

**UNIVERSITY OF EDUCATION, WINNEBA**  
**FACULTY OF SCIENCE EDUCATION**

**MATHEMATICS TEACHERS' PERCEPTION ON CLASSROOM ASSESSMENT  
AND PRACTICES AT THE JUNIOR HIGH SCHOOLS IN GHANA. A CASE  
STUDY AT AWUTU-SENYA DISTRICT**

**BY**

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**BED MATHEMATICS**

**A DISSERTATION IN DEPARTMENT OF MATHEMATICS EDUCATION FACULTY  
OF SCIENCE EDUCATION 'SUBMITTED TO THE SCHOOL OF RESEARCH AND  
GRADUATE STUDIES UNIVERSITY OF EDUCATION, WINNEBA, IN PARTIAL  
FULFILMENT OF THE REQUIREMENTS OF THE AWARD OF THE DEGREE OF  
MASTER OF EDUCATION IN MATHEMATICS EDUCATION OF THE UNIVERSITY  
OF EDUCATION, WINNEBA.**

**AUGUST, 2013**

## DECLARATION

### CANDIDATE'S DECLARATION

I hereby declare that this dissertation with the exception of quotations and references contained in published works which have been identified and acknowledged, is entirely my own original work and it has not been submitted, either in part or whole for another degree elsewhere.

Candidate's Name: ..... Date: .....

Candidate's Signature: .....

### SUPERVISOR'S DECLARATION

We hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on the supervision of dissertation as laid down by the University of Education, Winneba.

Supervisor's Name: ..... Date.....

Signature.....

## **DEDICATION**

I dedicate this work to my siblings: Rev. Fr. Hayford Amatey Armah, Doris Naa Ayeley Armah, Bismark Jonathan Armah and Michael Joseph Armah. Also to my niece Gertrude Tori.



## ACKNOWLEDGMENT

I wish to express my sincere thanks to my maker for his protection and wisdom during my study in the University.

I also wish to express my sincere gratitude and appreciation to Dr. P. O. Cofie for supervising this work. Again I want to express my deepest appreciation to all my friends who assisted me to obtain this level of education and my headmaster for his persistent advice and encouragement.



## ABSTRACT

Academic performance of students in mathematics is challenged by several factors. The study aimed at finding out mathematics teachers' perceptions on classroom assessment and practice at the Junior High Schools in Ghana.

Descriptive survey design using questionnaire for teachers, students' questionnaire, inspection of documents and interview of teachers were used to collect data. The respondents were 30 teachers and 20 students selected randomly from schools in Awutu-Senya district (Awutu and Kasoa circuits). The data collected were analyzed using percentages.

The study revealed that 70% of the mathematics teachers who participated perceived classroom assessment as a tool that the teacher uses to inform him/her on how the students have learnt. It also revealed that 100% of the participated teachers indicated that assessment is useful to both teachers and students, teachers use correct teaching and learning methods and had knowledge about classroom assessment practices but teachers did not provide students written comments on their marked exercises and assignments.

Based on the findings, the study recommended that teachers should be properly supervised in order to check unmarked exercises for students and written comments as feedback. Students should be made to copy questions for exercises and class test before answering them in their exercise books. Mathematics teachers at the JHS level of education also need to use different assessment strategies to monitor student progress in mathematics.

## TABLE OF CONTENT

Declaration	i
Dedication	ii
Acknowledgement	iii
Abstract	iv
Table of Content	v
List of Tables	vi

### CHAPTER 1:

Introduction	1
Background of the Study	1
Statement of the Problem	7
Purpose of the Study	8
Objective of the Study	9
Research Questions	9
Significance of the Study	9
Limitations	10
Delimitations	10
The Organizational Plan of the Study	10
Operational Definitions	11

### CHAPTER TWO

Literature review	12
-------------------	----

Mathematics learning in basic schools	12
Classroom assessment practices	15
Making formative use of class test	18
Relationship between perception and practice	20
Assessment reforms in Ghana	21
Continuous assessment in Ghana	22
School-based assessment in Ghana	25
Perception influences performance in mathematics	26

### **CHAPTER THREE**

Introduction	27
Research design	27
Research population	27
Sampling	28
Research instrument	29
Validity of the instruments	29
Data collection	30
Data analysis procedure	30

### **CHAPTER FOUR**

Data analysis and results	32
Background information of participants	32
Experience of participants	33

Number of years of teaching mathematics	34
Research question one	36
Research question two	40
JHS students' perception of their mathematics teachers' classroom assessment practices	45
Research question three	48
Inspection of students' documents	51
Response of teachers to interview questions	52
Discussion of findings	54
Summary	60
<b>CHAPTER FIVE</b>	
Summary, Conclusion and Recommendations	62
Summary	62
Findings	63
Major findings	64
Recommendations	66
Suggestions for further studies	67
Conclusion	67

