Coslick, 1998). Children come to pre-school or school able to differentiate small quantities from large quantities, short pieces from long pieces and they understand concepts such as "three ness" (Althouse, 1994; Baroody and Coslick, 1998). Althouse contends that children are inquisitive by nature. Whether in school or at home, children like to explore, feel, and smell things (Althouse; Baroody and Coslick, 1998). Cruiksshank and Sheffield (2000) describe primary school students as natural learners. Their

potential and energy for learning mathematics are considerable and they regard mathematics as any other subject (Cruiksshank and Sheffield, 2000).

Some children perform better in a more structured setting while others prefer a less structured environment (Bezuk et al., 2001). There are a number of factors that influence learners' preferred learning styles. The critical point is that teachers need to be aware of the fact that differences in preferred learning styles do exist and they must provide for them by incorporating a variety of approaches and activities into the mathematics class (Bezuk et al., 2001; Butler, 1988). Existing theories about how children learn have been classified in various ways, and they have a significant bearing on how mathematics is taught (Bezuk et al., 2001).

The traditional view of learning, sometimes called the "absorption theory", viewed children as passive learners who store knowledge as a result of memorization (Althouse, 1994; Bezuk et al., 2001). As a result of this theory in mathematics, lengthy or complex computations were used as a major form of exercise. Bezuk et al. state that instruction in mathematics stressed ways to perform these computations accurately. Today theories on learning fall into two camps: the behaviorist and the constructivist.

The behaviorist approach emphasized drill because the theory states that learning occurs when a bond is established between some stimulus and a person's response to it (Bezuk et al., 2001). The argument in this case was that the more often a correct response is made to a stimulus, the more established the bond became. This theory promoted learning without meaning. The teacher in this case is the source of knowledge while the learner is the passive

recipient. Constructivists on the other hand believe that learners construct their own learning; that is, mathematical knowledge emerges (Althouse, 1994; Bezuk et al., 2001; Baroody and Coslick, 1998).

Today most mathematics educators believe that children construct their own knowledge as they interact with their environment (von Glasersfeld, 1995; Baroody and Coslick, 1998; Bezuk et al., 2001). From the constructivist point of view, children construct their own understanding of mathematical ideas by means of mental activities or through interacting with physical models of the ideas (Althouse 1994; Bezuk et al., 2001; NCTM, 2000,).

According to Piagetian theory (Althouse, 1994) mental structures (schemata) change with intellectual development, and they are reconstructed continuously as children progress from one intellectual stage to another (Althouse, 1994; Cruiksshank and Sheffield, 2000). Piaget identified four stages of intellectual development, which to some degree are critical to the teaching of mathematics because they suggest students' readiness to learn (Althouse, 1994; Cruiksshank and Sheffield, 2000). These stages are sensorimotor (0 – 2 years), preoperational thought (2-7 years), concrete operational (7 – 11 years), and formal operations (11-15 years) (Piaget, 1973). Although the ages at which individuals progress through these stages are approximate, every child passes through them in the same order. Piaget believed that meaningful learning takes place if students have the opportunity to construct their own knowledge and emphasized that such conditions must be complied with if in the future individuals have to be productive and creative and not simply repeating what others said or did. Piaget's theories, which can be

considered to fit within constructivism to some degree, guide teachers to interact with children by fully engaging them in investigations and discussions.

Teachers who fail to engage students assume that their job is to put knowledge into children’s heads (Cruiksshank and Sheffield, 2000). They also assume that the proof of this transmission of knowledge is a high score on standardized tests (Cruiksshank and Sheffield, 2000). Kamii (1985) suggests that the focus of teachers should be on children’s thinking rather than on their ability to write correct answers. Bezuk et al. (2001) contend that in a constructivist setting the teacher is responsible for establishing a learning environment that sparks children’s interest in mathematics. This can only be achieved if the teacher is able to provide learners with appropriate materials, activities and support. However, for teachers to be able to provide relevant activities and materials they must understand the learning needs of their students by carrying out a form of assessment. With this approach learning is the responsibility of both the learner and the teacher. In addition, children learn to be autonomous in terms of information search and how they interact with materials.

Brooks and Brooks (1999) contend that our perceptions and knowledge are continuously shaped by social factors. Apart from constructing knowledge individually, people construct knowledge socially. Through interaction with the environment, individuals continue to construct new knowledge. The knowledge and perceptions that individuals possess are as a result of sociological forces including the influence of ideologies, religion, human interests and

group dynamics (Phillips, 2000). The classroom environment, therefore, becomes very critical.

Earlier in this section, it was stated that children are inquisitive by nature, but schools are one of the first places where children are asked to be passive and quiet (Cruiksshank and Sheffield, 2000). They are encouraged to listen, observe, and repeat what the teacher has demonstrated to them. In most schools, students are viewed as a bunch of learners and not individuals. This kind of approach creates learning problems, more especially in mathematics because the individual needs of the learners are never addressed. This behavior is what Patterson (2003) calls “one–box-fits–all”. Patterson illustrates his point with a story:

> Two men were listening to a speaker in a large auditorium filled to capacity. One man begins to experience difficulty in breathing and, in a panicky voice, requests that the individual next to him administer CPR (*cardiopulmonary resuscitation*). The second individual looks around the auditorium and calmly replies, “Sorry. No one else needs it, so you can’t have it either.” Schools continually require students with varying needs fit into a single box. (Patterson, 2003, p.572)

Most people would say the way the other man responded was unusual and put the life of his neighbor in danger. But the same metaphor applies to schools where students of different needs and abilities are always treated the same throughout the year without making any effort to understand their learning difficulties. Teachers do not take time to

understand the learners' needs but instead respond to external pressure positively by aiming at covering the curriculum content at a specified time predetermined by other people who in most cases fail to take into consideration the nature of the students.

Further, studies have shown that the learning styles of boys are generally different from the learning styles of girls. While boys prefer competitive learning, girls prefer cooperative learning (Fox and Soller, 2001). In addition, perceptions of boys toward mathematics are different from those of girls, which seem to be related to perceptions of gender roles and career aspirations (Fox and Soller, 2001).

Assessment Practices

The NCTM (1995) believes that assessment has the potential to enhance mathematics learning and to promote students' interest in mathematics. This is too general a statement considering the fact that in most schools assessment means testing and grading (van de Wallen, 2001).

Beckmann, Senk and Thompson (1997) studied the assessment and grading practices of 19 high school mathematics teachers. Their study revealed that the most frequently used assessment tools were tests and quizzes and these determined about 77% of students' grades. Twelve of the nineteen teachers used other forms of assessment, such as written projects or interviews with students. These other forms of assessment counted for about 7% of students' grades. Beckmann, Senk and Thompson found that test items were of low level, involved very little reasoning and were almost never open-ended. They also found that teachers' knowledge and beliefs as well as the content and textbooks

of the course, influenced the characteristics of the test items and other assessment instruments.

McMillan, Myran and Workman (2002) in their study, aimed at describing the nature of classroom assessment and grading practices, found that teachers were mostly interested in assessing students' mastery or achievement and that performance assessment was used frequently. Morgan and Watson (2002) reported that most middle and high school teachers use teacher-constructed tests to assess students' achievement. In addition, Morgan and Watson found that most teachers view classroom assessment as an added requirement to their teaching job and not as a tool to improve their teaching.

Cooney (1992) and Garet and Mills (1995) found similar results. Cooney surveyed high school mathematics teachers' assessment practices while Garet and Mills surveyed grade 4 to 12 mathematics teachers across the United States. Both studies reported that teachers mostly used short-answer tests for assessment. The two studies further reported that there was a strong influence of publisher's assessment materials on classroom practices. Teachers use the ready-made tests without making modifications to them (Cooney, 1992; Garet & Mills, 1995). Beckmann, Senk and Thompson (1997) identified three reasons why teachers do not use multiple assessment methods. First, some teachers had limited knowledge of different forms of assessment. Second, teachers felt they had no time to create different forms of assessment. Third, teachers felt there was little or no professional guidance; therefore, they (teachers) were not confident enough to try out other forms of assessments. Cooney reported a strong link between assessment and grading in the minds of high school teachers.

There is enough evidence suggesting that in schools assessment mainly refers to tests, examinations and grading (Bezuk et al., 2001; Lissitz and Schafer, 2002; Van de Walle, 2001). School leaders have reached a point of believing that one cannot assess without assigning grades (Lissitz and Schafer, 2002). Although tests seem to be popular in schools, teachers seem to have different skills and views about tests. A study by Morgan and Watson (2002) revealed that different teachers interpreted similar students' work differently. McMillan (2001) studied the actual classroom assessment and grading practices of secondary school teachers in relation to specific class and determined whether meaningful relationships existed between teacher's assessment practices, grade level, subject matter, and ability levels of students. McMillan found that there was no meaningful relationship between teacher's assessment practices, grade level, subject matter and ability level.

Fennell et al. (1992) suggest that specific training is necessary for teachers to learn to assess children's thinking by analyzing students' discourse. Dean (1999) contends that most teacher education programs skim over classroom assessment, leaving teachers to assess in the way they were assessed when they were in school. Campbell and Evans (2000) evaluated pre-service teachers who had completed coursework in educational measurement and found that student teachers did not follow many assessment practices recommended during their coursework.

Effects of External Testing

A number of studies have reported the effects of external mandated testing on both teaching and learning.

Studies looking for these effects have found that externally mandated testing in elementary schools included a narrowing of curriculum and increase in instructional time geared to content and format of the tests (Smith and Rottenberg, 1991). In addition, they found that teachers disliked the tests, believing that the tests caused undue stress and fatigue on their students. Teachers' own emotional responses to tests were reported as shame and embarrassment at low scores but merely relief at high scores. About the efficacy of testing itself, teachers disagreed with statements about testing helping with school improvement and giving useful feedback. Rather they reported testing as causing stress for both teachers and students. Teachers in schools where test scores were improving reported experiencing more pressure from the community to raise test scores (Smith & Rottenberg, 1991).

Although teachers seem to dislike external tests and examinations, a survey conducted by Lissitz and Schafer (2002) reported that most teachers rated themselves "good" or "very good" at interpreting standardized test results. According to Lissitz and Schafer eighty-two percent of the teachers surveyed rated themselves as good or very good at explaining standardized test scores. They do not perceive their own knowledge about testing to be a major problem (Lissitz & Schafer). This signals a shift in interest, which is as a result of external pressure. Although the teachers rated themselves good and very good at explaining standardized test scores, Brookhart (2002) recommends more instruction at both pre-service and in-service level in order for teachers to build repertoire of methods for high quality classroom assessment and less instruction on standardized tests. Brookhart contends that most

measurement courses emphasize standardized tests results, which have no meaning to the students.

Meek (2003) reports that testing time in schools in the US has increased drastically in recent years. In some schools the SAT-9 testing window is three weeks and during this time teachers are encouraged to give test reviews when students are not taking tests (Meek, 2003). The three weeks that schools spend on testing denies the students the opportunity to learn new subject matter. Unfavorable policies seem to drive schools in that direction.

A study conducted by Tirosh (2000) on prospective teachers concluded that prospective teachers' abilities to analyze the reasoning behind students' responses were very poor. This suggests that novices sometimes fail to make sense of students' work, resulting in failure to understand the children's learning difficulties. Tirosh recommended that teachers in training must be helped to understand the mathematics thought processes of their students. Tirosh goes further to suggest that more effort should be devoted to exploring how prospective teachers' programs could improve teachers' knowledge of children's ways of thinking.

Brooks and Brooks (1999) reported that, in many districts throughout America, students spend a good deal of time preparing for standardized tests or statewide examinations. In mathematics students are encouraged to memorize formulas and proofs necessary to pass examinations. Although students end up passing the examinations, most of them cannot demonstrate ability to apply their knowledge to new situations (Brooks & Brooks, 1999). Brooks and Brooks (1999) add that the learning that takes place is cosmetic. It is intended only to pass examinations. Rather than seeking deep understanding, the

students seek short-term methods for accomplishing tasks or passing tests. When asked several weeks or months later to apply what they supposedly had learned, most students fail to do so (Brooks & Brooks, 1999). The way the subject matter is presented and the manner in which learning is assessed mitigate the development of such understanding, and instead encourage rote memorization. Many commonly used procedures for assessment encourage a narrowness of focus and ignore aspects of classroom life that may be of significance in helping students to succeed in learning.

Of interest also is the study conducted by Mertler in 1998. The study was designed to examine assessment practices of teachers in Ohio. The specific aim of the study was to gain an understanding of the extent to which teachers use traditional versus alternative forms of assessment techniques in their classrooms. This study found significant differences among teachers at different school levels and at differing levels of teaching experience with respect to their assessment practices. Elementary teachers reported using informal observations and questions most of the time, significantly more often than both middle and high school teachers. Mertler found no significant difference between teachers in urban, suburban, or rural schools with respect to their use of traditional assessments. Just like school setting, Mertler found no significant different in assessment practices by gender. Similarly, no significant differences were found between teachers based on their years of teaching experience with respect to their use of traditional assessments, but significant differences did exist for their use of alternative assessment. Mertler reported that teachers with 1-5 years of experience reported using alternative

assessments about half of the time, significantly more frequently than their counterparts with 31-35 years of experience, who reported not using alternative techniques very often. Teachers in this study indicated that their current level of preparation in terms of assessing student learning is better than the preparation they received from the pre-service course; this may imply that some classroom assessment skills are acquired on-the-job. This finding supports the views of Gullickson (1986) who contends that there is a misalignment between what is taught to pre-service teachers, in terms of assessment skills and techniques and what in-service teachers actually need in the schools.

Assessment and Grading

Teachers' grading practices have received far more attention in the literature than have assessment practices (McMillan, Myran & Workman, 2002). Grades have important consequences and communicate students' achievement to parents and communities but fail to communicate useful information to students about their weak areas. Communities use grades to put labels on schools; for instance, good schools are associated with good grades. The idea of supporting the students to learn has shifted to rewards and evaluation. Teachers' behaviors seem to suggest that a grade is a form of payment to students for work completed (MacMillan, Myran & Workman). Grades are something that students earn as a compensation for work completed. To make sure that students are compensated accordingly, teachers teach to the test. The students also become myopic by always wanting to know whether what they are learning will be on the test or not. On the other hand, teachers are busy

finding out whether they will cover the curriculum before examinations. Their attention is drawn to covering all the topics within the suggested time regardless of the nature of students being taught.

Sgroi (1995) believes that using assessment to monitor students' understanding of mathematics concepts is very critical and classrooms should be organized to promote active participation and to give students the freedom to explore mathematical ideas. Teachers should use different methods to monitor students' progress in mathematics. Methods such as journal writing, learning logs, probing questions, observation, clinical interviews, and thinking aloud may help teachers to understand the mental processes that students engage in as they solve mathematical problems (Carr, 2002; Robinson, 1995). When teachers place meaningful assessment at the center of instruction, they give students insights into their own thinking and growth, and students gain new perspectives on their potential to learn mathematics (Stepanek, 2002). The shift from assessing students' achievement to assessing how they are learning helps the teacher to explore better ways of supporting the students in learning mathematics better. Additionally, assessment for learning helps the students to know the areas they need to work on. In this case assessment is used to improve both teaching and learning. Assessment for learning, therefore, becomes part of the day-to-day teaching and learning process.

Monitoring students' learning in mathematics may be more critical than establishing what students have achieved at the end of the course. Although achievement information collected at the end of the course is what schools, parents and teachers are mostly interested in, the information does

not help the learners to learn any better, since it comes at the end of the learning phase. If learning is defined as construction or acquisition of new knowledge, then teachers should be particularly concerned with how the process is managed and not how it is evaluated.

Perceptions and Practices

Researchers have attempted to investigate teachers' perceptions of assessment in many different ways (Chester & Quilter, 1998). Chester and Quilter believed that studying teachers' perceptions of assessment is important in the sense that it provides an indication of how different forms of assessment are being used or misused and what could be done to improve the situation. More critical also is the fact that perceptions affect behavior (Atweh, Bleicker & Cooper, 1998; Calderhead,1996; Cillessen & Lafontana, 2002)

A study conducted by Chester and Quilter (1998) on in-service teachers' perceptions of classroom assessment, standardized testing, and alternative methods concluded that teachers' perceptions of classroom assessment affected their assessment classroom practices. Teachers that attached less value to classroom assessment used standardized tests most of the times in their classrooms. Chester and Quilter went further to say that teachers with negative experiences in classroom assessment and standardized testing are least likely to see the value in various forms of assessment for their classroom. They recommended, therefore, that in-service training should focus on helping teachers see the value of assessment methods rather than "how to" do assessment.

A study conducted by Green (1992) on pre-service teachers with measurement training revealed that the pre-

service teachers tended to believe that standardized tests address important educational outcomes and believed that classroom tests are less useful. In the same study in-service teachers believed that standardized tests are important, but not to the degree that pre-service teachers did. A case study of one science teacher conducted by Bielenberg (1993) showed that the teacher's beliefs about science defined how she conducted her science classes. Diene (1993) conducted a study to understand teacher change. The study considered the classroom practices and beliefs of four teachers. Findings suggest that teachers' beliefs and practices were embedded within and tied to broader contexts, which include personal, social and previous ideas about a particular aspect.

The Malawi Context

Primary Schooling

Primary schooling in Malawi consists of eight years, and official entry age is 6 years although it is not uncommon to find children who are under 6 or over 6 years old in grade 1. The primary school grades are called standards for instance grade 1 is called standard 1. A student has to pass end-of-year examinations in order to move on to the next standard and students remain in the same standard if they fail the examinations. Although these are teacher-made examinations, they make the learning environment competitive. Unfortunately, not all students like competitive learning. According to Fox and Soller (2001), girls prefer working collaboratively while boys like working competitively. This means that education systems that emphasize tests and examinations put girls at

a disadvantage. Perhaps this is one of the contributing factors to poor performance of girls in mathematics and science (Mbano, 2003; Nampota and Wella, 1999).

Since in Malawi students are not allowed to move on to the next class if they fail end of year tests, it is not uncommon to find 14-year-olds still in standard 5. In this regard, age range becomes a problem in terms of teaching methods, classroom assessment as well as class management.

Children leaving standard 8 take a Primary School Leaving Certificate examination but a “Pass” does not automatically give them a place for the 4 years of secondary education because of limited places. For instance in 1996 there were 120,000 students in standard 8 who were competing for 8,000 places in secondary schools (Kunje and Lewin, 1999). Repetition rate is at 20% and transition rate into secondary from primary is about 10% (Kunje and Lewin, 1999).

Student Absenteeism

Absenteeism in primary schools in Malawi is of great concern, and there is disparity between the rural and the urban with the rural registering high absenteeism. The national statistics suggest that there is also disparity among regions with the Southern Region registering the highest absenteeism and the Northern Region the lowest (Malawi National Statistical Office, 2002). There are a number of factors contributing to this scenario, and they include lack of interest on the part of the students, sickness, hunger, poverty, domestic chores, child labor, and attending funerals (Malawi National Statistical Office, 2002).

Although gender is not pronounced in the early years of schooling (grades 1 to 3) as a factor, it floats up as a factor in the upper grades. Girls tend to absent themselves from school more than boys and this is also true with drop out trends (Kadzamira, Nthara and Kholowa, 2004; Malawi National Statistical Office, 2002). This pattern could be explained culturally, where girls are expected to do more family chores than boys. When a family member is sick, a girl would be asked to look after the sick while the mother and father are out in the field or to paid jobs.

Primary Mathematics Curriculum

All public schools in Malawi follow one national curriculum, which is centrally developed at the Malawi Institute of Education (MIE). The practice in the past has been that the Institute would develop the curriculum for all twelve subjects offered at primary level together with accompanying textbooks. The curriculum and the books would then be distributed to the public schools and the Institute would organize seminars to orient teachers on how to use the materials.

Each subject has two main textbooks, students' textbook and teacher's guidebook. Currently the system has been modified. The Institute is no longer responsible for the development of textbooks although it continues to coordinate the development of the curriculum. The development of textbooks is now the responsibility of the private sector. The role of the institute is to select textbooks that seem to align with the curricula and recommend to the Ministry of Education to purchase for the public schools.

One would describe the primary mathematics curriculum as “teacher proof.” All the teacher’s guidebooks describe step-by-step what teachers are supposed to do in a lesson (Croft, 2002). The idea of describing step-by-step what a teacher is supposed to do in a particular lesson seems to undermine the ability and the creativity of the teachers. The approach itself assumes that all students across the nation are the same and, therefore, can be taught using one teaching approach. For instance, Activity 15 (Teachers’ Guide for standard 5, page 46) reads in part: let students be in groups of 3 or 4, give each group three strips of paper of equal lengths, let each group fold one strip of paper into halves, shade one half and then write on it “1/2”, repeat this procedure with separate strips of paper for 2/3 and 3/5. All students in standard 5 across the country are likely to do this activity exactly as it is spelt out in the teacher’s guidebook. Although teachers are encouraged to create their own activities or modify the given activities, studies conducted by the Malawi Institute of Education have revealed that teachers follow the guide word by word without modifying the tasks or creating their own.

The Malawi Integrated In-service Teacher Education Program [MIITEP] students’ handbooks follow the same style as the primary teacher’s guidebooks. The books spell out step-by-step what the teacher educator and the student teachers are supposed to do. After going through the procedures, students are given problems that mimic the examples to solve. Answers to the problems are provided just below the problems or on the next page (MIITEP handbook 1). Both the primary and teacher education curricula suggest activities for students at the end of

every topic, but the curricula are silent on different ways of assessing students for understanding.

Teacher Preparation

Primary teacher education in Malawi remains a challenge. The majority of the tutors in the primary teacher training colleges are secondary school teachers transferred to the colleges to train primary school teachers without any further training themselves (Mvalo, 2000; Kunje and Lewin, 1999). The current practice is that the Ministry of Education identifies a secondary school teacher to become a primary school teacher educator. The secondary school teachers join the primary teacher training colleges without thorough understanding of the basic mathematical concepts and pedagogical content (Ngalande, 1999). They also lack the relevant experience because they have never taught at elementary school level (Ngalande, 1999).

This creates problems because the tutors fail to draw from their own experience. Worse still there are no relevant books that college tutors could use to supplement students' handbooks. The only resources that the college tutors use are the students' handbooks. Although the secondary school teachers have no primary school teaching, experience, they are expected to prepare the primary teacher trainees to become effective primary school teachers. This arrangement is one of the contributing factors to poor standards in primary schools in Malawi (Ministry of Education, 1999).

There are many contributing factors to high quality education, but teacher performance is perhaps the central factor. A school may have good classrooms and all the

necessary teaching materials, but if teachers are not able to organize the classroom environment to promote the learning process, all the materials and classrooms mean nothing. Hauya (1993) contends that teacher education has continued to be criticized for failing to prepare teachers for the reality in the classroom. A balance between theory and practice remains a challenge.

The government of Malawi introduced free primary education in 1994. In the same year primary school enrollment rose from 1.9 million at the end of one school year to 3.2 million at the beginning of the next (MOE, 1999). The exponential rise in enrolment exerted unprecedented pressure on the system. To counter react, the government recruited 18,000 untrained teachers and re-employed 2,000 retired teachers to supplement the existing teaching force (MOE, 1999).

A need to train the 18,000 teachers as quickly as possible led Malawi to introduce a non-traditional mode of training teachers called the Malawi Integrated In-service Teacher Education Program [MIITEP] in 1997 (Teacher Development Unit [TDU] (undated). TDU is now DTED (Department for Teacher Education and Development). This program (MIITEP) has three components; two-week orientation, college based training (a total of five months) and on job training (the rest of the two-year period). The whole training duration is two years but student teachers spend most of their time in schools teaching and working on self-study materials. The MIITEP was the fourth major program within ten years (Matola, Mitengo, Sangoma and Susuwele, 1997).

The Malawi Special Teacher Education Program (MASTEP) was launched in 1990 with the goal of increasing by 4,500

the supply of qualified teachers in three years (Kunje and Lewin, 1999; Hauya, 1992). The Ministry of Education adopted the distance mode because it was perceived to be cost-effective, quicker in producing teachers and at the same time comparable in the quality of products to conventional modes of training. The program was designed to run for three years from 1990 to 1993 (Hauya, 1992). The program recruited both MSCE and JCE holders although recruitment favored the MSCE holders.

Trainees of the program were attached to a primary teacher training college as external students and each college had a desk officer who managed the affairs of the students. The training was delivered in three modes: distance learning, seminars, and face to face residential. The face to face residential was conducted in the colleges when the full time students were on holiday.

The course subjects were in two major categories called minor and core subjects. The core subjects were mathematics, English, Chichewa, science and health, agriculture, foundation studies, social studies and general studies. The minors were music, physical education, creative arts, religious education and home economics. The core subjects were taught during face to face residential while the minor subjects were taught at seminars. College tutors on hire basis taught the eight residential courses while district education inspectors conducted the seminars for the minor subjects (Hauya, 1992).

According to TDU (undated), Domasi College was a center for a one-year program from 1987 to 1993) while the two-year program was regarded as Malawi’s traditional way of training teachers. The two-year program ran parallel with the one-year and the MASTEP program, but the

introduction of the MIITEP program replaced the two-year program.

The target of the one-year program was the ever-growing body of untrained temporary teachers who had on-the-job training experience but had no formal professional qualification (Hauya, 1992). In the initial year the program admitted 540 students at Domasi Teachers' College and another 150 at Kasungu. The curriculum of the program was built on the two-year program except that some topics within subject areas were left out (Hauya, 1992). Academic requirements to qualify for training were MSCE or JCE but with two years of teaching experience.

The two-year residential program was the conventional training program for Malawi before it was replaced by MIITEP after massive recruitment of untrained teachers following the introduction of free primary education in 1994. Seven of the eight national teacher-training colleges housed the program. These were: Karonga, Mzuzu, Kasungu, St. Joseph, Lilongwe, Blantyre and Montfort. Domasi was basically for the one-year program. The capacity of the colleges varied from 180 for the small colleges to 540 for the large ones. Recruitment in all the colleges favored men. The ratio of men to women was 3:1.

The entry requirements were JCE and MSCE and training led to two types of professional qualifications, T2 for those with MSCE and T3 for JCE entrants. The curriculum for the two-year program had fifteen areas of study, thirteen of which were teaching subjects and two were professional areas, namely foundation studies and teaching practice (Hauya, 1992).

The current teacher education program (MIITEP) was introduced to respond to the recruitment of 18,000

untrained teachers. The 18,000 untrained teachers represented about 42% of the teaching force (Kunje and Lewin, 1999). With the introduction of MIITEP the two-year traditional program was suspended. MIITEP is a two-year pre-service teacher education program, combining residential training in primary teacher training colleges with on-the-job training and distance education. The actual training starts with three months of residential training in the colleges, followed by 20 months of self-study and attendance at zonal seminars, and supervision by the head teacher and Primary Education Advisor (PEA).

MIITEP has been the only mode of training teachers since its inception. While MIITEP has experienced significant success in terms of increasing teacher output, lack of quality in the course delivery is a major concern (Carm, et al., 2000; Kunje and Lewin, 1999). While teaching, MIITEP students were supposed to attend seminars at a teacher development center (TDC) and also be supervised by PEAs and head teachers. This has been the weakest aspect of the program. The seminars at TDCs and the supervision at school level do not take place.

Currently the Malawi Ministry of Education is modifying the program to what is called one plus one. This means students will spend one year in college and one year in schools before they are certified as qualified teachers. Unlike in the past where the Teacher Service Commission (TSC) only was involved in recruitment of teachers, the current recruitment policy calls for the participation of teacher’s training colleges, TSC, Department for Teacher Education and Development (DTED) and human resources department of the Ministry of Education (DTED, 2004). This proposed program will recruit MSCE holders only and a

candidate will be expected to produce original MSCE certificate or its equivalent or examinations notification slip at the interview (DTED, 2004).

This chapter has reviewed a number of factors that have influenced the way mathematics is being taught in schools and how learners perceive mathematics. The chapter has reviewed beliefs about how children learn mathematic, how teachers' assessment practices affect learning and students' achievement. The chapter has closed by discussing the Malawi primary mathematics curriculum and teacher preparation for primary schools in Malawi.

CHAPTER III

METHODOLOGY

In this chapter, the methodological structure of the study is presented. The chapter is divided into six sections. The first section outlines the research design, followed by a description of the participants, the description of the schools, the instruments used, procedure for data collection, and lastly a description of how the data were analyzed.

Research Design

This study uses naturalistic inquiry to elicit data related to teachers' perceptions of classroom assessment and classroom assessment practices in mathematics in two primary schools in Malawi. The purpose of this study is well suited for qualitative research methods. The study collected data using a questionnaire, lesson observations, interviews, and document analysis in order to answer the research questions (Ary, Jacobs and Razavieh, 2002). The data collected helped to answer the following research questions:

1. How do primary school teachers perceive classroom assessment?
2. What kinds of assessment methods and tools do mathematics teachers use to assess their students?
3. What is the influence of teachers' perceptions of classroom assessment on their classroom assessment practices?

Creswell (1998) suggests that a researcher could gather field notes by conducting an observation as a

participant observer or as a non-participant observer. Alternatively, a researcher could start as an outsider observer and then move into the setting and observe as an insider (Creswell, 1998). Merriam (2001) suggests that observation becomes a research tool if it serves a formulated research purpose, if it is planned deliberately, if it is recorded systematically, and if it is subjected to checks and controls on validity and reliability. Ary, Jacobs and Razavieh (2002) contend that the best way to enhance validity is to carefully define the behaviour to be observed and to train the people who will be making the observations. However Ary, Jacobs and Razavieh identify two sources of bias that affect validity: observer bias and observer effect. According to Ary, Jacobs and Razavieh (2002) observer bias occurs when the observer's own perceptions and beliefs influence observations and interpretations, while observer effects occur when the people being observed behave differently just because they are being observed.

Apart from observation, interviews were used to collect information that could not be observed directly. Interviewing is necessary when the required information cannot be observed such as feelings, beliefs, perceptions and opinions (Merriam, 2001). In this study the first interview was designed to solicit information that revealed the interviewees' perceptions of classroom assessment. According to Merriam, interviewing is the best technique to use when conducting intensive case studies of a few selected individuals. This study used one-on-one semi-structured interviews. The problem with using a highly structured interview in qualitative research is that rigidly adhering to predetermined questions may not allow

the researcher to access participants' perspectives and understandings of the issues (Merriam, 2001). Instead the researcher gets reactions to the investigator's preconceived notions of the ideas (Merriam, 2001). According to Merriam, semi-structured formats assume that individual respondents define the issues in unique ways. On the other hand, unstructured interviews take a skilled researcher to handle the great flexibility demanded by the unstructured interview.

Creswell (1998) and Merriam (2001) contend that document analysis, as a data source, is as good as observation and interview. However, it could be argued that document analysis has the potential to reveal information that the interviewee is not ready to share and also information that may not be available during observation. The multiple data sources allow for triangulation of data to reduce bias and at the same time to develop a deeper understanding of the issues under study.

This study used a questionnaire, lesson observation protocol, semi-structured interview, and document analysis as main tools for data collection. The questionnaire responses, the lesson observation and interviews helped to map out patterns between perceptions of classroom assessment and classroom assessment practice. "A primary characteristic of observation is that it involves the direct study of behaviour by simply watching the subjects of the study without intruding upon them and recording certain critical natural responses to their environment" (Rea and Parker, 1997; p. 3). Creswell (1998) recommends the use of observational protocol as a method for recording notes. Document analysis was used to triangulate the information collected through observation and interview. In

addition, document analysis provided first-hand information on the kind of written feedback given to students and the nature of activities they do. The documents were students' notebooks, teachers' lesson plans, and schemes of works and records of work.

Participants

Six primary school mathematics teachers drawn from two public schools in Zomba participated in this study. Three teachers were drawn from each of the two primary schools. Each teacher represented a section at the school. At a primary school there are three sections: infant section (standard 1 and 2), junior section (standards 3 and 4) and senior section (standards 5 to 8). Zomba is located in the southern part of Malawi and was once the capital city of Malawi. Zomba was chosen because of its proximity to the researcher.

The participants were trained teachers currently teaching mathematics in the two public schools. Three teachers had gone through a two-year conventional teacher education program to become teachers while the other three had gone through the Malawi Integrated In-service Teacher Education Program (MIITEP). Two teachers were holders of the Malawi School Certificate of Education (MSCE) while four were holders of Junior Certificate of Education (JCE). Their teaching experiences ranged from 7 to 33 years (See Table 3.1).

Table 3.1 Participants' credentials

Teacher	Gender	Teaching grade	Academic Qualification	Teaching Experience	Attended INSET	Teacher Education Program
1	Female	2	JCE	13	Yes	2-year
2	Male	4	JCE	18	No	2-year
3	Male	6	MSCE	33	Yes	2-year
4	Female	2	JCE	10	No	MIITEP
5	Female	3	JCE	7	No	MIITEP
6	Male	6	MSCE	8	No	MIITEP

Primary school teachers in Malawi are mainly in three categories (grades): trained teachers that completed four years of secondary education (MSCE) and passed public examinations at that level (graded as T2 teachers), those that completed two years of secondary education (JCE) and passed public examinations at that level (graded as T3), and those who passed the public examination at any of the two levels but have no teaching certificate (graded as untrained teachers). Those teaching without a teaching certificate were not sampled for this study. Table 3.1 above shows the teachers' gender, grade level at which they were teaching at the time of the research, their academic qualifications, teaching experience and the initial teacher education program they underwent.

At school level teachers were selected based on gender, classes they were teaching and teaching experience. The initial interview and questionnaire helped the researcher to determine the teachers' perceptions of classroom assessment practice.

Description of the Schools

As stated earlier in this chapter, two schools, one rural and one urban, participated in this study.

Incidentally, at the time of this study, each school had enrolled 1324 students. The urban school had 37 teachers (27 female and 10 male) including the head teacher with a teacher-pupil ratio of 1:36. The rural school had 10 teachers (3 females and 7 males) including the head teacher with a teacher-pupil ratio of 1:133. Teacher allocation favored the senior classes in both schools. At the urban school the senior classes had a total of 709 students and a total of 21 teachers were allocated to these classes giving a teacher-pupil ratio of 1:34 while the infant had a teacher-pupil ratio of 1:36. At the rural school the senior classes had a total of 350 students and 5 teachers were allocated to the senior classes giving a teacher-pupil ration of 1:70. The infant had a total of 619 students with 3 teachers (the only three female teachers in the school) giving a teacher-pupil ratio of 1:206. In both schools the senior classes were favoured in terms of teacher allocation, classrooms, desks, teachers' tables and chairs. At the rural school the infant classes had no tables or chairs for the teachers while all teachers for the senior classes had chairs and tables. All the students in the infant classes were sitting on the floor while all students in the senior classes were sitting at desks. At the rural school the senior students were allowed to take books home while the infant students were not allowed to take books home.

The trend at the urban school was not very different from that of the rural school. Although the infant teachers had tables and chairs, their furniture was relatively in bad shape as compared to those of the teachers teaching senior classes. The senior class teachers were using new tables and chairs. The students in the senior section had

decent desks while the infant students were sitting on the floor. Infant classes were using the oldest block at the school. At the time of this study, the roofs of some infant classrooms were leaking, forcing students to use only part of the classroom while the senior students were in classes with windowpanes, lockable doors and a good roof. At least the urban school allowed the infant students to take books home.

Instrumentation

This study adapted instruments from the 1998 – 99 Local Systematic Change (Weiss, 1999). These are instruments developed by Horizon Research, Inc. (HRI). HRI is a private research firm located in Chapel Hill, North Carolina, specializing in work related to science and mathematics education. Szpyrka (2001) used the same instruments to explore classroom instruction, assessment and equity in the middle school science classroom in the United States. One of her major findings was that teachers mostly use externally prepared tests to assess their students.

The adapted instruments were a questionnaire on the teacher’s perception of classroom assessment, pre-lesson observation interview protocol, lesson observation protocol, and post-lesson observation interview protocol. The instruments were adapted in order to make them relevant to the purpose of the study. This combination of several data collection strategies or methods is called triangulation (Creswell, 1998). Triangulation involves corroborating evidence from different sources to shed light on a particular theme or issue. Triangulation in

qualitative research is important to validity issues such as checking the truthfulness of the information collected.

Questionnaire on Teacher's Perception of Classroom Assessment

This questionnaire aimed at determining the teachers' perceptions of classroom assessment before lesson observations. The questionnaire had fifteen closed items (Appendix A). The first four questions sought to establish teaching experience, how long the teacher had been teaching mathematics, the grade level at which the teacher was teaching mathematics and how long the teacher had been teaching mathematics at that grade. The rest of the items were in two major categories, namely perception of classroom assessment and classroom assessment practices.

Pre-Lesson Observation Interview Protocol

The purpose of this instrument was not only to establish what the class had been doing in mathematics and what unit they would be working on during the observation but also the objectives of the lesson to be observed and instructional materials to be used (Appendix B). The interview protocol had seven questions including the following: 1) What has this class been doing in mathematics recently? 2) What unit are you working on? 3) What are your objectives for this lesson? 4) Is there anything in particular that I should know about your class that I would be observing?

Lesson Observation Protocol

The purpose of the observation protocol (Appendix C) was to guide or make the observation more focused. The

classroom observation protocol looked at lesson design, lesson presentation including elements of assessment. In addition it looked at assessment indicators such as feedback, teacher-student interaction and monitoring progress.

Post-Lesson Observation Interview Protocol

The interviews were designed to follow up issues noted during class observation and also information from the initial interview on perceptions of classroom assessment. The pattern and nature of questions varied from one individual to another depending on issues that emerged during lesson observation. However each interviewee answered all the questions on the post-lesson observation interview protocol (Appendix D).

Data Collection Procedure

The initial data collection process included obtaining permission from the Ministry of Education through the District Offices and Educational Division (Appendices K and L). The pilot testing of the observation and interview protocols followed after permission was granted. Teachers with similar characteristics to those who participated in the actual study were sampled for the pilot phase of the study. Some questions on the observation and interview protocols were modified after feedback from the teachers. Those who participated in the pilot phase were not allowed to participate in the actual data collection phase.

Sampling

One rural and one urban school were purposefully sampled to participate in this study and data were

collected through observation and interviews. A total of three male teachers and three female teachers were drawn from the two primary schools. At each school three teachers were purposefully selected one from each section of the school: infant, junior and senior sections. Initially all the teachers from the rural schools and teachers from standard (grade)1 to seven from the urban school responded to a questionnaire and their responses were one of the factors that were considered for the selection of the six teachers. A meeting was called to brief all the teachers on the purpose of the study and to build trust. Head teachers of the selected schools attended the briefing. After the briefing the teachers were asked to make their final statements whether they would participate in the study or not. All teachers expressed their interest to participate in the study. No teacher was forced to participate in the study. After the meeting the researcher visited the two schools twice to familiarize himself with the operations of the school and also to build rapport with the selected teachers and the school heads.

Exploratory Lesson

The Exploratory Lesson was prepared jointly between the teacher and the researcher. The major purpose of this lesson was to try out most of the assertions that the classroom teacher made during post-lesson observations and these were related to the students' or teacher's behavior. For instance all the teachers said the pupils were not asking questions in class because they were shy and that students could not be given tasks without first of all giving them a related example.

The preparation for the exploratory lesson started by the teacher explaining to me the procedures he/she follows when preparing a lesson plan. After that, a discussion followed on how a lesson could be designed to address their concerns. The concerns were the basis for developing objectives for the lesson. The class teacher used his/her schemes of work to come up with a topic of the lesson, and from the topic activities were developed jointly. In this way, the content of the lesson was consistent with the teacher's plans; only the methods for the delivery of the lesson changed.

Lesson Observation

Each teacher was observed five times. A pre-observation interview was conducted before the first lesson observation and the rest of the lessons were observed without pre-observation interview. The pre-observation interview was discontinued because most of the questions on the protocol became irrelevant after the researcher had started interacting with the teacher (Appendix B). A good number of the questions on the protocol could only be asked once. After establishing a working relationship with the teacher, it was possible to get answers to most of the questions on the protocol without interviewing the teacher. A post-observation interview followed after the lesson observation. The purpose of the pre-lesson observation interview was to have a general picture of the content matter to be covered in the lesson to be observed, the instructional materials to be used and whatever the teacher wished the researcher to know before the lesson observation. The interview after class observation was

based on the lesson observed. The interviews focused on the teacher's assessment practices in the classroom.

Information collected from records (previous lesson plans, schemes of work, and children's work) helped to explain some of the information collected through observation and interview. The multiple data sources proposed helped to maintain credibility of the study. In addition member checks and peer examinations were employed (Creswell, 1998). Basically the data collection was in two stages.

Stage 1. The first stage was descriptive. It tried to map classroom assessment practice in the two schools using observation, interview and document analysis with the purpose of trying to understand what common practices are in place and how teachers carry out assessment. The initial observations and interviews were used to draw some patterns and issues of interest. After visiting a school, detailed field notes were prepared describing what was observed and learned. Data collected in stage one were analysed to identify key issues for the next stage.

Stage 2. Stage two was interpretive. The key issues from stage one were followed up in detail with the teachers, seeking clarification and confirming patterns tentatively mapped out in stage one of the study.

Data Analysis

To answer the research questions posed earlier in this study, a systematic search for the entire data corpus was conducted and data categories were created. Constant comparative method of data analysis was used (Merriam, 2001). The constant comparative method is a technique often used in the grounded theory tradition of qualitative

research. It involves systematic search and arrangement of field notes and other data accumulated into categories in order to increase the understanding of the situation. In reviewing the field notes, the researcher generated and tested assertions by looking for key linkages and conducting member checks. During data collection and analysis the researcher:

i. Looked for key issues, recurrent events or activities that became categories of focus.
ii. Collected data that provided many incidents of the categories in order to see the diversity of the dimensions under the categories.
iii. Wrote about the categories being explored, attempted to describe and account for all the incidents in the data while continuously searching for new incidents.
iv. Worked with the data and emerging model to try and establish the influence among assessment, learning and teaching.

This chapter has described the design of the study, the instruments that were used to collect data, how participants were identified, how data were collected and how the data were analysed. The researcher worked with six primary school teachers (3 males and 3 females). Each participant was observed five times teaching mathematics with the fifth lesson that was jointly planned by each teacher and the researcher.

CHAPTER IV

FINDINGS

In this chapter, the results of the study are presented. The chapter is divided into three sections. The first section presents the teachers' perceptions of classroom assessment based on their responses from the questionnaire, followed by findings from the lessons observations, and lastly a cross case analysis on the findings from the questionnaire, lessons observations and interviews.

Teachers' Perceptions of Classroom Assessment

The teachers, 3 males and 3 females, were selected from a total of 19 teachers that completed the questionnaire, which tried to establish their perceptions of classroom assessment before lesson observations. Out of the 19 teachers who completed the questionnaire only two teachers defined classroom assessment as a tool that a teacher uses to inform teaching and learning. One of the two teachers was not selected for this study because he was teaching standard (grade) 8. Standard 8 teachers were not included because schools regard this class as an examination class and involving them would have been perceived as a disturbance.

Responses to the questionnaire items provided the six teachers' perceptions of classroom assessment. One item on the questionnaire required the teachers to mark a statement that best-defined classroom assessment as they used classroom assessment in their classes. Four of the six teachers selected for the study defined classroom assessment as all tests a teacher gives at the end of a

topic or term. One teacher defined assessment as a process, which helps teachers to promote students from one class to another, while the sixth teacher defined classroom assessment as a tool that a teacher uses to inform teaching and learning. Of the four teachers that defined assessment as all tests a teacher gives at the end of a topic or term, two of them indicated that they assess their students in about every lesson. This response did not seem to match well with their perception of classroom assessment. The responses given by the other two teachers were once a week and once a month.

The teacher who defined assessment as a process that helps teachers to promote students from one class to another indicated that she assesses every two weeks, while the teacher who defined assessment as a tool that a teacher uses to inform teaching and learning indicated that he assesses his students in about every lesson.

All (six) teachers strongly agreed that classroom assessment is useful to them and to their students. The teachers were further asked to give a reason for their responses. The teachers gave the following reasons for strongly agreeing that classroom assessment was useful to them as teachers:

- “Because I can know which pupil is below average or above.”
- “It gives a picture of individual pupil’s ability.”
- “Because it helps me know my weakness and strong teaching areas as well as students’ class ability.”

- “Assessment helps me to know if students have understood my lesson or topic.”
- “The teacher knows his or her weakness and how to improve students’ progress.”
- “It helps me to know whether the students have understood or they have not understood what they have been taught.”

The participants gave the following reasons why they feel classroom assessment is useful to their students:

- “Because I can know the part which students understood or not.”
- “A pupil is given a chance of remembering what he/she learned.”
- “It helps students to remember what they forgot and keep them always alert.”
- “Students know their stand in class and also they can be able to know their understanding on a particular lesson although they are young.”
- “I easily know those students having problems and how to sort the problems out.”
- “It helps them to test their understanding and applying whatever they learned.”

The six participants were also asked to indicate the type of feedback they provide to students based on their assessment. Responses given included: clapping hands for the students, praising the students, giving them grades e.g. 70/100, displaying assessment results for everybody to see, and reviewing students’ work with the students.

The six participants were further asked to indicate (on a four point scale ranging from strongly disagree to strongly agree) whether the teacher education program they

underwent provided a variety of ways to assess students. Two participants strongly disagreed, one participant agreed while three strongly agreed.

The last section of the questionnaire had 15 items, which required the participants to respond on a four-point scale: never, sometimes, frequently and always. The items were on classroom assessment practice and they included items such as: I design my lessons to allow me to monitor students progress, I probe students' reasoning, I provide adequate time and structure for reflection, and I take into account prior knowledge of my students (See Appendix A).

There was strong agreement mainly on item 1 (I design my lessons to allow me to monitor student progress) and on item 5 (The instructional strategies and activities I use reflect attention to students' experiences and readiness). Four participants indicated that they always design lessons to allow them to monitor student progress, while two indicated that they do that frequently. Five teachers of the six indicated that the instructional strategies and activities they use reflect attention to students' experiences and readiness (Table 4.1).

There was variation in the way the participants responded to items 4, 6 and 14. There was no item that clustered all the respondents into one category (see Table 4.1).

Item 4: I probe students' reasoning.

Three participants indicated that they *sometimes* probe students' reasoning while another three indicated that they *always* probe students' reasoning.

Item 6: I provide adequate time and structure for reflection.

One participant indicated that he/she *never* provides adequate time and structure for reflection; three said they *always* provide adequate time, while two indicated that they sometimes do provide adequate time for reflection.

Item 14: The in-class activities consolidate the main ideas of the lesson.

This item split participants into two groups of three each. Three participants indicated that *sometimes* their in-class activities consolidate the main ideas of the lesson, while the other three said their in-class activities *always* consolidate the main ideas of the lesson.

Apart from the items isolated above, the responses of the participants to the rest of the items were similar. The most selected responses were *frequently* or *always*. Interestingly, the participants who said they assess students in almost every lesson had the highest frequency of always as a response to other items. Two of the three participants had defined classroom assessment as all tests a teacher gives at the end of a topic or term, while the third teacher is the one who defined assessment as a tool that a teacher uses to inform teaching and learning. The responses given by the teacher who defined assessment as a tool for teaching and learning were consistent with his definition of classroom assessment. For instance, the participant indicated that he monitors and assesses students' progress all the time and the students in his class are allowed to talk and share ideas during mathematics lessons.

Table 4.1 Summarized Responses from the Teachers' Perceptions Questionnaire

		Never	Sometimes	Frequently	Always
1	I design my lessons to allow me to monitor student progress	0	0	2	4
2	My instructional strategies and activities reflect attention to issues of access, equity and diversity for students	0	1	2	3
3	The design of my lessons incorporate tasks, roles, and interactions consistent with investigative mathematics	1	2	2	1
4	I probe students' reasoning	0	3	0	3
5	The instructional strategies and activities I use reflect attention to students' experiences and readiness	0	0	1	5
6	I provide adequate time and structure for reflection	1	2	0	3
7	I interact with my students	0	2	1	3
8	I encourage my students to talk and share ideas	0	1	1	4
9	I give students immediate feedback when they need directions to proceed	0	3	2	1
10	I take into account prior knowledge of my students	0	1	2	3
11	I make sure the pace of the lesson is appropriate for the developmental level/ needs of the students and the purpose of the lesson	0	1	1	4
12	My questioning strategies are likely to enhance the development of students conceptual understanding/problem solving	1	0	1	4
13	My lessons progress based on students' responses	1	1	0	4
14	The in class activities consolidate the main ideas of the lesson	0	3	0	3
15	I identify students who have difficulties in understanding the main ideas of the lesson	0	1	2	3

Lessons from the Classroom

This section presents findings from lesson observations. Findings from individual teachers observed are presented as cases and pseudonyms are used in order to observe confidentiality. The cases include the experiences from the exploratory lesson observed. The exploratory lesson observed was planned differently from the first four lessons because the class teacher and the researcher jointly planned it.

Classroom observation protocol was used to observe all the lessons (30 lessons in total)(see Appendix C). Table 4.2 shows the overall ratings on the key assessment indicators for the first four lessons for each teacher. The ratings ranged from 1 (not at all) to 4 (to a greater extent). All the six teachers were rated 1 on indicators 4 and 8 (Table 4.2). This suggests that there was no evidence suggesting that the teachers probed students' reasoning or encouraged students to talk and share ideas. Students were not allowed to talk to each other, instead they were encouraged to work individually. Item 4 (Teacher probed students' reasoning) was also rated 1 because teachers mostly asked recall questions and there were no questions meant to follow up what a student had said. The teachers were also rated low on items 3, 13 and 15. On these three indicators only teacher 5 had a rating of 2 on each indicator while the rest of the teachers had a rating of 1. Generally the teachers had good ratings on items 10 and 16 with no teacher rated below 2. Items 11 and 14 had good ratings although one teacher in each case was rated 1.

Table 4.2 Ratings of Key Assessment Indicators

Indicator	Teacher					
	1	2	3	4	5	6
1. The design of the lesson allowed the teacher to monitor students' progress	3	1	1	2	3	2
2. The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students (e.g. waiting time)	2	1	2	1	1	1
3. The design of the lesson incorporated tasks, roles, and interactions consistent with investigative mathematics.	1	1	1	1	2	1
4. Teacher probed students' reasoning.	1	1	1	1	1	1
5. The instructional strategies and activities used in this lesson reflected attention to students' experiences and readiness.	1	1	2	1	2	1
6. Adequate time and structure were provided for reflection	2	2	1	1	2	2
7. The teacher was able to interact with students	3	1	1	2	3	2
8. The teacher encouraged students to talk and share ideas.	1	1	1	1	1	1
9. Students were given immediate feedback when they needed directions to proceed.	3	1	1	2	2	2
10. The teacher took into account prior knowledge of the students.	3	3	2	3	3	2
11. The pace of the lesson was appropriate for the developmental level/needs of the students and the purpose of the lesson.	3	2	1	3	3	3
12. The teacher's questioning strategies were likely to enhance the development of student conceptual understanding/ problem solving (e.g., emphasized higher order questions, identified prior conceptions and misconceptions).	2	1	1	2	1	1
13. The lesson progressed based on students' responses	1	1	1	1	2	1
14. The in-class activity consolidated the main ideas of the lesson of that day	3	1	3	3	3	3
15. Teacher was able to identify students who had difficulty in understanding the main ideas of the lesson	1	1	1	1	2	1
16. Students had chance to ask questions	3	2	3	3	3	3

Key

1 – Not at all

2 – Some evidence

3 – Clear evidence

4 – To greater extent

Five teachers of the six had a rating of 3 on indicator 16 because they usually paused and asked if students had any questions or not, and in most cases they asked the same question before giving students individual work to do. Although students never asked questions, teachers kept on checking with the students whether they had any questions or not. There was no enough evidence for any of the indicators to be rated four.

In the lessons that were observed the following were evident:

- One direction lesson delivery.
- Teacher dominating the lesson.
- No embedded assessment methods.
- Students discouraged to talk or share ideas.
- Activities and objectives lifted from the teacher’s guidebook.
- Students not asking questions.
- Lesson difficult to evaluate because of teacher’s lack of skills.

During post-lesson observation interviews, teachers raised questions that needed exploring and they included the following:

a) How can students be more involved in a lesson?
b) Is listening learning?
c) Can more time be given to students to work and explore given concepts or ideas?
d) Is it possible to assess students’ progress as they learn?
e) How can I make my students ask questions when they do not understand?
f) Can I design my own activities and achieve the same

objectives that are in the teacher’s guidebook?

Case Studies

This section presents six cases, one for each teacher. Each case begins with a description of the teacher followed by a description of the class, students’ attendance, and the status of teaching and learning resources. Each case describes the exploratory lesson and one typical lesson selected from the first four lessons observed.

Mrs. Limbika’s Case

About Mrs. Limbika

Mrs. Limbika is a Junior Certificate of Education (JCE) holder and she graduated from a two-year teacher education program in 1991. She has been teaching mathematics to infant and junior classes throughout her 13 years of teaching. At the time of the research, Mrs. Limbika was teaching standard 2 and she had been teaching standard 2 for two years.

According to the questionnaire responses, Mrs. Limbika perceived classroom assessment as tests teachers administer to their students at the end of a topic or term, and she prefers administering tests weekly to check students’ understanding of subject matter. Mrs. Limbika uses tests results to identify students with learning difficulties.

Class Size and Students’ Attendance

Mrs. Limbika was teaching 162 students (74 girls, 88 boys) in one class. She was observed 5 times and in all the cases students’ attendance was recorded (Table 4.3).

Table 4.3 Students' Attendance Pattern in Mrs. Limbika's Class.

Day	Girls		Boys		Total	
	Present	Absent	Present	Absent	Present	Absent
1	74	0	86	2	160	2
2	71	3	76	12	147	15
3	53	21	77	11	130	32
4	71	3	62	26	133	29
5	65	9	75	13	140	22

The highest attendance was 160 students with only two boys absent. The worst was 130 students present, with 21 girls and 11 boys absent. Mrs. Limbika mentioned two major contributing factors to absenteeism:

- hunger – this was a period Malawi was experiencing food shortage and many families had no food.
- rainy season – during rainy season students find it hard to walk to school especially if it starts raining in the morning before students start off for school.

According to Mrs. Limbika some parents discourage their children to go to school when it is raining in order to keep them away from swelling streams and rivers.

Teaching and Learning Resources

The classroom had no desks or chairs, and students were sitting on the floor. There were not enough mathematics books for everybody, and students were not allowed to take books home. Students were only allowed to use the books during mathematics lessons and books were

withdrawn after the lesson. About two to three students shared one book.

Mrs. Limbika's Lessons

The first lesson observed was on writing numbers. The main objective was for students to practice writing numbers 1 to 40. The lesson started by asking the whole class to count in chorus from 1 to 40. Then individual students were asked to write numbers 38, 40, 29 and 9 on the chalkboard. The students were asked to count the numbers 1 to 40 again while the teacher was writing a counting grid on the chalkboard with numbers 31, 32, 35, 37 and 38 missing. Students were then asked to copy and complete the counting grid. At this time the teacher went around to check students' work.

More than half the class could not write the numbers properly. Also, spacing between numbers was a problem. One student wrote: 01234567 while another wrote 0 1 2 3 4 5 6 7 8 P 10 11. Apart from not being able to space the numbers properly, writing numbers from 29 to 40 appeared to be the major problem. One student wrote ... 29 30 <u>21</u> <u>22</u> 33 34 <u>25</u> 36 <u>37</u> <u>28</u> 39 40[1].

Five minutes before the end of the lesson, Mrs. Limbika wrote some of the mistakes students made on the chalkboard. She quickly went through the counting grid filling in missing numbers. The students watched the teacher filling in the missing numbers. Immediately after she had finished inserting the numbers, she announced that it was the end of the lesson. Students returned the mathematics books.

[1] The underlined numbers are numbers that one pupil filled in.

Post-Observation Interviews

During post-observation interviews Mrs. Limbika expressed satisfaction with her lesson because the lesson went as planned. She said she was happy because all students were able to count from 1 to 40 without any problems. However, she was not happy that about half of the students were not able to copy and complete the counting grid correctly. “I know my students still need to learn to write the numbers and I plan to give them more practice on that”.

When she was asked to indicate whether it is possible to assess students on a daily basis as they learn, her response was, “No it is not possible to assess students on daily basis as they learn. The only way to assess them is to give them a test.”

Mrs. Limbika’s first lesson had two major activities, students counting from 1 to 40 in chorus and completing a counting grid individually. When they responded in chorus, the conclusion made by the teacher was that all students were able to count from 1 to 40. However, when they were asked to copy and complete a counting grid from 1 to 40, about half the class was not able to complete it.

The second lesson was a continuation of the same topic with emphasis on writing numbers in order. This was a 30-minute lesson. The teacher took 20 minutes to work out two examples with the students and for the remaining 10 minutes students were asked to copy the two examples and also to solve two problems.

After observing Mrs. Limbika for four times, a pattern seemed to emerge. Mrs. Limbika worked out a problem on the chalkboard for the students followed by student individual

seatwork. During individual seatwork students were not allowed to talk or discuss the problems. In most cases the teacher would walk around the classroom either to correct students' work or to assist those having problems. Sometimes she walked around to make sure that everyone was busy working and that students were not sharing ideas. It was part of the classroom rules that during individual work students should not talk to each other. Throughout the four observations no single student asked a question. "The students do not ask questions because they are shy," said Mrs. Limbika.

In Mrs. Limbika's class singing was a strategy for drawing students' attention. If she noticed that students were either not paying much attention or were making noise, she would start a song and ask all the students to stand and sing the song for a minute or two.

Mrs. Limbika's Teaching Records

Document analysis revealed that Mrs. Limbika's lesson activities are always drawn from the teacher's guidebook, including the teaching objectives. She did not change the sequence of the activities, and she tried to stick to the time suggested by the Teacher's Guidebook. The way Mrs. Limbika used the Teacher's Guidebook was more than a guide; it was perhaps close to a rulebook where every suggestion in the guidebook was followed to the letter. During her lessons she preferred using the teacher's guidebook than her lesson plans. "You can keep my lesson plan; I will not need it because I will use the Teacher's Guidebook," said Mrs. Limbika. She said she writes lesson plans because it is a requirement, but to her it is a waste of paper because she just copies what is in the teacher's guidebook.

The structure of her lesson plan included a section for self-evaluation. Teachers are expected to complete the section after they have taught the lesson. Ideally, it is supposed to be a record of how well the students learned and how effective the teaching was. Teachers can then use this information to refocus their teaching to help students make their learning more efficient and meaningful. Mrs. Limbika said she does not complete this section for two reasons: first, she finds it hard to complete because she does not know what to write; second, she does not see the need.

Students' Notebooks

It was evident that Mrs. Limbika marked every written exercise she gave to her students although written comments were missing throughout. In some instances wrong answers were marked correct and correct answers were crossed off. There were no credits for good attempts.

Since students do not copy the questions, it becomes hard to revisit the work at a later date, either to practice or to correct wrong answers.

Mrs. Limbika's Exploratory Lesson

The fifth observation was on a lesson that Mrs. Limbika and the researcher planned together. The major purpose of the lesson was to allow students to work together, share ideas and ask questions either to each other or to the teacher.

The lesson was planned to give students a chance to work in groups and share ideas. In the previous interviews with Mrs. Limbika, she had indicated that students were not asking questions because they were shy and that they did

not want to expose their ignorance. This lesson was designed in part to challenge the students to ask questions. Mrs. Limbika and the researcher agreed, therefore, that Mrs. Limbika was not going to solve a related problem on the chalkboard, as had been the practice. This time she was going to spend about five to eight minutes explaining the activities and the rest of the time would be left to the students to work in groups. The idea here was to maximize students' working time and reduce the teacher's dominance of the lesson.

Both Mrs. Limbika and the researcher were surprised to see the way the students were engaged in discussions and disagreements. The groups kept on asking questions to make sure they were on the right track. Although Mrs. Limbika thought the activities were too challenging and that the students were going to be frustrated, the opposite was true. Students were able to make connections and solve the problems. The activities engaged the students throughout the period and they showed willingness to continue even after the lesson was over.

Interview with Mrs. Limbika After the Exploratory Lesson Observation

"I think I have been denying my students a chance to enjoy learning mathematics," said Mrs. Limbika during the post-observation interview. She added that she was able to see what the students were able and not able to do through talking to them, observing them and through the questions they asked. Mrs. Limbika said she enjoyed the lesson and she thought she did not get tired trying to show students how to do it. She thought students wanted to keep on working together. "I think the students who do not like

mathematics also enjoyed today because they all worked as a group.”

Mr. Ndekha’s Case

About Mr. Ndekha

Mr. Ndekha (a Junior Certificate holder) graduated from a two-year teacher education program in 1986. Although he has been teaching for 18 years, he has never attended in-service training and has never been promoted. Mr. Ndekha was teaching 99 students in his standard 4 class. Although Mr. Ndekha had been teaching for eighteen years, he has taught mathematics for five years only in upper classes (standards 6 and 7). From the questionnaire Mr. Ndekha perceived classroom assessment as tests teachers give to their students at the end of a topic or term, and he indicated that he administers his tests to his students on a weekly basis. He uses assessment to compel students to revise their work.

Class Size and Students’ Attendance

There were more girls (51) in Mr. Ndekha’s class than boys (48). Just as in Mrs. Limbika’s class there was no single day that attendance reached total enrolment. Girls’ attendance seemed to worsen with time. Table 4.4 shows the attendance pattern. Day 1 and 2 were consecutive days and attendance of girls dropped by 6. The worst absenteeism for girls was on day 4 when 18 girls and 5 boys were absent. Boys registered their worst absenteeism on day 3 with 10 boys absent. Mr. Ndekha gave the same reasons that Mrs. Limbika gave for absenteeism and added that some students have no interest for school.

Table 4.4 Students' Attendance Pattern in Mr. Ndekha's Class.

Day	Girls		Boys		Total	
	Present	Absent	Present	Absent	Present	Absent
1	51	0	45	3	96	3
2	45	6	47	1	92	7
3	35	16	38	10	73	26
4	33	18	43	5	76	23
5	36	15	45	3	81	18

Teaching and Learning Resources

The class was sparsely equipped. There were few books for students (at least one book per desk) and three students shared a desk meant for two students. Students were not allowed to take books home. The teacher had one homemade abacus, which he used for demonstration only. There was nothing on the walls although the room was lockable. In some cases not all students had pens or pencils for writing.

Mr. Ndekha's Lesson

The first day Mr. Ndekha was observed teaching place value and had one abacus, which he had made from wood and clay. He used this abacus to demonstrate place value. The abacus helped him to develop the concept of place value among his students. He used the abacus to illustrate and justify the operations that are done when either adding or subtracting numbers. Mr. Ndekha wrote the following numbers on the board and modeled the numbers using his abacus: 2010, 6219 and 5029. He then drew the pictures of the modeled numbers on the chalkboard for students to copy.

After students had finished copying the three examples, they were given four numbers in picture form on the chalkboard to write down the actual numbers. The activity proved to be very simple because it only required one to count the beads in each column and write down the number. All students got everything correct.

The post-observation interview after the lesson was based on whether the activity helped the students to construct any new knowledge related to place value or not. Mr. Ndekha was convinced that the students had mastered the required concepts. As a way of checking his assertion, Mr. Ndekha agreed that the following day students would be given the problem and allowed to discuss it if they wanted to. The students were given the problem in Figure 4.1 to study and to draw a possible correct picture and number. They were told the model was wrong; therefore, they needed to identify the mistake and correct it. It was agreed that volunteering students would write their answers on the chalkboard.

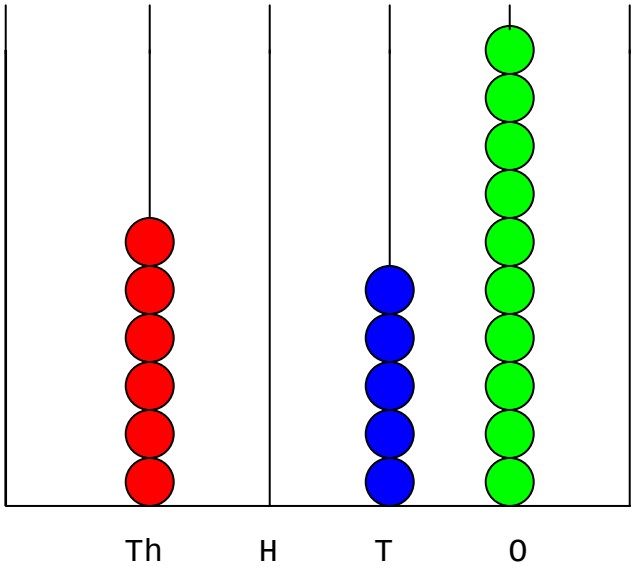


Figure 4.1 Abacus Wrongly Modeling the Number 6060

The problem triggered a lot of discussion and there were a lot of disagreements. The following were some of the possible solutions from students: 659, 6010, 6059, 6069, 6510 and 60510. The teacher made sure that all possible solutions were recorded on the chalkboard. Ironically, after a long debate the class with approval from Mr. Ndekha settled for 6069 as the correct solution. The class, therefore, agreed that the model was as shown in Figure 4.2.

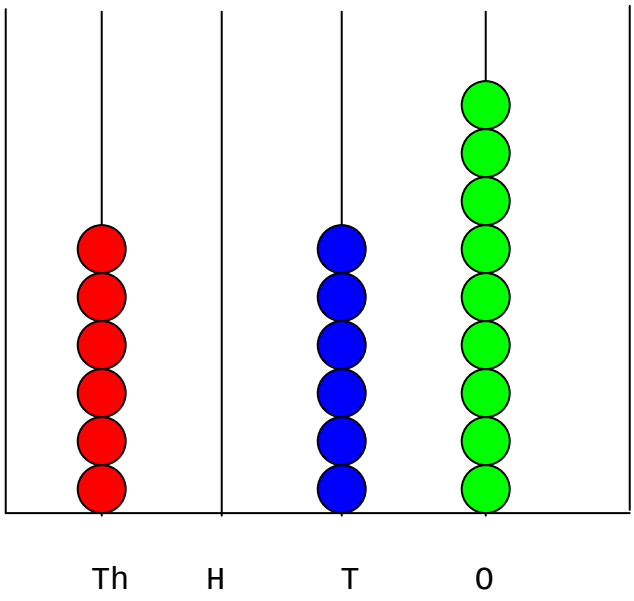


Figure 4.2 Students' Model of the Number 6060

Post-Observation Interviews

Part of the conversation during the post-observation interview after the lesson proceeded as follows:

Wm: *How did the lesson go?*

Mr. Ndekha: *I liked yesterday's lesson. Students were not confused but today all students were making noise and they were confused. I am sure they have learnt nothing today.*

Wm: *I thought you had a good lesson today because you gave students a chance to discuss and share ideas.*

Mr. Ndekha *Today students wasted a lot of time discussing the problem and they were slow. Yesterday students were able to solve four problems after I had given them examples. Why do you say it was a good lesson?*

Wm: Well, *I thought so because the problem challenged the students and you had given them the opportunity to discuss and share ideas. By the way, I notice that your students always sit in rows and do individual class work all the time. Why do you think this is important?*

Mr. Ndekha *Students in this school sit in rows. It's not only in this class. I can't give a reason why they sit in rows. I don't think there is a special reason why they sit in rows.*

Wm: *Ok. Thanks. But perhaps you may have a reason why they have to do individual class work all the time.*

Mr. Ndekha *Yes. I don't want them to be lazy. If you ask them to work in groups or pairs they become lazy. Some students just copy work from their friends without understanding. They must learn to work hard.*

Mr. Ndekha's third and fourth lessons, which were observed, were on subtraction with borrowing. He made sure his lesson proceeded in the same manner in which he had been conducting his lessons previously. For instance, on one

particular day he took 13 minutes to work out two problems with students on the chalkboard and asked students thereafter to copy the two examples and solve five problems in 12 minutes. The lesson was for 35 minutes but 5 minutes were for students to settle and receive mathematics books, which were distributed and withdrawn every day during mathematics. More than half the class did not manage to finish the problems, and Mr. Ndekha encouraged them to finish during their free time and submit for marking.

Mr. Ndekha is good at marking students' work although he does not give written feedback to students. The students made sure their work was marked in order to know if they got the problem correct. This appeared to be a motivation to the students. They seemed to work hard because they knew that the teacher was going to check their work. Mr. Ndekha used part of break time to mark students' work.

There is one thing that Mr. Ndekha did not like about his class and this was the impression the class gave him when working a problem together with him on the chalkboard, which mostly contradicted their performance when given individual work to do. "I don't understand these students. Every time I am working out examples with them on the chalkboard they always answer my questions correctly and they don't show that they do not understand. But when I give them similar problems to solve they fail," Mr. Ndekha observed. In Mr. Ndekha's class students gave choral responses, leaving Mr. Ndekha to believe that all was well.

Mr. Ndekha's Teaching Records

Mr. Ndekha's lesson plans were not different from Mrs. Limbika's lesson plans. Although he had indicated earlier that he formulates teaching objectives, the truth was that

he copied the objectives word by word from the teacher's guidebook. The examples he worked out on the chalkboard with his students were examples given in the teacher's guidebook. In other words, he reproduced the examples. Mr. Ndekha does not include the self-evaluation section in his lesson plans, an indication that he does not do any self-assessment. He indicated that he does not see the need, and after teaching he does not keep the old lesson plans. It was evident that he does not keep his lesson plans after using them because he was not able to show the researcher old lesson plans.

Students' Notebooks

There was no written feedback or comments from the teacher in the students' notebooks. Students who mostly got class exercises wrong had more crossed off work in their notebooks. There were only two options, right or wrong and no feedback provided to students that might allow them to improve in the future. There was no credit given for good efforts or partly done work. The assumption is that if a student got it wrong, he/she should know the source of the mistake.

Mr. Ndekha's Exploratory Lesson

Although it was evident that Mr. Ndekha's teaching philosophy was in opposition to an investigative approach, his exploratory lesson aimed at giving chances for the students to work in groups. In part the lesson aimed at promoting students' ability to ask questions either to each other or to the teacher. The sitting arrangement was changed to allow students to work in groups and talk to each other. In addition, Mr. Ndekha was not going to work

out examples on the chalkboard, as had been the case in the past. He was to take only about five minutes to introduce the lesson and allow students to work in groups. Then the students would work for five to eight minutes with no assistance from Mr. Ndekha.

One of the activities required the students to work out the number of people that would be required to carry bricks to a construction site if each person was to carry nine bricks at once and make one trip only. The students were free to use any method to figure out the number of people required. The students were given the picture below (Figure 4.3) to help them solve the problem.

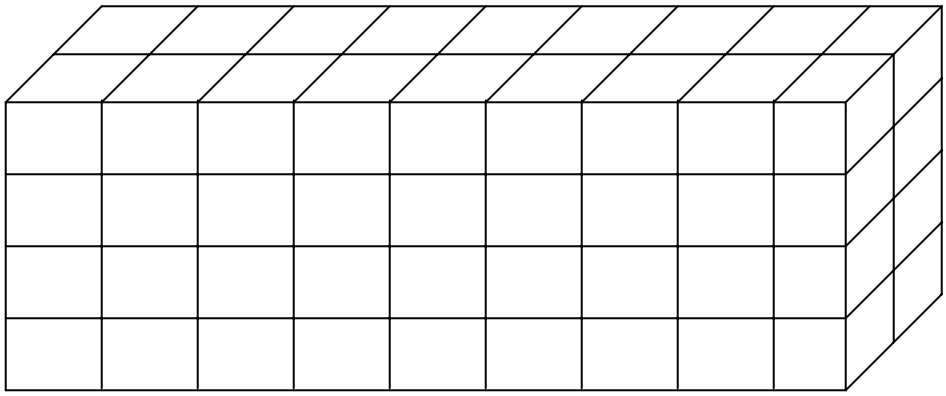


Figure 4.3 A Pile of Bricks to be Carried to Construction Site

The challenge was to work out the total number of bricks from the 3-D object. It was hard for most students to visualize that there was a layer behind the layer they were able to see. Students gave the following as total number of bricks: 36, 49, 54, 62, 72. Those that came up with a total number of bricks not divisible by 9 said it was not possible to carry all the bricks without some

bricks remaining. Some students said their teacher had made a mistake. The group that got 62 bricks counted all faces they could see. The brick in the top right corner was counted three times. One group got the correct total number of bricks after several attempts; however, the rest of the groups did not accept the group's answer as the correct answer. The students and the teacher agreed to use the break time to investigate the problem further, using real bricks that were outside the classroom. The class turned a theoretical problem into a practical problem. The same mathematics they regarded as difficult and abstract became fun. It was notable that the same students who were described by Mr. Ndekha as shy and passive asked questions and disagreed with him on some aspects of the problem. During break time, while using real bricks, the students worked out the number of people required to carry the bricks to a construction site.

Interview with Mr. Ndekha After the Exploratory Lesson Observation

During the post-observation interview, Mr. Ndekha said he was not happy in the way students conducted themselves. He did not like the fact that some groups did not accept the correct answer and that they needed proof or to be convinced beyond doubt. The students had put much thought into the problem, and therefore they wanted to defend their thinking, which they thought was more logical than the explanation other groups gave. They had reached a point where they could not just accept ideas that do not seem to make sense to them. It appears Mr. Ndekha feels comfortable if he works out examples on the chalkboard and gives the students problems to solve individually. In that way

students have no chance to bring different views. Perhaps he wanted to avoid the abacus experience where the whole class including him settled for a wrong solution as the correct solution to the problem. He appeared insecure with mathematics as evidenced by his not wanting students to discuss and to seek clarification from him. The following day Mr. Ndekha instructed his students to go back to their usual sitting arrangement (sitting in rows).

Mr. Zoona's Case

About Mr. Zoona

Mr. Zoona graduated from a two-year program 33 years ago and has taught primary mathematics at different grades for 28 years. He is a holder of the Malawi School Certificate of Education (MSCE) and graduated from a two-year teacher education program. He was proud of his vast teaching experience. Mr. Zoona has attended several in-service training courses. Although, Mr. Zoona enjoys 33 years of teaching experience, his perception of classroom assessment is not different from Mr. Ndekha's and Mrs. Limbika's perceptions. Mr. Zoona perceives classroom assessment as all tests a teacher gives at the end of a topic or term as shown by his responses from the questionnaire. However, he believes that it is possible to assess students in about every lesson. Mr. Zoona uses classroom assessment to check to see if students have understood his lesson.

Class Size and Students' Attendance

Mr. Zoona was teaching standard 6 and was observed five times. There were 91 students (57 girls and 34 boys)

in his class. Absenteeism was a problem in this class. On day three, twenty-two girls and three boys did not come to school, representing about 27% of the total students (Table 4.5). Absenteeism in this class was as high as in the lower classes.

Table 4.5 Students' Attendance Pattern in Mr. Zoona's Class

Day	Girls		Boys		Total	
	Present	Absent	Present	Absent	Present	Absent
1	57	0	22	12	79	12
2	56	1	28	6	84	7
3	35	22	31	3	66	25
4	48	9	34	0	82	9
5	46	11	32	2	78	13

Teaching and Learning Resources

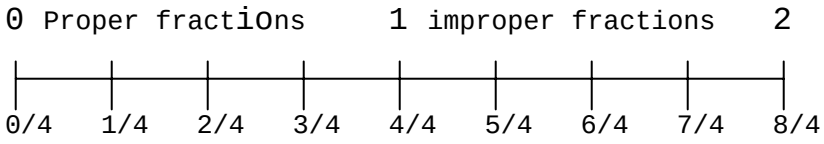
Each student had a mathematics book and they were allowed to take books home. Students were sitting at desks. There was a science corner in the classroom and there were a few wall charts on agriculture, science and social studies. All students had notebooks for mathematics. The classroom had two chalkboards although Mr. Zoona was using one chalkboard all the time.

Mr. Zoona's Lessons

On the first day of observation, Mr. Zoona was teaching division of whole numbers by whole numbers. His lesson started with mental sums, which lasted for 7 minutes followed by two examples and then individual class work. Mr. Zoona went round marking students' work and assisting those who had problems. At the end of the lesson, he worked

out the problem on the chalkboard and instructed those who got the problem wrong to copy the solution from the chalkboard.

His third lesson was on improper fractions. After working out an example on the chalkboard (see example below) with the students he asked them to be in groups to discuss the example further. Thereafter, the students copied the example.



Mr. Zoona's example aimed at assisting students to see the difference between proper and improper fractions. He started by drawing the lines with all the segments. The students had first to figure out, with their teacher, what the line segments represented, guided by the whole numbers above the line. One thing they discovered was that there were four equal segments from one number to another. They needed to figure out what part of a whole each segment represented. After working out what each segment represented, they filled in the values. By inspection, they saw the difference between the fractions on the left side of 1 and those on the right side of 1. With the teacher's guidance the students were able to see the difference between the fractions on the two sides of the number 1. One student said, "I don't see the difference but I think we can divide the numerators on the right hand side by 4 because the numerators are bigger than four." This student gave a clue to the whole class to see that fractions on one side had bigger numerators than denominators.

After working out the example, Mr. Zoona invited questions from the students but no student asked a question. When they were told to discuss the example further in groups, some students asked for clarifications from their fellow students. His strategy of putting students in groups to discuss the example helped students who did not have the courage to ask Mr. Zoona questions to ask their fellow students. Some students were hesitant to ask questions because of language problems. At this level (grade 6) the medium of communication is English and, if students have problems with the language, they choose to remain quiet. After about five minutes of further discussions on the same example, he gave them two problems to discuss before solving the problems individually. Although some students had difficulty, the majority finished on time and got the two problems correct. In this class the students had the opportunity to discuss and share ideas.

Post-Observation Interview

Part of the conversation after observation proceeded as follows:

Wm: I noticed that after working out the example on the chalkboard with students you gave a chance to the students to discuss the same problem. What were you trying to achieve?

Mr. Zoona: Some teachers think if you work out an example on the chalkboard then all students have understood. Some students do not ask questions, not that they have understood but because they have no courage to ask questions.

Wm: You directed most of your questions to boys and not girls. Do you have a particular reason for that?

Mr. Zoona: Did I? I didn't realize that.

Wm: Do boys in your class perform better than girls?

Mr. Zoona: I don't know I have never compared their performance. I think there is no difference.

Mr. Zoona's Teaching Records

"Yes, you can look at my teaching records. I also have last year's schemes and records of work if you would like to look at them," said Mr. Zoona. His lesson plans were very detailed and included examples, which were not from the teacher's guidebook (see one of his lesson plans below). However, some objectives were from the teacher's guidebook. The evaluation section for each lesson was completed. When he was asked to comment on why he finds it necessary to fill in the self-evaluation section, he replied, "This section is a record of what I have experienced or observed during teaching. I refer to this information when I am planning my next lesson." All the necessary sections of his schemes of work were filled in with relevant information.

Topic: Improper Fractions

Objectives: *i. Students to discover the difference between proper and improper fractions*

ii. Drawing line to scale

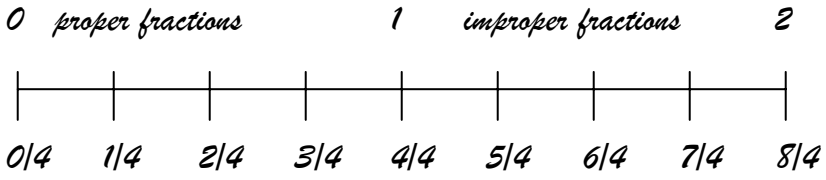
iii. Discussing in groups

iv. Solve given problems correctly

Materials: chalkboard ruler, colored chalk

Introduction: Revise yesterday lesson on fractions (ask one student to say what they learned yesterday)

Example: Write the example on the chalkboard (line first with whole numbers but no fractions)



Questions 1. What do you think each small part of the line represent?

2. Is there any difference among the numbers?

3. Is there any similarity among the numbers?

-Let the pupils discuss in groups.

-Let the pupils copy the example

-Let the pupils do question 1, exercise 5E page 29.

Self-evaluation:

The lesson was good. Pupils followed the example. They did not ask questions because the example was clear.

Students' Notebooks

Each student had a notebook designated for mathematics. There were no written comments or feedback from the teacher in the notebooks. The red ink in the students' notebook was the only evidence, which showed that the teacher checks students' work. There were incidences of

incorrect work marked correct. From the students' work, one would not know what the question required the students to do.

Mr. Zoona's Exploratory Lesson

The exploratory lesson, which I observed, was co-planned by Mr. Zoona and the researcher and was on division of whole numbers by fractions. The students worked in groups to represent the following problem pictorially: 1 ÷ ¼ = 4. They were first asked to understand what the mathematical statement meant. They needed to explain why if 1 is divided by ¼ the result would be a whole number 4. Figure 4.4 below captures some of the reasons given by the students.

- When you divide by a fraction you invert the fraction.
- The rule is to invert.
- Because we are dividing we invert in order to multiply.
- Yes, it is correct 4 will be the numerator.
- Yes, if you divide 1 into quarters you will have four quarters.
- Four means there are four quarters in 1.
- Not correct the answer is ¼.
- No, the answer cannot be bigger than 1.

Figure 4.4 Why 4 is the Answer

The groups that were able to explain using a rule and those that explained from their understanding of what division means drew similar pictures. The common mistake was having segments of different sizes represent ¼ as if the segments were from different wholes (see Figure 4.5).

The diagram below illustrates the common mistake students made.

1/4	1/4	1/4	1/4

Figure 4.5 Quarters in One Whole

Interview with Mr. Zoona After the Exploratory Lesson Observation

During the post-observation interview Mr. Zoona emphasized the need to allow students to talk and share ideas. He was not surprised that some students simply used a rule and confirmed that the correct answer was 4 without understanding why they had to invert the divisor. “That is how we were taught mathematics and we are teaching what we learned,” Mr. Zoona remarked. “Have you gone to college to see how mathematics is taught? It is not different from how we are teaching it in schools. It is also possible that some school teachers are teaching mathematics better than the way mathematics is taught in colleges,” said Mr. Zoona.

Mr. Zoona’s lesson plans included objectives and examples that were not in the teacher’s guidebook. The conversation on document analysis went as follows:

Wm: I see that some examples and objectives in your lesson plans are different from those in the teacher’s guidebook. Would you like to comment on that?

Mr. Zoona: Yes, I go through the examples in the Teachers’ Guidebook but if I see that they do not meet what I feel my students need to know, I create my own examples.

Wm: Someone told me that Primary Education Advisors (PEA) question teachers if they use different objectives and

examples from those in the guidebook. What is your comment?

Mr. Zoona: It could be true. I have not experienced it and even if I did, I would be happy to explain to the PEA why I decided to use my own objectives and examples. Ok, you observed me teaching fractions. If I were to use examples from the book one of the examples I could have used is on page 28 of the students' book but that example is wrong. Does the PEA expect me to use that example even if I know it's wrong?

Wm: *Some teachers do not write anything under self-evaluation but I see that you do. Do you think it's important to do self-evaluation?*

Mr. Zoona: Yes, the section gives me the opportunity to record what I learned or saw happening, which I think I can use to improve my teaching next time.

Wm: Thank you so much for your time and for responding to my questions freely.

Mrs. Ulemu's Case

About Mrs Ulemu

Mrs. Ulemu has a Junior Certificate and joined teaching in 1994 as an untrained teacher under the Malawi Integrated In-service Teacher Education Program (MIITEP). She graduated in 2000 as a trained teacher. Mrs Ulemu has been teaching mathematics for five years. At this school she was teaching mathematics in standard 2. There were three teachers assigned to this class, including Mrs. Ulemu. The three teachers shared subjects and taught the students in turn. On the first day of observation the other

two teachers were sitting at the front corner in the classroom and did not participate in the lesson.

Based on the questionnaire Mrs. Ulemu perceives classroom assessment as tests a teacher gives at the end of a topic or term; however, she believes that it is possible to assess students in about every lesson.

Class Size and Students' Attendance

There were 81 students present in a class of 85 on the first day of observations (31 girls and 50 boys). Two boys and two girls were absent. Table 4.6 shows attendance pattern during the research period.

Absenteeism was not as bad a problem as was in Mr. Zoona's class, where twenty-two students were reported absent in a day. During the research period the worst absenteeism was registered on day two where a total of five students were absent (3 girls and 2 boys) representing about 9% of the total enrolment (Table 4.6).

Table 4.6 Students' Attendance Pattern in Mrs. Ulemu's Class

	Girls		Boys		Total	
Day	Present	Absent	Present	Absent	Present	Absent
1	31	2	50	2	81	4
2	30	3	50	2	80	5
3	33	0	51	1	84	1
4	30	3	52	0	82	3
5	15*	0	29*	0	44*	0

** The class of 85 students was split into two classes A and B of 44 and 41 students respectively. Mrs. Ulemu was the mathematics teacher to both classes.*

Teaching and Learning Resources

Students were sitting on the floor and the room was relatively small for 81 students. However, each student had a mathematics book. The teacher had both the teacher's guidebook and student book. There were no posters on the walls and the teacher relied heavily on chalk and chalkboard.

Mrs. Ulemu's Lessons

Mrs. Ulemu was observed five times. In her first lesson she was introducing numbers 26 to 30. The lesson started with counting numbers 1 to 30 followed by an activity where students were asked to go to the chalkboard to identify numbers and the numbers were 30, 5, 26 and 18 written in that order. The first student was asked to identify 30 from the list and he failed. The second student got it right and all the students that followed managed to identify the numbers they were asked to identify. There was no follow up on the student who failed. The student looked ignored.

Mrs. Ulemu then wrote the following example on the chalkboard and filled in the missing numbers while students watched her:

Example: 25 ☐ ☐ 28

She said the number twice before writing it down, and after writing it down, she asked the students to say the number after her. She repeated the process for the second box. Students were then given the following problems to workout individually:

☐ ☐

1. Fill in the missing numbers 22 24

2. Fill in the missing number 20  22 23 24

Some students finished 15 minutes before time and remained idle while the teacher was busy marking and assisting those that had problems.

Mrs. Ulemu always introduced her lessons by working out one or two examples on the chalkboard followed by seatwork. Rarely did she direct questions to individual students. Most of the questions she asked required students to give choral responses. Sometimes she would ask questions seeking an explanation, but she would only wait for a few seconds and answer the question herself. Students were not allowed to talk to each other when the teacher was working out an example or when they were doing individual work. Students who finished their work were instructed to hide their exercise books to avoid others seeing their work. One interesting feature was that students were instructed to fold their arms together when Mrs. Ulemu was talking. The common slogan was *“arms in the garage!”* When Mrs. Ulemu said arms in the garage, everybody folded his/her arms.

Post-Observation Interviews

During post-observation interviews Mrs. Ulemu said she knew that some students had finished fifteen minutes before time but there was nothing she could have done because she was busy marking and assisting those that had problems. When she was asked to comment on her lesson, Mrs. Ulemu responded, “It is difficult to evaluate your own lesson. Tell me what you think about my lesson.” The rest of the conversation went as follows:

Wm: I understand during training teachers are trained on how to evaluate their lessons. Is this true?

Mrs. Ulemu: I don't believe in what I learned in college. I don't think I can evaluate my own lesson. It is not possible to evaluate my lesson.

Wm: Oh I see; let us move on to something else. I saw you talking to individual students in class. Do you think it is necessary to talk to individuals?

Mrs. Ulemu: Yes, it is. I will tell you a story. Last year I had two students (sisters) from the same family. One was performing much better than the other and I couldn't understand why. Then I decided to interview the other student to find out why she was not doing well. I discovered she had a family problem. Her mother and father divorced and she was living with her father and stepmother. She complained that at home she was always busy washing dishes, clothes or cooking while her sister was busy studying. The situation changed when I talked to her sister and encouraged them to be reading and studying together. Her performance now is good. She is in standard 3.

Wm: Thank you for sharing that story. It is fascinating.

Mrs. Ulemu's Teaching Records

Mrs. Ulemu had only a few lesson plans. In most cases she used the teacher's guidebook to teach. Her schemes of work listed the topics and indicated the teacher's guidebook as reference material. Suggested methods of teaching were question and answer, discussion, and explanation. Although she indicated discussion as a method of teaching, she did not use the method on the days she was observed.

Students' Notebooks

There were no written comments in the students' notebooks. Each student had at least a separate notebook for mathematics. Some written exercises were not marked, making it hard for students to know whether they got the problems correct or not or how to improve.

Mrs. Ulemu's Exploratory Lesson

Mrs. Ulemu's exploratory lesson aimed at giving students more time to talk and explore the best ways to solve the given problem. This necessitated students to be in groups, which was a departure from what both the teacher and the students were used to. The problems they were given did not specify whether they were to add, subtract, divide or multiply. It was up to the students to find the best way to solve the problem. The students were given a counting grid ranging from 1 to 60 but with numbers 4, 9, 13, 15, 16, 20, 21, 24, 27, 29, 32, 38, 43, 45, and 47 missing (Appendix E). Mrs. Ulemu and the researcher created the counting grid. Some numbers on the grid were in color. The students were also provided with Father Christmas. The Father Christmas was in colors that were also on the grid. The students were told a story and from the story they were supposed to find the weight of their Father Christmas, using the colors on the counting grid and the colors of their Father Christmas. This was a relationship problem. The students were expected to relate colors to numbers and use the numbers to find the weight of their Father Christmas. For instance if their Father Christmas was in red and blue and on the counting grid red was 56 and blue was 42 then the weight of their Father Christmas would be

98. In this exercise units were not important but the ability to figure out the relationship between colors and figures and also to add the numbers.

Mrs. Ulemu took six minutes to distribute materials and to introduce the first part of the activity, which required students to fill in missing numbers on the counting grid. The activity turned out to be easy. Most groups took about 7 minutes to complete the activity, which they were expected to complete in 9 minutes. Mrs. Ulemu checked their work to make sure that they got the numbers correct; thereafter, she introduced the second part of the activity, which required students to work out the weight of their Father Christmas (Appendix E). This was the most challenging part of the activity where students were expected to relate numbers with colors and pick out relevant numbers from the grid according to the colors of their Father Christmas and then add the numbers up. Students were given ten minutes for the activity. This appeared more challenging to the students. It was a very unfamiliar way of doing mathematics. The students were expected to pick out the numbers and set up a mathematical expression and lastly solve the expression.

The first five minutes of the activity appeared not promising. The first group to break through wrote the numbers on the Father Christmas himself; however, they did not know what to do next. The second group wrote a correct mathematical expression but failed to add up the numbers. They had written the numbers horizontally (35 + 51). The teacher suggested to the group to rewrite their problem vertically, and when they did, they managed to add up the two numbers correctly as shown below.

$$\begin{array}{r} 35 \\ +51 \\ \hline 86 \end{array}$$

By the end of the lesson, seven out of the nine groups had finished with correct answers. The Father Christmas and the colors fascinated the students, and they were engaged throughout the lesson.

When the students were put in groups they were asked to choose a recorder for their work. Eight out of the nine groups chose a boy as a recorder, while one group chose a girl.

Interview with Mrs. Ulemu After the Exploratory Lesson Observation

"I think I have been underestimating the ability of these students. I did not believe they were going to see the connection between the colors of their Father Christmas, and the numbers, and that they would formulate a mathematical expression without me telling them how to do it." She went further to say that she enjoyed the discussions that went on in the groups. "It is today that I appreciated that a mathematical expression written horizontally is more difficult than an expression written vertically."

Wm: Why do you think adding vertically was easier than adding horizontally.

Mrs. Ulemu: I think because I have taught them how to add numbers in a column and they could not see a column.

Wm: There are two groups that did not finish within the allotted time. What do you think was their problem?

Mrs. Ulemu: They took a long time to see the relationship between the colors of their Father Christmas and the colors on the counting grid. However they managed to formulate their mathematical expression at the end of the lesson but had no time to add up the numbers. Had we given them an extra five minutes they would have finished as well.

Mrs. Ulemu's last remark was that she enjoyed the lesson and hoped that her students also enjoyed the lesson.

Mrs. Ziwani's Case

About Mrs. Ziwani

Mrs. Ziwani has been teaching for 7 years. She joined teaching as an untrained teacher and has been trained through the Malawi Integrated In-service Teacher Education (MIITEP). She qualified as a teacher in 2003. Mrs. Ziwani is a holder of a Junior Certificate. At the time of the study, she was teaching mathematics in standard 3. Although she has been teaching for 7 years, she only started teaching mathematics three years ago. This class had three teachers, and Mrs. Ziwani was one of them.

According to the questionnaire responses provided by Mrs. Ziwani, she perceived classroom assessment as a process that helps teachers to promote students from one class to another. However, she preferred assessing students every two weeks.

Class Size and Students' Attendance

In her class there were 103 students (59 girls and 44 boys), but later the class was divided into two classes and Mrs. Ziwani continued to teach mathematics to the two

classes. In Mrs. Ziwani's class the worst absenteeism was registered on the first day when five girls and 3 boys were absent, representing about 8% of the total enrollment (Table 4.7).

Table 4.7 Students' Attendance Pattern in Mrs. Ziwani's Class

Day	Girls		Boys		Total	
	Present	Absent	Present	Absent	Present	Absent
1	54	5	41	3	95	8
2	59	0	42	2	101	2
3	57	2	44	0	101	2
4	58	1	44	0	102	1
5	25*	2	22*	0	47*	2

** Class was divided into two but Mrs. Ziwani was teaching mathematics to both classes.*

Teaching and Learning Resources

Students in Mrs. Ziwani's class were sitting on the floor and the classroom was overcrowded. There were a few drawings on science and agriculture on the walls. However, each student had a mathematics textbook, which they were allowed to take home, and the teacher had both a teacher's guidebook and student's book.

Mrs. Ziwani's Lessons

Mrs. Ziwani was observed five times and her second lesson she was teaching addition of two digit numbers without carrying. She introduced her lesson with mental sums. For the first five minutes all students were standing and a student could only sit down after answering a

question correctly. After five minutes she allowed everybody to sit down. She asked her students to be in groups and invited group leaders to collect sticks (about 4 cm long) from her table. There were 11 groups of about 9 students each. Each group was given enough sticks to enable them to add the two-digit numbers, using the method she had taught them.

Mrs. Ziwani wrote the following problems on the chalkboard:

1.	T	O		2.	T	O
	3	5			3	7
	+2	2			+4	1

She started by explaining to students what “T” and “O” were standing for and what they meant. She then together with the students modeled the first problem using the sticks. She asked students to explain how 35 could be modeled using the sticks. Students were asked to try it in their respective groups and then chose a leader who would report to the whole class. She allowed students six minutes to discuss the problem.

After the six minutes she started inviting groups to report. The first group modeled 35 as /// /////. Three sticks representing 3 and five representing 5. She asked if there were some groups that had the same answer as the one the first group modeled. Seven other groups had the same model. The teacher did not give the groups a chance to explain why they thought that was a correct model, but went ahead to find out from the remaining three groups. One group reported they had not come up with any model. The remaining two groups had eight sticks together. Their model

was ////////. They were not asked to explain either, but it appears they added three and five together.

The teacher who appeared to be against time started showing them how to do it. She explained what five written under “O” meant and a number written under “T” meant. “Look hear, this five means five ones; therefore, we will have five sticks, but this three does not mean three ones because the three is not under ones. It is under tens; therefore, this is three tens. It means we have tens and the tens are three.” She asked the students to count along with her. They counted ten sticks and called that one ten, counted another set of ten called that another one ten, making two tens. After counting the third set, she asked students whether they needed to count another set or not. The students in chorus said no. They had three sets of tens and five ones. The teacher then arranged the sticks on her table and then drew the picture on the chalkboard, which represented three tens and five ones. She then quickly modeled the number twenty-two, by showing the students how to add the ones and the tens. She did not have time to work out the second example. She promised the students to continue from where they stopped.

The following day the lesson continued from where they had stopped. She asked the students to model the second example. Only one group had problems but the rest came up with a correct model.

Post-Observation Interviews

During post-observation interviews of the two lessons, Mrs. Ziwani emphasized the importance of allowing students to work in groups. She said:

I think when you allow students to work in groups

they enjoy mathematics. There are other things that you cannot explain to students very well but they can ably explain to each other. When you have a large class better encourage your students to work in groups. When you are talking to one group, you are already talking to 8 or 10 students. I think that is better than talking to all 100 students at once.

Interestingly Mrs. Ziwani does not believe in co-teaching. When she was teaching mathematics her two colleagues were in the classroom waiting for their turn. “They would mess up my lesson if I allowed them to co-teach with me. I don’t participate in their lessons either,” she said.

Mrs. Ziwani was also asked to comment on why, after allowing students to work in groups, she decided to take over and show them how to do it. And she said she did that because she feels bad when students work very hard but cannot get the correct answer.

Mrs. Ziwani’s Teaching Records

Mrs. Ziwani writes lesson plans for each and every lesson she teaches. Her lesson plans had examples and objectives that were not in the teacher’s guidebook. She said sometimes she formulates objectives if there is need to do so. Especially when she finds that a good number of her students have problems she would formulate objectives and activities to go with the formulated objectives. She was one week behind her teaching schedule. “That is very common with me. Sometimes I can be ahead, sometimes behind. I go by the pace of my students. When I see that my students have problems, I don’t proceed until I am

satisfied they are doing fine.” Her lesson plans were more elaborate than her schemes of work (schemes of work and lesson plan are defined under definition of terms under Chapter 1). Her schemes of work just followed what was suggested in the Teacher’s Guidebook. There was no modification of how much work to cover in a week and all the teaching methods recorded were those suggested in the Teacher’s Guidebook.

Students’ Notebooks

Each student had a separate notebook for mathematics. There were no written comments apart from marking the work correct or wrong using a red pen. Although one would say the ticks and crosses are a kind of written feedback to students, this feedback does not help the learner to discover where he/she went wrong.

Mrs. Ziwani’s Exploratory Lesson

Mrs. Ziwani’s exploratory lesson aimed at challenging students more than she had already been doing. She planned to take about five to seven minutes to introduce the lesson and ask the students to be in groups. She would then allow them to work in the groups and give each group support according to the progress the group was making. Those that seemed to be ahead of everybody else would be allowed to proceed and those with problems would be assisted accordingly in order to catch up. The students were given five problems: one problem required them to match pictures/models with numbers by drawing lines connecting picture/model with number (Appendix F). The remaining problems were on subtraction but students were not told to subtract. They were expected to discuss and deduce that the

problems involved subtraction. It was also possible to solve the same problems by addition.

Although the problems were unfamiliar to the students, working in groups was not new to them. The teacher explained the task to the students and gave them the freedom to start with any question they thought was the easiest. Initially the teacher had thought the first question was going to be the easiest and questions 2, 3 and 4 difficult. Surprisingly, the opposite was true. Question number 4 (Appendix F) was the easiest followed by questions 2 and 3. Question 1 was the most difficult question. In less than four minutes all groups were through with question 4. Questions 2 and 3 slowed them down because they needed the teacher to read the statements once again for them, as they could not read for themselves. Three groups were ahead of everybody but could not do problem number one. About four minutes to end of the period, one group figured out problem number one. The members of that group were then asked to join the remaining groups to assist them with question one. By end of the period, every group had finished. There was no need for the teacher to go through the problems again.

Interview with Mrs. Ziwani After the Exploratory Lesson Observation

During the post-observation interview Mrs. Ziwani quickly pointed out that she was surprised to see that what she thought would be easier for the students proved difficult. When she was asked to explain why it was the case she said, “I don’t know but I think question four was easy because it looked familiar. It was already set for them.” Mrs. Ziwani said she enjoyed listening to the

groups' conversation especially when there was disagreement in the groups.

Mr. Tiona's Case

About Mr. Tiona

Mr. Tiona is a holder of a Malawi School Certificate of Education and joined teaching in 1996 as an untrained teacher under the Malawi Integrated In-service Teacher Education Program (MIITEP). He qualified as a teacher in 2003. He has been teaching mathematics for four years in senior classes (grades 6 to 8). During this study he was teaching mathematics in standard 6. Mr. Tiona has not attended any in-service course.

Based on the responses from the questionnaire, Mr. Tiona perceived classroom assessment as a tool that a teacher uses to inform teaching and learning. He feels both teachers and students can benefit from classroom assessment. Mr. Tiona feels it is possible to conduct classroom assessment in every lesson depending on what one wants to focus on. He feels it is also possible to focus on a selected number of students. "You don't have to assess all the students all the time. You can choose to assess about five or seven students in a lesson," he added.

Class Size and Students' Attendance

There were 126 students (65 girls, 61 boys) on the first day Mr. Tiona was observed. But at that time the school was making arrangements to split the class into two and the second time Mr. Tiona was observed, the class had been split. In this class there were 72 students present.

The attendance pattern throughout the research period was as shown in Table 4.8 below.

Table 4.8 Students' Attendance Pattern in Mr. Tiona's Class

Day	Girls		Boys		Total	
	Present	Absent	Present	Absent	Present	Absent
1	65	0	61	2	126	2
2	36	0	36	1	72	1
3	35	1	37	0	72	1
4	35	1	36	1	71	2
5	36	0	37	0	73	0

Mr. Tiona's new class had 36 girls and 37 boys. The initial class was not split into two equal classes because the other class was using relatively a small classroom. From Table 4.8 one can see that the worst absenteeism was registered on the first day and fourth day. On the first day two boys were absent and no girl was absent, while on the fourth day two students were absent (one boy and one girl) representing about 3% of the total students in class.

Teaching and Learning Resources

Although at the beginning of the study the classroom appeared to be overcrowded with 126 students, each student was sitting in a desk. Three or four students shared a desk, not that they could not afford two students per desk but because the room could not take more desks. Each student had a mathematics textbook and a separate notebook for mathematics. There was information on the walls about mathematics, science and agriculture.

Mr. Tiona's Lessons

Mr. Tiona was observed five times teaching mathematics. His teaching followed the same pattern always. He started with mental sums, followed by working out examples on the board with Mr. Tiona doing most of the work, and then individual class exercise. In his first lesson, he was teaching addition of fractions. After mental sums, which were on addition of whole numbers, he wrote the following problems on the chalkboard:

What is the LCM of 1) 10 and 5?
2) 2 and 3?
3) 8 and 3?
4) 6 and 5?

After working out numbers 1 to 3 on the board, the teacher invited two students to workout number 4 on the chalkboard. The students silently worked out the problem as follows:

Student 1: 5 = 5, 10, 15, 20, 25, 30
6 = 6, 12, 18, 24, 30

Student 2: 6 x 5 = 30

Interestingly, the students did not use the method that Mr. Tiona used to solve the first three problems. Perhaps they did not understand it or they had already mastered their own way of finding lowest common multiple (LCM), since Mr. Tiona did most of the work without explaining to the students what he was doing. After the students had finished working out the problem on the chalkboard, the teacher thanked the students and told them to sit down. He did not comment whether their solutions were correct or not but went ahead and solved the problem

in the way he had solved the first three problems. The students were not given a chance to explain their work. He then solved the problem using a different method as follows:

Teacher's method:

2	5	6
3	5	3
5	5	1
	1	1

$2 \times 3 \times 5 = 30$

Mr. Tiona did most of the work without explaining to the students. After he had finished working out the problem, he asked the students to copy the examples.

Ironically, the four examples were meant to introduce addition of fractions. After the students had finished copying the examples, the teacher wrote the following problems on the chalkboard.

1. $\frac{1}{2} + \frac{1}{3}$

2. $\frac{1}{2} + \frac{1}{10}$

Realizing that time was not on his side, the teacher quickly worked out the examples and asked the students to copy the examples. Immediately after the teacher had finished working on the example, one student whispered to his desk mate telling him that he did not understand the way the teacher solved the two problems on the chalkboard; therefore, he felt very confused. The desk mate told the teacher, but the student who complained denied having said

anything to that effect. The teacher just proceeded as if nothing had happened. The lesson ended before students could even finish copying the examples.

"I gave you two examples yesterday. Today is your turn to add fractions. I will not give you another example," said Mr. Tiona. This is how he introduced his lesson the following day. All the students were quiet, but some students exchanged glances as if they did not agree with what the teacher said. The teacher wrote the following problems on the chalkboard for the students to solve:

1. $\frac{1}{4} + \frac{1}{4}$ 2. $2\frac{1}{6} + 1\frac{1}{3}$ 3. $\frac{5}{8} + 1\frac{1}{4}$

Students came up with interesting solutions, implying that they did not understand the examples that they had copied the previous day. Some of the solutions from the students are shown below.

Student 1: $\frac{1}{4} + \frac{1}{4} = \frac{1+1}{4} = 2 = \frac{2}{4}$ Ans.

Student 2: $\frac{1}{4} + \frac{1}{4} = \frac{4+4}{8} = \frac{8}{16}$ Ans.

Student 3: $\frac{1}{4} + \frac{1}{4} = \frac{4+4}{8} = \frac{8}{8}$ Ans.

Student 4: $\frac{1}{4} + \frac{1}{4} = \frac{4+4}{4} = \frac{8}{4} = 2$ Ans.

Some of the solutions for question two were: $3\frac{7}{3}$, $\frac{2}{3}$, $5\frac{3}{2}$.

Most students in the class looked confused and frustrated. They did not seem to know what they were supposed to do. Fifteen minutes before the end of the

lesson, Mr. Tiona stopped the students from working and told everybody to pay attention as he worked out the problems on the chalkboard while explaining every step to the students. The students were all quiet and attentive. “Look here, is this difficult? This is what I told you yesterday. It is because you do not pay attention when I am explaining. Is it clear now?” asked Mr. Tiona, looking disappointed. “Yes sir,” all students responded in chorus as if they wanted to please their teacher.

Post-Observation Interviews

Before the lesson observation started, Mr. Tiona had indicated that he uses classroom assessment to inform teaching and learning. The researcher was very eager to learn from Mr. Tiona how he uses classroom assessment to inform teaching and learning. Part of the discussion went as follows:

Wm: It was interesting to observe you teach. How did your lesson go?

Mr. Tiona: I think my lesson went on well. Today was a continuation of yesterday’s work. I think some of them had forgotten the examples I gave them yesterday.

Wm: I noticed that most of your students were not able to add a quarter to a quarter correctly. What could be the reason?

Mr. Tiona: Most of these students are lazy and playful. They do not study at home.

Wm: Were problems 2 and 3 related to the examples you gave yesterday?

Mr. Tiona: Yes, they are. These students already know how to add whole numbers. It is not necessary to show them how to add whole numbers again.

Wm. Ok, I wasn't sure if they know how to add mixed numbers. Thank you so much I enjoyed your lesson.

Mr. Tiona's Teaching Records

Mr. Tiona's teaching records were not as comprehensive as he claimed them to be. For instance the outline of one of his lesson plans was as follows:

Topic: Addition of fractions

Objectives: i. Copy the given example correctly.

ii. Copy the given sums correctly.

iii. Add fractions correctly.

Materials: flash cards.

Introduction: Find LCM of: a. 10 and 5

b. 2 and 3

c. 8 and 3

d. 6 and 5.

Example: ½ + ¼

Exercise: 1. $\frac{1}{4} + \frac{1}{4}$ 2. $2\frac{1}{6} + 1\frac{1}{3}$ 3. $\frac{5}{8} + 1¼$

Self-evaluation:

.....

The self-evaluation section was blank.

Students' Notebooks

There was no evidence of written feedback or comments from the teacher in the students' notebooks. The teacher used a red pen to either cross off wrong answers or marking

correct the right answers. Crossed off work seemed to mean nothing to the students. There was no credit given for good effort.

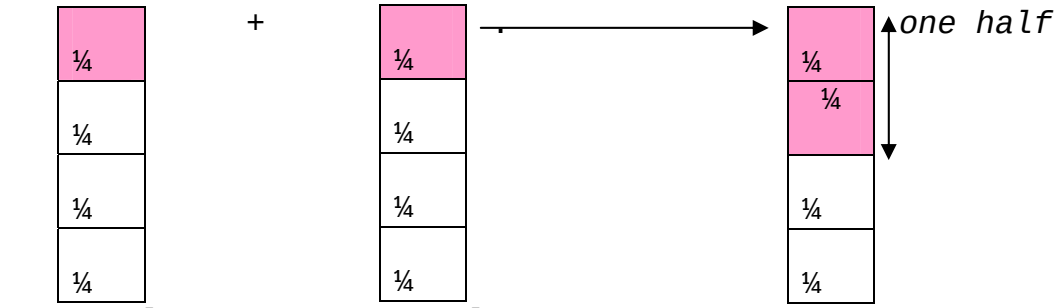
Mr. Tiona's Exploratory Lesson

Mr. Tiona and the researcher agreed that the last lesson would focus on helping students to construct the meaning of fraction and explore possible ways of adding fractions. For this to be achieved, Mr. Tiona and the researcher agreed to design activities that would allow students to work in groups to discuss and design strategies to solve the problems. In addition Mr. Tiona and the researcher agreed that more time would be allocated to group work than to working out examples on the chalkboard, and that groups would be assisted accordingly, depending on the progress they make.

The teacher's guidebook and the students' book did not seem to have activities that would assist Mr. Tiona to achieve the set objectives. These objectives were formulated as a result of what was observed in the previous lessons and, therefore, needed activities that would directly address what was established as a gap in knowledge. One of the questions required students to study a picture and relate it to a mathematical statement and explain why the mathematical statement was correct. See extract below and for more details see Appendix H.

Using the diagram below, explain why ¼ + ¼ = ½

During planning Mr. Tiona was of the opinion that his students would not see the relationship, and therefore, would find the work difficult.



Mr. Tiona was going to take about five minutes to introduce the lesson and allow students to work in groups for twenty-five minutes and he would use the last five minutes of the lesson to conclude his lesson.

"Good morning everybody. Today you will do mathematics in groups. You remember that we do science in groups not mathematics, but today you will work in groups to do mathematics." That is how Mr. Tiona introduced his lesson. He took about seven minutes to explain the activities. The students worked in groups of about 8 students per group.

Although Mr. Tiona said the students worked in groups during science lessons, it took them sometime to begin to work constructively. One would think that perhaps they were not used to working in groups. The power of sharing ideas started to emerge after more than five minutes while in groups. The students started to discuss the problems seriously and writing their ideas down. In some cases they disagreed on certain ideas and asked the teacher to guide them. The teacher guided the students either by asking them a question or by giving them a counter example. By end of 35 minutes all groups had finished their work, to the surprise of Mr. Tiona. There was no need to go through the

problems as a whole class, since all the groups had finished successfully.

Interview with Mr. Tiona After the Exploratory lesson Observation

"I have learnt a lot today. I never thought these students could think logically as they did today. I think they enjoyed the lesson today. The 35 minutes were like 10 minutes. They wanted to continue working. I was fascinated in the way they solved the first question. How they got ¼ is what fascinated me most," said the teacher during post-observation interview. It was evident that Mr. Tiona underestimated his students and thought they were not going to solve the problems. Part of the discussion went as follows:

Wm: What is it that your students need to know about fractions?

Mr. Tiona: I liked the discussions they had in their groups. The discussions helped them to learn more about fractions. Some students gave good explanations. I heard one student saying, we need to make the denominators the same before we can add the fractions. I want them to continue working in groups.

Wm: Why is it that the students asked you many questions today?

Mr. Tiona: I think because they wanted to make sure they were on track.

At the end of the discussion Mr. Tiona said his students would continue working in groups, and he would try as much as possible to give them more time to work in groups.

Cross Case Analysis

This section gives an overall picture of the findings of this study by bringing together the major findings from the individual teachers. The section begins by presenting the teachers' perceptions of classroom assessment based on the questionnaire, which they completed at the beginning of the study followed by the type of feedback they provide to students, assessment methods and tools used by the teachers, classroom assessment practices, and lastly the teachers' subject knowledge.

Teachers' Perceptions

In this study four teachers out of the six perceived classroom assessment as tests that teachers give at the end of a topic or at the end of a term. This may have implications on when and how a teacher would assess his/her students. And if the test were administered at the end of a topic or term, the major purpose would be to check mastery of subject matter and not necessarily to help students learn. It is, of course, important to check whether students have achieved the intended objectives, but at this point it would be too late to go back if the objectives are not achieved.

One teacher perceived classroom assessment as a tool for promoting students from one grade level to the next. This perception is not different from the perception held by the other four teachers. The only difference in this

case is time factor. But in all cases teachers use test results to promote students from one grade level to the next and also to check if they have mastered the subject matter at the end of a topic or term. This seems to suggest that assessment means testing.

Among the teachers who perceived classroom assessment as tests was Mr. Zoona with 33 years of teaching experience and attendance at many in-services courses. His teaching experience and attendance of in-service courses seem not to have made him different from the less experienced teachers. It is perhaps highly likely that the in-service courses that he attended never, addressed the issues of classroom assessment. Chester and Quilter (1998) strongly recommended that in-service training should focus on helping teachers to see the value of assessment methods rather than “how to” do assessment only.

Interestingly, Mr. Tiona with only eight years of teaching experience and trained under the Malawi Integrated In-service Teacher Education Program (MIITEP) perceived classroom assessment as a tool that a teacher uses to inform teaching and learning. His perception of classroom assessment may have been as a result of a number of factors. Some teachers who went through the MIITEP training perceived assessment differently. Mr. Tiona has never attended any INSET; therefore, his perception of classroom assessment could not have been influenced by INSET courses. Diene (1993) contends that teachers’ beliefs, perceptions and practices are embedded within and tied to broader contexts, which include personal, social, and previous ideas about a particular aspect. Mr. Tiona’s response to a related question was consistent with his perception of

classroom assessment. Mr Tiona indicated that he does assess his students in about every lesson.

There was lack of consistency in the responses, which Mr. Zoona and Mrs. Ulemu gave to the same question. Mr. Zoona and Mrs. Ulemu said they assess almost every lesson and yet they perceived assessment as tests. Their perception of classroom assessment seemed not to be grounded on any learning philosophy and the concept may have carried different meanings at different times. In addition, they may have found the concept (assessment) itself confusing.

Mrs. Limbika and Mr. Ndekha indicated that they assess about once a month and once a week respectively. Although testing the students weekly is on the high side, this was slightly consistent with his perception of classroom assessment. Mrs. Ziwani's response to the related question was not consistent with her perception of classroom assessment. She indicated that she assesses every two weeks and yet she perceived classroom assessment as a process, which helps teachers to promote students from one class to another. The inconsistency comes about because in Malawi teachers use one-off tests (i.e. promoting students from one class to the next is based on one test that a student takes at the end of the term) to promote students from one grade level to the next. If a student fails the test his or her previous performance is never considered and, therefore, the student is told to repeat the class.

Teachers' responses from the initial questionnaire showed that there was a strong agreement on their perception of usefulness of classroom assessment (see Table 4.1). In summary, all the teachers felt that classroom assessment informs teaching and learning. They all felt

classroom assessment does benefit students. Mrs. Limbika said, “Classroom assessment helps students to know what they do and do not understand.”

Feedback Provided to Students

Feedback could be understood as a process of providing students with information about their learning, which will help them to accomplish the learning goals successfully.

In this study the teachers did not seem to have a lucid way of giving thoughtful feedback to the students. For instance, one teacher thought by giving a student a grade, that grade would help the student to improve. The teachers’ responses on the questionnaire on types of feedback that they give to students are summarized in Figure 4.6.

- Revising all the work taught.
- I help them in all ways.
- Displaying the assessment results and doing some correction to help children get the right answers to questions they got wrong.
- Clapping hands for the pupils. Telling them ways of praise.
- I grade their work and give them marks e.g. 70 out of 100 (70%).
- I do a thorough revision of the topic.

Figure 4.6 Types of Feedback Provided to Students as Reported by Teachers

Giving thoughtful feedback can be challenging even to teachers who understand the concept of assessment (Angelo

and Cross, 1993; Davis, 1993). This seems to be the case with the teachers that participated in this study. One teacher felt thoughtful feedback meant revising all the work taught with all the students. This is what Patterson (2003) calls “one-box-fits-all” approach in his CPR metaphor. It is very likely that not all students will need all the work to be revised, but perhaps individuals or small groups of individuals may need guidance on specific areas of the topic in order to progress. If teachers fail to imbed assessment within their lessons, it is difficult to understand what individual students are able or not able to do.

The teachers lacked both knowledge and skills to implement feedback effectively. They gave no individual written or verbal feedback to students. There was no written feedback in students’ notebooks apart from crossed out work or work marked correct and in some cases marks indicating how many questions the student got correct. Some teachers felt grades are always meaningful to students. One teacher wrote, “I grade their work and give them marks e.g. 70 out of 100 (70%).” Although the teacher acknowledged that students could not learn about their particular strengths and weaknesses from the grades, she saw more benefits for her students. She believed that the primary benefit to students is the encouragement, competition, and incentives that this practice provides. Research on cooperative learning, however, has demonstrated that when group goals and individual accountability are taken into account and used together, the effects of cooperative learning on individual achievement are consistently positive (Schmidt, Miske and Santhe, 2003; Fox and Soller, 2001).

Assessment Methods and Tools Used by the Teachers

The research question that focused on assessment methods and tools used by teachers to assess their students was central to this research. All the six teachers reported that they use tests to assess their students. However, the teachers differed on the frequency of administering the tests to students. The frequencies of administering tests ranged from weekly to after every three months. A study conducted by Improving Educational Quality (IEQ) in Malawi reported that monthly tests were the main method of assessing students for most Malawian primary school teachers (Schmidt, Miske and Santhe, 2003).

Although some teachers in this study reported that they give tests weekly or monthly, no teacher gave a test during the data collection period (January to March). A study conducted by Mulhall and Taylor (1998) reported that teachers tend to report what they learned in college during training and not what they practice. In their study Mulhall and Taylor (1998) asked teachers to rank teaching methods and results from rankings seemed to suggest that teachers tended to rank the methods of teaching and learning according to what they were taught in their teacher training. For instance, in countries where teacher training emphasized pupil-centered approaches, these methods of learning were given high ranks. Mulhall and Taylor’s findings support the findings of this research. There was a clear discrepancy between what the teachers said they do and what they practiced in the classroom. Table 4.9 summarizes what the teachers reported and what was observed.

Table 4.9 Reported and Observed Practices

Reported Practice	Observed Practice
• Interact with their students in class. • Encourage their students to talk and share ideas. • Use instructional strategies and activities that reflect attention to issues of access, equity and diversity. • Design lessons to allow them to monitor student progress. • Ask questions that enhance the development of students' conceptual understanding or problem solving. • Provide adequate time and structure for reflection. • Use instructional strategies and activities that reflect attention to students' experiences and readiness.	• There was very limited student-teacher interaction. • Students were not allowed to speak to each other during a lesson. • Students were encouraged to hide their work after they had finished. • Lessons were predominantly teacher centered • Teachers asked low level questions. • Students were not given time to reflect on or share ideas. • Students never asked questions. • In most cases students gave choral responses to the teacher.

The responses that teachers gave before lesson observation suggest that they have the theoretical knowledge but fail to put the theory into practice. There are a number of factors that may contribute to failure to translate theoretical knowledge to practice. Kersaint and Thompson (2001) cited lack of collaboration between schools and colleges that prepare teachers as a problem. They contend that teachers are prepared in an environment that does not resemble the school environment in which they are expected to teach. In Malawi, colleges make arrangement

with schools to give student teachers that are on teaching practice small classes (few students) so that they can easily apply what they learned in college. In other words, student teachers are encouraged to practice on an ideal situation, and when they graduate, they face the reality alone without any support. Susuwele and Wilkins (2002) report:

> Pre-service education seems to be a major contributing factor to performance of teachers in Malawi compounded by a lack of in-service training. When teachers were asked to propose what they would like to see colleges doing, most of them said they would like to see college tutors modeling learner-centered approaches other than just talking about them as is the case now. As one teacher commented, “Colleges should be exposing students to different methods of teaching. I think we do more theory than practice when we are in college.” The teachers would like to see instructors engaging their students in discussions and investigations. One teacher noted: “There is not much practice when teachers are in training.” Another teacher suggested: “Student teachers should be teaching each other more often for the tutors (instructors) to identify weaknesses.” (p.10).

If student teachers are given few students to practice on when the real class size is twice or three times as much, that puts them in an awkward situation when they qualify. With the MIITEP program, students find themselves in front of large classes before they are taught how to handle large classes. With time they discover how to handle the large classes, and what they discover is what they practice, which then becomes difficult to change. What they practice is what they believe works. College tutors may not change that within the short period they interact with the student teachers.

Classroom Assessment Practices

There were no differences between the urban and the rural schools in the way they managed and delivered their lessons, and there was no difference across standards (grades). The teachers asked low-level questions and called for choral responses from the students. Teacher-centered approaches were predominant. On average students worked only the last ten to fifteen minutes of the 35-minute lessons. There were cases when a teacher took twenty minutes to work out two examples on the chalkboard and gave students four problems to solve in 15 minutes. The problems given were generally meant for practice.

The teachers at the rural school felt that their colleagues in urban schools enjoy better teaching conditions. They felt schools in urban areas were relatively better equipped with teaching resources than the rural schools. Kadzamira and Chibwana (2000) reported that there were striking differences in the allocation of educational resources, including teachers, between the rural and the urban and also within schools by standards.

Infant and junior students at the rural school were not allowed to take mathematics books home while the urban school allowed their students to take books home. The rural school students used the books during mathematics lessons only and the first five minutes of the lesson were used to give out books, and the last five minutes were used to withdraw the books, leaving the students with 20 minutes (in case of the infant classes) and 25 minutes for the junior classes. The net effect of losing ten minutes everyday could translate into losing 70 30-minute lessons in one academic year or 60 35-minute lessons.

The teacher-student ratios were high at the rural school (1:133) and low at the urban school (1:36) where two or three teachers shared a class and subjects. At the rural school each teacher had a class and taught all the subjects. There is significant variation in the distribution of teachers and materials with the urban being favored more than the rural (Croft, 2002; Malawi National Statistical Office, 2002; Kadzamira, Nthala, and Kholowa, 2004).

A teacher from the rural school said, “Our friends (*perhaps he meant colleagues*)[2] in town teach better students.” When he was asked to explain what he meant by better students he added, “The students watch TV, videos, read newspapers and they have books at home; therefore, they are clever.” This could be an indication that some teachers in rural areas feel their students are not as good as urban students. Although the teacher emphasis was on resources, absenteeism at the rural school was also worse than at the urban school.

Class size may have contributed to the way teachers taught and managed their classes, but their perception of classroom assessment may have contributed even more. Kadyoma (2004) reported that teachers who participated in Improving Educational Quality (IEQ) continuous assessment project claimed that continuous assessment was contributing to lowering of educational standards because students’ performance was not being reported in the form of grades or positions. The traditional way of assessing students is to give a student a grade and a position on the tests they write (Kadyoma, 2004). Kadyoma (2004) quotes a teacher:

[2] phrase in italics and brackets mine

> I am one of those teachers; we have so many things to do. We have an exercise book, in which we write tasks for continuous assessment. It is too involving. Even during the holidays we are unable to complete what we are supposed to prepare for the next term. As a result, most of the teachers just tick. But that is not a true reflection of the student's performance as such. They tick so that when those concerned come they should see that the work is being done yet we are just cheating as a result the learning of children is going down. It is too much (p.124).

The teachers that participated in the IEQ continuous assessment project regarded the activity as an added-on activity. This view resulted because separate activities were designed for the continuous assessment. Although these activities were not called tests but assessments, the nomenclature did not change the meaning. The teachers perceived this as continuous testing and not continuous assessment. Diene (1993) contends that if assessment is not embedded within the teaching process, teachers will see it as a separate activity that demands extra time. Selemani-Mbewe (2002) reports teachers having positive attitudes toward classroom assessment but having limited knowledge of classroom assessment.

Teachers' Subject Knowledge

The teachers' flexibility in understanding and accepting ideas was related to their academic qualifications and not necessarily teaching experience. The Malawi School Certificate of Education (MSCE) holders were more flexible and keen to try out ideas than were the Junior Certificate of Education (JCE) holders. Even after trying out an idea, the JCE holders reverted to the way

they had been doing things before. They felt more secure to continue doing what they had been doing before. According to Stoll and Fink (1996), change can be threatening and if change is introduced, it must be supported until the threats die out.

Summary

Based on the questionnaire responses, classroom observations and interviews, three categories of teachers emerged:

i) Those that perceived classroom assessment as testing or as a process for promoting students to the next level but their lessons had elements of classroom assessment and learner-centered approaches.

ii) Those that perceived classroom assessment as testing and their lessons had no elements of classroom assessment, and used teacher-centered approaches.

iii) Those that perceived classroom assessment as a tool teachers use to inform teaching and learning, but used teacher-centered approaches.

A study conducted by Chester and Quilter (1998) revealed that teachers' perceptions of classroom assessment affected their classroom assessment practices. The findings by Chester and Quilter support the findings of this study. Three out of the four teachers that perceived classroom assessment as all tests teachers give to their students, used teacher-centered approaches to teach and their lessons had no evidence of embedded classroom assessment. In addition, the teachers had limited reflective skills. They had problems in evaluating their lessons. One teacher said she does not believe in self-evaluation. They also displayed limited skills to analyze students' work or

behavior in order to draw inferences. Partly it appears the curriculum contributes to this scenario too. The teacher's guidebook is very prescriptive. It suggests activities, methods and time to spend on each activity. One teacher remarked, "Primary Education Advisors expect us to follow the Teachers' Guide to the letter."

With one teacher who perceived classroom assessment as tests, elements of learner-centered approaches were evident in his lessons and some elements of classroom assessment methods. His teaching experience and flexibility to learn new ideas might have influenced his classroom practices.

Most interesting of all was a teacher who perceived classroom assessment as a tool that teachers use to inform learning and teaching. His lessons, however, were not only teacher-centered but also his lessons had no elements of classroom assessment practices. This supports the findings of Mulhall and Taylor (1998) who reported that teachers may have the theoretical knowledge but fail to translate it to practice.

This chapter has presented the major findings of this study. There was enough evidence suggesting that in the two schools assessment mainly refers to tests and examinations. The teachers have a lucid idea of what classroom assessment is and use limited methods and tools to assess their students. Most of the lessons observed were teacher centered. The teachers' perceptions of classroom assessment influenced their classroom assessment practices. The study further established that there was a mismatch between what teachers said they do and what they practiced and that teachers with higher academic qualifications were more flexible in trying out new ideas.

CHAPTER V

DISCUSSION OF FINDINGS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

> *"Students' points of view are windows into their reasoning. Awareness of students' points of view helps teachers challenge students, making school experiences both contextual and meaningful. Each student's point of view is an instructional entry point. …Teachers who operate without awareness of their students' points of view often doom students to dull, irrelevant experiences, and even failure."*
> *(Brooks and Brooks, 1999, p.60).*

This study grew out of the recognition of the increasing importance for teachers to understand their teaching and support learning meaningfully. The argument evolves around Bruner's (1986) assertion that learning is an active process where the learner constructs new knowledge by discovering principles themselves under the guidance of a facilitator who is a teacher. For teachers to be able to understand their teaching and be able to guide learning, they need to be critical about their students' learning and their teaching. Vygotsky (1987) contends that teachers who embed assessment in their lessons become more effective in understanding their students' learning and in informing their teaching. Brooks and Brooks (1999) regard students' points of views as windows into their reasoning.

In order to understand what happens in the primary mathematics classroom in Malawi, this study considered the following questions: How do primary school teachers perceive classroom assessment? What kinds of assessment methods and tools do teachers use to assess their students

in mathematics? And what is the influence of teachers' perceptions of classroom assessment on their classroom assessment practices? Six teachers in two schools were observed six times each while teaching mathematics. Through a questionnaire, observations, interviews and analysis of records data were collected about these teachers' perceptions, views and practices.

In this chapter, the findings of the study are discussed. The chapter is divided into five sections. The first section discusses the teachers' perceptions of classroom assessment followed by assessment methods and tools used by the teachers, influence of teachers' perceptions on assessment practices, implications of findings for improvement, and lastly recommendations for further research.

Primary Teachers' Perceptions of Classroom Assessment

This study revealed that these teachers perceive classroom assessment as tests and they use tests to assess students' learning. Although tests are part of assessment and could be used to assess students' learning, they do not answer all questions that a teacher would ask about his/her students. A teacher may be interested to find out students' progress in a particular lesson and what knowledge or skills they need in order to progress. A test would not provide such information because tests are normally given at specified time intervals. In addition, it is not possible to administer tests every day, but it is possible to assess students on a daily basis. Tests help the teachers to check, as one teacher said, what students have achieved. This means that other methods and tools must be

used in order to understand the quality of teaching and learning.

Teachers that perceive classroom assessment as testing fail to understand the learning potentials and difficulties experienced by their students during the learning process. Instead of asking the question, “Will I support my students to learn this with minimal difficulties?” They ask the question, “Will I cover all the topics within the given period for my students to be able to take the test?”

Generally tests do not give students a chance to improve because the tests are administered after the learning process has taken place.

Assessment Methods and Tools

Using assessment to monitor students’ understanding of mathematical concepts is very critical and teachers must organize their classrooms to promote active participation and to give students the freedom to explore mathematical ideas (Brooks and Brooks, 1999; NCTM, 2000). This study revealed that these teachers had limited ways and methods of assessing their students. These teachers mainly used tests to assess their students. Although teachers gave individual exercises toward the end of every lesson, the exercises were given to the students to practice and consolidate what the teacher had just demonstrated. This kind of approach encourages memorization of procedures and processes.

Teachers need to use different strategies to monitor students’ progress in mathematics. Strategies such as journal writing, learning logs, probing questions, observation, clinical interview, and thinking aloud may help teachers to understand the mental processes that

students engage in as they solve mathematics problems (Fennema and Romberg, 2001). When teachers place meaningful assessment at the center of instruction, they give students insights into their own thinking and growth, and students gain new perspectives on their potential to learn mathematics.

A shift from testing for achievement to assessing how students are learning (assessment for learning) would help the teacher explore better ways of supporting the students in learning mathematics. Additionally, emphasis on classroom assessment would help the students to know the areas they need to work on. Other benefits of classroom assessment are summarized in Figure 5.1 below.

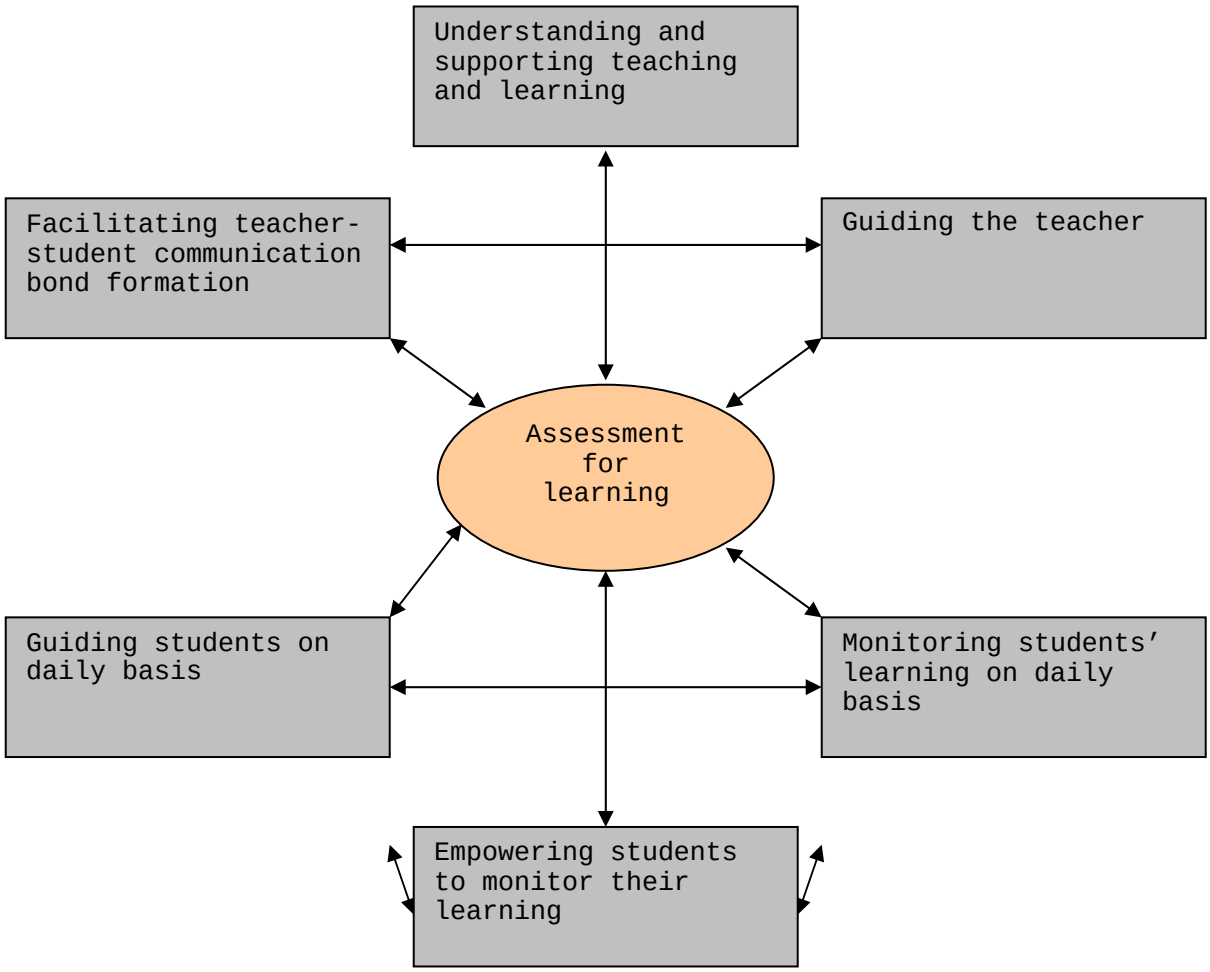


Figure 5.1 The Role of Assessment for Learning

Figure 5.1 illustrates the role of classroom assessment (assessment for learning) in the classroom. The model suggests that assessment for learning helps the teacher not only to understand the teaching and learning process but also to be able to support learning meaningfully. Assessment for learning informs the teachers about what students are able or not able to do. In this study the teachers displayed limited understanding and use of classroom assessment. The model further suggests that assessment for learning empowers students to monitor their learning. The fifth lesson, which was the exploratory lesson, allowed students to evaluate their work. Mr. Ndekha and his students agreed to use break time to investigate the 3-D problem further, using real bricks. The students had a problem in just accepting an answer from one group, which they could not understood.

Properly managed classroom assessment is likely to empower students to monitor and assess their learning; it can guide both teaching and learning, and can facilitate good working relationship between the teacher and the students. The student-teacher communication improved as students continued to check their progress with Mr. Ndekha and even disagree with Mr. Ndekha where they did not seem to have enough information.

In this study the use of classroom assessment as a tool for learning was limited. Classroom assessment needs to be part of a day-to-day teaching and learning. It should not be seen as an add-on activity as was perceived by some primary school teachers that participated in the Improving Educational Quality Project (Kadyoma, 2004).

Some teachers in this study specified the time interval they assess their students, an indication that classroom assessment comes separate from teaching. Even the lessons of those who indicated that they assess in about every lesson did not reflect any systematic elements of classroom assessment.

Influence of Teachers' Perceptions on Assessment Practices

The teachers' perceptions of classroom assessment had influence on their classroom assessment practices. There was very little attempt to understand how the students were learning, for example, one teacher said that it is not possible to assess students on a daily basis as they learn mathematics. The findings support previous findings by Chester and Quilter (1998) who found that teachers' perceptions of classroom assessment affected their classroom assessment practices.

It is important to note that two broad categories within classroom assessment exist, and these are assessment of learning and assessment for learning (Stiggins, 1998). Generally, tests are good tools for *assessment of learning* while other methods and tools such as journal writing, diagnostic interviews and observations are good for *assessment for learning* (Pophan, 1999; Stiggins, 1998). Since the teachers mentioned tests as the tools they use to assess their students, one could conclude that the teachers mainly emphasized assessment of learning.

It is important to assess what students have achieved but more important also to assess how they are learning. Brooks and Brooks (1999) contend that emphasis on assessment for learning is likely to improve students'

achievement. In summary, assessment for learning takes care of assessment of learning.

However, this study established that there are other factors in addition to perceptions of classroom assessment that are likely to influence teachers' classroom assessment practice. These factors are those illustrated in figure 5.2. This study revealed that teachers' flexibility (i.e. ready to try out new ideas) seem to depend on academic qualification. The two teachers who had higher academic qualifications were more willing to try out new ideas than those who had low academic qualifications. This has implication on institutions and individuals who organize in-service courses for teachers. Benefits from in-service courses may depend not only on the nature of the training but also the academic qualifications of the participating teachers.

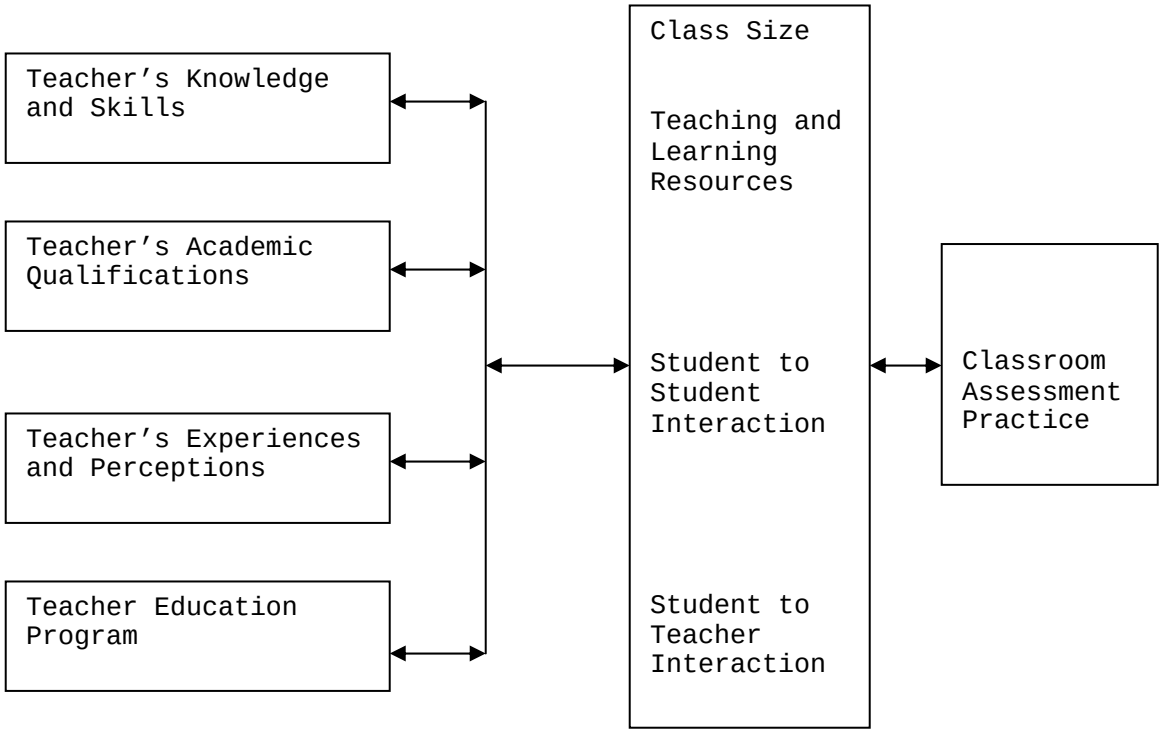


Figure 5.2 Factors Likely to Influence Classroom Assessment Practices

The model suggests that class size, teaching, and learning resources have influence on classroom assessment. In this study the teachers were not able to finish marking students' work within the mathematics period because of large numbers of students. In this case the teachers had no opportunity to know how many students were able or not able to solve the problems. In all cases teachers had merely to guess whether a good percentage of the students were able or not able to solve the problems. This is likely to affect the teacher's planning, more especially if each student has to be considered according to his or her ability. This was also true with teaching and learning resources. The six teachers who participated in this study had limited teaching and learning resources, and that may have limited the choice of activities to do with students. However the exploratory lessons were informative and exciting but at the same time used relatively more teaching resources than the ordinary lessons. The lessons were possible because the researcher supplied the resources. This suggests that resources are important if teachers have to design good activities and also carry out meaningful classroom assessment. Further, the model suggests that the teacher education program plays a role in classroom assessment practices. Although in this study there was no difference between those that went through the two-year program and those that went through the MIITEP program, they all remembered what they learned in college, suggesting that initial teacher education programs have a continued impact on teachers.

Assessment for learning is an integral component of the teaching and learning process, and it is one of the

powerful educational tools for promoting learning (Assessment Reform Group, 1999). Its influence on the teaching and learning process makes it a crucial component of school improvement (Gipps, 1990). Assessment, therefore, is an important aspect of the work of every teacher and school, more especially if it can be used to promote teaching and learning.

In most cases, teachers in this study assessed in order to rank students and not to identify individual capabilities and weaknesses. For example, one participant perceived assessment as a process for promoting students from one grade to another. Assessment practices in the classess studied were limited, incomplete and not tied well to the learning activities. Classroom assessment should provide information to teachers for their own self-evaluation and the evaluation of their students (MacGilchrist, Myers, Reed, 1997). Information from assessment should help the teacher to discover areas where students have difficulties and can, therefore, be used to modify teaching methods and strategies in order to support students' learning.

Implications of Findings for Improvement

> *...Schools continually require students with varying needs fit into a single box. (Patterson, 2003, p.572)*

Although this study was done on a very small scale, it raises significant issues related to the quality of the teaching of primary mathematics in Malawi. Most of the issues discussed are from lesson observation and the post-observation interviews the researcher had with the teachers. Nevertheless, the study provides evidence to

suggest that teachers' performance in the classroom is a combination of many factors. The factors include: teacher's knowledge, skills and experience, lack of teacher's support, large classes, inadequate teaching and learning resources, inequitable distribution of resources and ill-preparation of teachers. Stuart (1999) contends that a curriculum that falls in the hands of teachers that fail to interpret it is no better than the worst curriculum. Most of the findings in this study if paid attention to would complement the effort of the Primary Curriculum and Assessment Reform (PCAR) philosophy, which defines a teacher as a knowledgeable facilitator of the teaching and learning process, who guides all learners to achieve their potential, as a skills trainer, as a role model to pupils and as an active classroom researcher (MoEST and MIE, 2003).

Although the quality of lesson delivery is a result of many factors, failure to assess the students as they learn impacts the learners negatively. Students' behavior, comments and answers create opportunity for the teacher to understand their conceptions and misconceptions they hold. For instance Mr. Tiona asked two students to find the LCM of 6 and 5. One student simply multiplied the two numbers to find the LCM, while the other student worked out multiples of each multiplicand and picked the first common number appearing on both lists. Both students gave thirty(30) as the LCM, but the teacher never commented on the two methods. An opportunity had risen for the teacher and the students to compare the two methods and see if they work for all given numbers. Instead the teacher solved the same problem using a different method without explaining why he preferred the method he used. The teacher's

performance reflects to some extent lack of classroom assessment knowledge and strategies.

The Ministry of Education and the Malawi Institute of Education should consider introducing subject-based INSETS, which should target classroom teachers and not school leaders. For the past five years the Malawi Institute of Education has put more emphasis on leadership and school management courses. During the interviews teachers remembered and valued what they learned in college during pre-service training. This means that pre-service training is a factor to consider when considering teacher performance. It is important, therefore, that assessment of students be covered in detail when teachers are in training and should not be confused with testing, which is only one component of assessment.

Although the current practices at school level do not favor classroom assessment, well-managed classroom assessment could result in improvement of educational standards, which Malawi is striving to achieve through external examinations and tests. In Malawi external examinations are a measure of educational standards and because of this teachers rush students through the curriculum to make sure that all topics are covered. Schools have stopped paying attention to aspects that could have helped them improve the standards of both learning and teaching, such as classroom assessment, learning resources, absenteeism and student-teacher ratios. The Malawi Ministry of Education and the Malawi Institute of Education should consider introducing interventions in colleges that would help to improve classroom practices, including classroom assessment practices. To do this effectively, the

interventions must be articulated by all institutions in both pre-service and in-service programs.

Absenteeism is a problem more especially in rural areas. Worse still, girls absent themselves from school in larger numbers than boys. This problem is not being checked and the end result will be more girls dropping out of school. If more and more girls are allowed to drop out of school, the nation will not have enough educated women to take up leadership positions as is being proposed by political leaders. Malawi has not achieved her quarter of thirty percent (30%) women as members of parliament. Absenteeism, which is being viewed as the schools' problem today, will tomorrow be a national problem when Malawi will not be able to find educated women to take up leadership and managerial positions.

There is no joint effort between schools and parents to curb the problem. Parents do not inform teachers why their children are not able to go to school and teachers do not make any effort to find out from parents. If parents, teachers and students do not work collaboratively to curb the problem, the situation will not improve. Educational Division Offices and Districts should join hands with schools to mobilize the communities so that communities and teachers work together to lessen the problem. In addition, the Ministry of Education should make deliberate efforts to support girls' education in rural areas and supply rural schools with resources.

Currently, there are a number of educational interventions in the form of projects trying to improve the quality of education in general. However, schools seem to perceive these as add-on activities, which increase their workload. For instance the Malawi School Support Systems

Program (MSSSP) is one such example. The Ministry of Education in consultation with Educational Division Offices should introduce a clearing office to scrutinize all projects before they get started as a way of harmonizing their efforts.

It would be worthwhile to set up a system that allows college tutors to work in schools with classroom teachers in order for tutors to better understand the challenges experienced by classroom teachers. In so doing, the gap that seems to exist between teacher preparation and the reality in the classroom may be minimized. Uganda calls this an outreach tutor program. The college tutor is assigned a cluster of schools to work with schools for two to three years (Kabuye, 1996). The main objective is to crossbreed college theories and experiences with school experiences (Kabuye, 1996). At the end of the day, both the schools and the colleges benefit. When a tutor is attached to a cluster of schools, he/she moves out of the college to reside at the cluster center. During the two years the tutor works with classroom teachers and also acts as a link between the college and the schools. This system has helped the teacher training colleges to appreciate the challenges that classroom teachers experience and has also given opportunity to tutors to try out the theories they suggest in college (Kabuye, 1996).

Almost all the teachers in this study did not appreciate the format of the current lesson plan. This results in some parts of the lesson plans being left blank; for instance the self-evaluation section was left mostly blank. Mr. Ndekha clearly said that he did not see the need to complete the self-evaluation section, while Mrs. Ziwani said she does not believe that an individual can evaluate

him/herself. This is an indication that more needs to be done in colleges to help teachers appreciate the importance of a lesson plan and sections of the lesson plan. The way the teachers design and deliver their lessons makes it difficult for them to evaluate the lessons. Students are not given a chance to participate in the lessons, therefore, making it hard for teachers to make inferences as to how much students have achieved. If teachers are not able to reflect on their teaching, their performance is likely to remain static.

Teacher training colleges in consultation with PEAs and classroom teachers should take the responsibility to revisit the lesson plan format to make it relevant and acceptable to teachers. The college must make sure that teachers in training appreciate the importance of the lesson plan while in college. Malawi Institute of Education should organize in-service courses to address this issue.

The teachers who participated in this study held misconceptions about classroom assessment. This was evident by their inconsistence in responding to related questions on classroom assessment and the mismatch between their perception of classroom assessment and classroom assessment practices. Generally, the teachers perceived assessment as testing. The Ministry of Education and the Malawi Institute of Education should introduce issues of classroom assessment in teacher training colleges.

The practice of assigning two or three teachers to one class to teach in turn is not productive. Splitting the classes so that one teacher concentrates on fewer students or team teaching would be more productive than the current practice. The Malawi Ministry of Education policy stipulates that primary school teachers must be assigned to

a class and teach all the subjects offered at primary school level (Ministry of Education, 2000). The practice of assigning three teachers to a class is not only a waste of resources but unjust to the system considering that within the system, especially in rural areas, there are schools that have more classes than teachers. At such schools, a teacher is assigned to two classes and must jump from one class to the next when some teachers somewhere else teach in turn.

Good classroom practices existed at the two schools, but there was no evidence that the good classroom practices were being shared. Teachers continue to work in isolation. The Malawi School Support Systems Program emphasized collaboration and teamwork and yet this did not exist in the two schools (MOE, 1998). The Malawi School Support Systems Program was a national initiative designed to equip school managers and classroom teachers with good school management skills and good classroom practices. The program trained three hundred and fifteen primary education advisers (PEAs) each responsible for about 15 primary schools. It also trained all primary school head teachers and two senior teachers from each school on school management and good classroom practices. It was hoped that the head teacher and the two senior teachers would act as resource persons to train the rest of the teachers at the school level. The culture of sharing ideas and working as a team was expected to emerge at each school, and the PEAs as trained managers were looked up to for the needed culture. PEAs and the head teachers should take the responsibility to introduce the culture of sharing ideas within the school and among schools through the teacher development centers (TDCs).

Recommendations for Further Research

It may be worthwhile to undertake studies in the following areas in order to understand some of the issues raised in this study.

i) A study to investigate the apparent gap between theoretical knowledge and classroom practices should be conducted. This study has established that there is a mismatch between what teachers said and what they practiced in the classroom. Investigating this mismatch between teachers' methodological theories and their classroom practices could provide understandings that could help teacher preparation programs develop ways to close that gap.

ii) A similar study on classroom assessment could be conducted in Primary Teacher Training Colleges. One teacher alluded that what they practice is what they learned in college and yet another said there is not much being done in colleges in terms of classroom assessment practices. A study would help planners and the Malawi Institute of Education to map out a strategy to address this problem. The study would also help to establish the source of the problem.

iii) An investigation of how teachers analyze students' errors in mathematics could provide knowledge crucial to improving teachers' assessment for learning practices. Without teachers being able to analyze students' work accordingly, it would be hard for the teachers to plan and support the students meaningfully. Teachers' analysis of student errors is part of classroom assessment.

iv) A study is needed to investigate students' perceptions of a good mathematics teacher. Student-teacher relationship is a working relationship that must be understood either way. The expectations of students of a teacher may play a role in students' participation in class. If students expect always to be told what to do, they may find it hard to accept investigative approaches to teaching.

v) The college tutors' perceptions of a good mathematics teacher may influence the way they prepare teachers. A study to investigate their perceptions of a good mathematics teacher may be useful. It would help the Malawi Institute of Education, which is responsible for the in-service of the college tutors. Relevant courses can only be designed if curriculum developers and policy makers understand the shortfalls and strength of teacher educators.

vi) Comparative studies conducted within the region are needed in order for Malawi to learn from other countries. Countries such as Zambia, Mozambique and Tanzania experience similar economic and social challenges that Malawi experiences and, therefore, these countries can benefit from each other.

Accepting the proposition that people learn by constructing new understanding of relationships and phenomena in their world makes the understanding of the present classroom practice in primary schools in Malawi difficult. The current setup in schools promotes memorization of processes and procedures. Even where teachers have allowed students to work in groups, the learning has been superficial because of the nature of assessment that students are subjected to. Both the way the

subject matter is presented and the manner in which learning is assessed mitigate the development of concepts and meaningful understanding but instead encourage rote memorization.

Building capacity of teachers to improve their assessment skills should be a priority if learning mathematics has to be meaningful. Malawi must realize that improving educational standards goes beyond community mobilization, effective management of external examinations, construction of school buildings, and availability of teachers and books. It includes good classroom practices of which assessment of students is a critical aspect.

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Appendices

Appendix A

Teacher's Perception of Classroom Assessment Practices

Name of school…… Your name……

Number of students in your class…… Your gender……

1. How long have you been teaching? ……

2. How long have you been teaching mathematics?……

3. At what grade (standard) are you teaching mathematics at this school?.....

4. How long have you been teaching mathematics at this grade (standard)?.....

5. Mark a statement below that best defines assessment as you use assessment in your classroom.

   [ ] a. classroom assessment is a process of administering a test to students in order to assign grades and report to parents and officials.

   [ ] b. classroom assessment is a process, which helps teachers to promote students from one class to another.

   [ ] c. classroom assessment refers to all tests a teacher gives at the end of a topic or term

   [ ] d. classroom assessment is a tool that a teacher uses to inform teaching and learning

6. How often do you assess? (Mark one option that best describes how often you assess)

   [ ] a. once a week

   [ ] b. once a month

   [ ] c. every two weeks

[ ] d. twice a term

[ ] e. about every lesson

[ ] f. other (specify)……

7. Assessment is useful to me. (*Mark one on the given scale*)

1	2	3	4
Strongly disagree	disagree	agree	Strongly agree

Why?.....

.....

8. Assessment is useful to my students. (*Mark one on the given scale*)

1	2	3	4
Strongly disagree	disagree	agree	Strongly agree

Why?.....

.....

9. What type of feedback do you provide for students based on your assessment?

.....

.....

10. My teacher preparation program provided a variety of ways to assess students. (*Mark one on the given scale*)

1	2	3	4
Strongly disagree	disagree	agree	strongly agree

Please read carefully the statements below and indicate using (X) on the four point scale the degree at which you do it. Mark the box under “Never” if you don’t do it, mark the box under “Sometimes” if you do it at times, “Frequently” if you do it often and “Always” if you do it at all times.

1. I design my lessons to allow me to monitor Student progress. …… …… …… ……

2. My instructional methods and activities reflect attention to issues of access, equity and diversity for students. …… …… …… ……

3. The design of my lessons incorporate tasks, roles, and interactions consistent with investigative mathematics. …… …… …… ……

4. I probe students' reasoning. …… …… …… ……

5. The instructional methods and activities I use reflect attention to students' experiences and readiness. …… …… …… ……

6. I provide adequate time and structure for reflection. …… …… …… ……

7. I interact with my students. …… …… …… ……

8. I encourage my students to talk and share ideas. …… …… …… ……

9. I give students immediate feedback when they need directions to proceed. …… …… …… ……

10. I take into account prior knowledge of my students. …… …… …… ……

11. I make sure the pace of the lesson is appropriate for the developmental level/ needs of the students and the purpose of the lesson. …… …… …… ……

12. My questioning methods are likely to enhance the development of students conceptual understanding/problem solving. …… …… …… ……

13. My lessons progress based on students' responses. …… …… …… ……

14. The in class activities consolidate the main ideas of the lesson. …… …… …… ……

15. I identity students who have difficulties in understanding the main ideas of the lesson. …… …… …… ……

Appendix B

Pre-Lesson Observation Interview Protocol

1. What has this class been doing in mathematics recently?

2. What unit are you working on?

3. What are your objectives for this lesson?

4. What instructional materials are you using?

5. What do you anticipate doing in your mathematics class at the time I will be observing ?

6. Any particular things that may be problematic for particular students?

7. Is there anything in particular that I should know about your class that I will be observing?

Appendix C

Lesson Observation Protocol

Date…… Name of the school……

Time of observation…… Start …… End……

Grade level…… Teachers' gender……

Number of students …… Boys…… Girls……

A. Classroom Context: Rate the adequacy of the physical environment.

1. Classroom resources: 1 sparsely equipped 2 3 4 5 rich in resources

Comments……

……

2. Classroom space 1 Crowded 2 3 4 5 Adequate space

Comments……

……

3. Room arrangement 1 Inhibited interaction among students 2 3 4 5 Facilitated interact

Comments……

……

B. Description of the lesson observed.

C. Major way(s) in which student activities were structured.

☐ As a whole group ☐ As small groups ☐ As pairs ☐ As individuals

Comments (*estimate time spent on each*)…….

……

……

……

D. Major way(s) in which students engaged in class activities.

☐ Entire class was engaged in the same activities at the same time

☐ Groups of students were engaged in different activities at the same time (e.g. centers).

Comments……

……

……

E. Major activities of students in the lesson.

☐ 1. Listened to a presentation:
- ☐ a. By teacher (would include: demonstration, lectures, extensive procedural instruction).
- ☐ b. By student (would include informal, as well as formal, presentations of their work).
- ☐ c. By guest speaker/ “expert” serving as a resource.

Comments……

……

☐ 2. Engaged in discussion/seminar:
- .a whole group.
- b. small groups/pairs.

Comments……

……

3. Engaged in problem solving/investigation:

- ☐ a. Played a game to build or review knowledge
- ☐ b. Followed specific instructions in an investigation.
- ☐ c. Had some latitude in designing an investigation.
- ☐ d. Recorded, represented and/or analyzed data.
- ☐ e. Recognized patterns, cycles or trends.
- ☐ f. Evaluated the validity of arguments or claims.
- ☐ g. Provided an informal justification or formal proof.

Comments……

……

……

☐ 4. Engaged in reading/reflection/written communication about mathematics.

- ☐ a. Read about mathematics.
- ☐ b. Answered textbook/worksheet questions.
- ☐ c. Reflected on reading, activities, or problems individually or in groups.
- ☐ d. Prepared a written report.
- ☐ e. Wrote a description of a plan, procedure, or problem solving process.
- ☐ f. Wrote a reflection in a notebook.

Comments……

……

☐ 5. Used audio-visual resources:

- ☐ a. To develop conceptual understanding.
- ☐ b. To learn or practice a skill.
- ☐ c. To collect data.

☐ d. As an analytic tool (e.g. data analysis).

☐ e. As a presentation tool.

☐ f. As a communication tool.

Comments……

……

☐ 6. Other activities.

……

……

……

……

F. Comments.
(Additional information necessary to capture the activities or context of this lesson including comments on any feature of the class.)

G. Ratings of Key Assessment Indicators

	Not at all			To a greater extent
1. The design of the lesson allowed the teacher to monitor students' progress	1	2	3	4
2. The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students (e.g. "wait time" cooperative learning)	1	2	3	4
3. The design of the lesson incorporated tasks, roles, and interactions consistent with investigative mathematics.	1	2	3	4
4. Teacher probed students' reasoning.	1	2	3	4
7. The instructional strategies and activities used in this lesson reflected attention to students' experiences and readiness.	1	2	3	4
8. Adequate time and structure were provided for reflection	1	2	3	4
7. The teacher was able to interact with students.	1	2	3	4
8. The teacher encouraged students to talk and share ideas.	1	2	3	4
10. Students were given immediate feedback when they needed directions to proceed.	1	2	3	4
10. The teacher took into account prior knowledge of the students.	1	2	3	4
11. The pace of the lesson was appropriate for the developmental level/needs of the students and the purpose of the lesson.	1	2	3	4

	Not at all			To a greater extent
13. The teacher's questioning strategies were likely to Enhance the development of student conceptual understanding/ problem solving (e.g., emphasized higher order questions, identified prior conceptions and misconceptions).	1	2	3	4
13. The lesson progressed based on students' responses.	1	2	3	4
14. The in-class activity consolidated the main ideas of the lesson of that day.	1	2	3	4
15. Teacher was able to identify students who had difficulty in understanding the main ideas of the lesson.	1	2	3	4
16. Students had chance to ask questions.	1	2	3	4

Appendix D

Post-lesson Observation Interview Protocol

1. How did the lesson go?

2. What did this lesson tell you about what your students are learning in mathematics?

3. Did you make any adjustments? Explain.

4. What did this lesson tell you about what your students still need to learn in mathematics?

5. How do you plan to further assess the students' learning?

Appendix E

Activities for Standard 2 Lesson 5

1. Lembani nambala malo omwe mulibe nambala

1	2	3		5	6	7	8		10
11	12		14			17	18	19	
	22	23		25	26		28		30
31		33	34	35 Green	36	37		39	40
41	42 blue		44		46		48	49	50
51 yellow	52	53	54	55	56 red	57	58	59	60

2. Father Christmas wanu wabvala zotani

……

……

3. Pedzani kulemera kwa Father Chrsitmas wanu pogwiritsa ntchito zomwe wa bvala.

Father Christmas akulemera……

4. Lembani maina anu

a. ……

b. ……

c. ……

d. ……

e. ……

f. ……

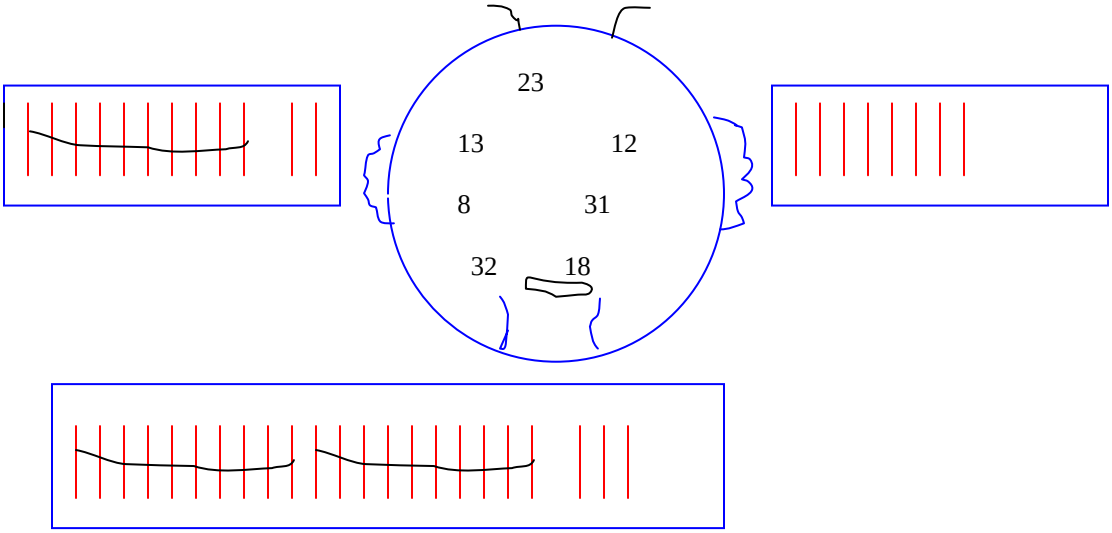
g. ……

h. ……

Appendix F

Activities for Standard 3 Lesson 5

1. Bokosi liri lonse likuyimira numbala. Lembazi mzere kuchokera pabokisi kukafika panambala yoyenera mchimutucho.

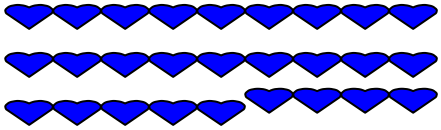


……

2.  Anthu angati ?

 Zachepa ndi bwanji?

……

3.  Zachuluka ndi zingati?

 Zilipo zingati?

……

4.

T	O
9	7
3	5
6	2

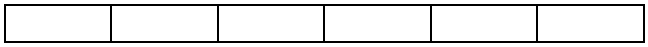
Kodi samuyi ndiyotani? Ikani chizindikiro.

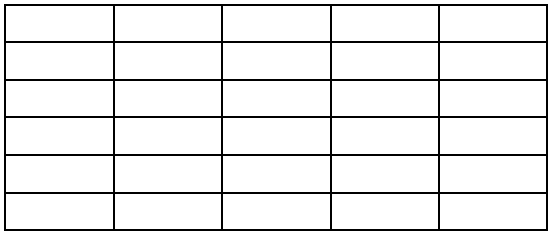
Appendix G

Activities for Standard 4 Lesson 5

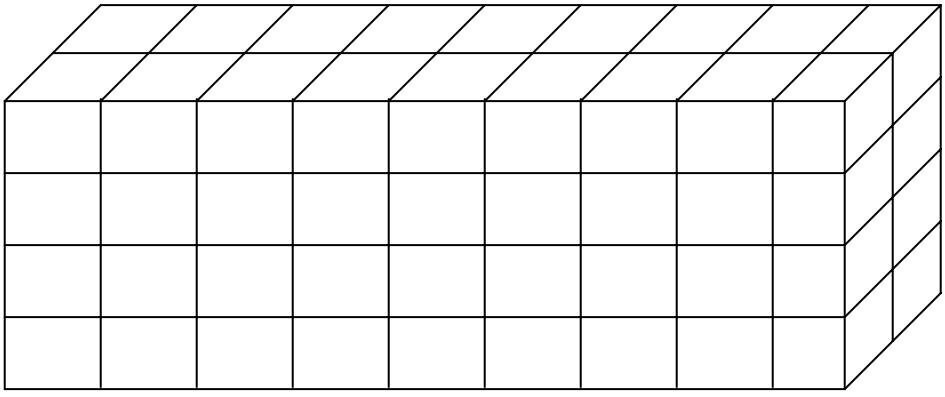
1. How many pieces of A can you make from B?

A





2. How many people are required to carry all the bricks below to construction site if each person has to carry 9 brick and make one trip only?

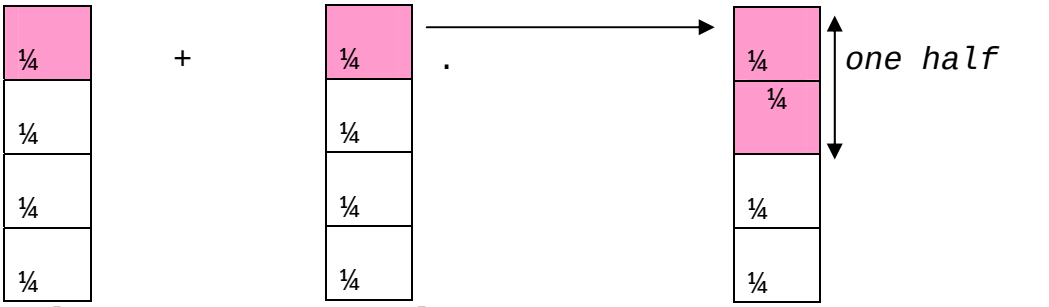


Appendix H

Activities for Standard 6 Lesson 5

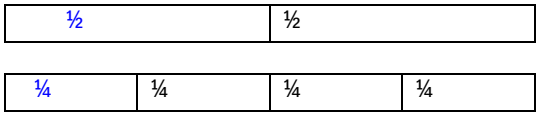
1.Use the cards provided to find out what fraction of A is B.

2. Use the picture below to explain why ¼ + ¼ = ½



One whole with four portions *One whole with four portions* *Two quarters making one half of the whole*

2. Use the picture below to explain why ½ ÷ ¼ = 2



3. Draw pictures to show that 1/3 ÷ 1/6 = 2

Appendix I

Letter to Horizon Research Inc

1833 Grayland Street – Apt.2
Blacksburg
VA 24060

July 14, 2003.

Horizon Research Inc
326 Cloister Court
Chapel Hill
NC 27514-2296

Dear Sir/Madam,

REQUESTING PERMISSION TO USE RESEARCH INSTRUMENTS FOR A DOCTORAL RESEARCH STUDY

I write to kindly seek permission from your organization to use your instruments for data collection for my doctoral dissertation. I would like to use the following instruments, pre-classroom observation questionnaire, lesson observation questionnaire, teacher's perception questionnaire, and post-classroom observation interview questionnaire.

I am a doctoral student at Virginia Polytechnic and State University. My study will investigate primary teachers' perceptions of classroom assessment and how those impact their classroom practices. Please feel free to check my candidature with Virginia Tech.

I would like to thank you in anticipation of your favorable response to my request.

Yours faithfully,

William Susuwele-Banda

Appendix J

Letter from Horizon Research Inc

horizon
RESEARCH, INC.

July 28, 2003

William Susuwele-Banda
1833 Grayland Street – Apt. 2
Blacksburg, VA 24060

Dear Mr. Susuwele-Banda:

You have our permission to use the Pre-Classroom Observation Interview Protocol, the Classroom Observation Protocol,, and the Post-Classroom Observation Interview Protocol in your dissertation research, as long as you acknowledge Horizon Research, Inc. and the National Science Foundation. More recent versions of these instruments can be found on our web site at: www.horizon-research.com.

Sincerely,

[redacted]

Iris R. Weiss
President

IRW/sbh

326 CLOISTER COURT • CHAPEL HILL, NC 27514-2296
(919) 489-1725 • FAX: (919) 493-7589 • HRI@HORIZON-RESEARCH.COM

Appendix K

Letter to Education Division Office

Malawi Institute of Education,
P.O. Box 50,
Domasi.

22nd October, 2003.

The Divisional Manager,
South Eastern Division,
P/Bag 48,
Zomba.

Dear Madam,

REQUEST TO CONDUCT RESEARCH STUDY
IN PRIMARY SCHOOLS

I write to seek permission to conduct a study in primary schools in your division, specifically in Zomba. The study will mainly involve observing and interviewing classroom teachers who teach mathematics. Before the actual study, I will need to pilot my instruments but in two different schools.

The study requires that I collect data for a full term and I would like to begin collecting data in January. However, I would be grateful if I am allowed to pilot the instruments before the end of this academic year.

Please let me know if you would like to see the instruments or hold a discussion with me about my study.

Yours sincerely,

W.J. Susuwele

Appendix L

Letter from the Education Division Office

30th October, 2003

Mr. W.J. Susuwele,
Malawi Institute of Education,
P.O. Box 50,
Domasi

Cc: The District Education Manager,
P.O. Box 311,
Zomba Rural

The District Education Manager,
P.O. Box 311,
Zomba Urban

: The Headteachers:
Malemia , Mchengawedi, Mponda Schools.

PERMISSION TO CONDUCT RESEARCH STUDY IN PRIMARY SCHOOLS.

Reference is made to your letter dated 2nd October, 2003 in which you requested this office to grant you permission to do research in Primary Schools in this Division.

I am pleased to notify you that permission has been granted for you to carry out the Study on the teaching of Mathematics through observation, interviews and piloting the Instrument.

The schools involved will be Malemia, Mchengawedi in Zomba Rural and Mponda in Zomba Urban.

The District Education Managers and headteachers of these respective institutions are asked to assist accordingly Mr. Susuwele to carry out this research.

[redacted]

For: **EDUCATION DIVISION MANAGER**

VITA

William John Susuwele-Banda is a senior curriculum specialist at Malawi Institute of Education (MIE). He graduated from the University of Malawi in 1989 as a mathematics and physical science teacher. He taught mathematics and physical science at Chichiri Secondary School before joining Makerere University in 1992 to read for a master's degree in physics education. After his graduation, he joined Domasi College of Education to teach physics and physics Education. While at Domasi College he served as acting head of physics department and also as academic warden.

In 1996, William joined Malawi Institute of Education as a curriculum specialist. In 1998, he was asked to head a newly established department (Department of School and Teacher Development) at MIE. During his leadership, the Department of School and Teacher Development trained 315 primary education advisers (PEA) and took a leading role in establishing 315 teacher development centers in Malawi. He has chaired a technical committee on primary teacher education in Malawi for two years and was a member of a technical committee on policy investment framework (PIF).

William has published seven articles on different subjects in local press and journals in Malawi and has participated in a numbers of research and evaluation exercises. He has edited some primary mathematics books in Malawi and has co-authored physical science supplementary leaders for secondary school science teachers. His national and international presentations include: Mathematics and Science Teachers' Efforts in Reducing Gender gap: A case study of three secondary schools in Zomba presented at a Regional Africa GASAT Conference (19-24 October, 1997) Lilongwe, Malawi; Teachers' Development Centers in Malawi: Can they be set up to promote school improvement? Presented at an International Congress of School Effectiveness and Improvement (5-9 January, 2001) University of York, Toronto, Canada; and Mathematics Curriculum Reform and the Rooted Culture of Teaching and Learning. Presented at a Twenty-fourth Annual Meeting of the North American Chapter of International Group for Psychology of Mathematics Education (26-29 October, 2002) Athens, GA. Currently he is working on a book, which will help both beginning and experienced teachers in Malawi to make their teaching exciting and participatory.