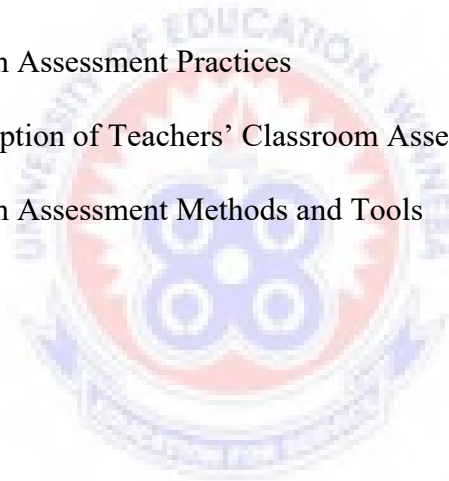


<b>REFERENCES</b>	68
Appendix A – Teachers questionnaire	77
Appendix B – Students questionnaire	81
Appendix C – Teachers interview questions	82



## LIST OF TABLES

Table 4.1 Distribution of Respondents' Teaching Experience	33
Table 4.2 Distribution of Respondents' Experience in Teaching Mathematics	34
Table 4.3 Distribution of Respondents' to Class They Teach	35
Table 4.4 Teachers Perception on Classroom Assessment	36
Table 4.5 Usefulness of Assessment to Teachers	37
Table 4.6 Usefulness of Assessment to Students	38
Table 4.7 Teachers' Classroom Assessment Practices	41
Table 4.8 JHS Students' Perception of Teachers' Classroom Assessment Practices	45
Table 4.9 Teachers' Classroom Assessment Methods and Tools	58





## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 Overview**

This chapter is on the background of the study, statement of the problem, the purpose of the study, objectives of the study, research questions, significance of the study, delimitations, limitations of the study, organization of the study, and operational definitions.

#### **1.1 Background of the Study**

It is becoming more and more evident that, classroom assessment is an integral part of the teaching and learning process. Recent years have seen increased research on classroom assessment as an essential aspect of effective teaching and learning (Myran & Worman, 2002). The National Council of Teachers of Mathematics (NCTM, 2000) regards assessment as a tool for learning mathematics. The NCTM contends that, effective mathematics teaching requires understanding of what students know and need to know.

Educational assessment can be defined as means of gathering, analyzing, and interpretation of information to tell how well a student is doing on a particular subject such as mathematics. Assessment entails everything from informal observation of a student's work to the use of commercial test such as Ghana's Basic Education Certificate Examination (BECE). It also involves measurement and decision making on an individual educational traits, potential and actual performance and may include formal examinations as well as less formal methods of measurements. Through assessment, we are able to monitor the success or failure of educational approaches and the need to make changes in the curriculum. Assessment gives feedback if

desired educational goals are being achieved or not. According to Roberts, et al (2001), assessment informs the teacher about what students think and what they need to learn. Ampiah, et al (2003) contend that a teacher need to know what children are able to do or not if he or she is to plan effectively.

Research has revealed that most students perceive mathematics as a difficult subject, which has no meaning in real life (Van de Walle, 2001). This perception begins to develop at the primary school where students find the subject very abstract and heavily relying on algorithm that, the students fail to understand. This trend continues up to Junior or Senior High School and Colleges of Education. By the time students get to Senior High School (SHS), they have lost interest in mathematics and cannot explain some operations in mathematics. Also, Bolt and Hobbs (2005), state that the way in which pupils are assessed in mathematics has a very strong influence on the way they are ultimately taught. To them as long as the school assessment is based on timed-written test with a large number of questions to be answered, little change regards to the methodology of most mathematics teachers are realized.

In recent times, mathematics educators agree that mathematics teaching at all levels should include the six elements suggested in 1982 by Cockcroft committee as outlined below; discussion practice for consolidation, practical work, investigational work, problem solving and application of mathematics in everyday situations. According to the committee, engaging students in all the six elements will make students become active learners rather than passive recipients for learning mathematical concepts.

In Ghana, most if not all the six elements of instruction suggested above are missing in teachers' classroom practices. The mode of mathematics instruction involves the use of traditional

approach in which the teacher poses a problem, explain the process of solution in small, atomized steps, and then students practice more of the same things taught (Mereku, 2004). Such instruction has proved insufficient for generating a deep understanding of mathematics for all students (Battisa, 1999, Mereku, 2004). Many students may develop procedural fluency (i.e. use of algorithms or rules), but they often lack the deep conceptual understanding necessary to solve new problems or make connections between mathematical ideas and real life situations.

Robertson (2005) suggests two traditional reasons for assessment which are mainly for (i) communicating results of students' achievement which has been a key responsibility for teachers, and (ii) selecting and sorting students for entry into various programmes. Besides reporting and sorting, student assessment can improve student learning, teacher effectiveness, and increase the levels of student engagement with the material (Marzano, 2000; Shephard, 2000, McMillan, 2004). Heady, (2000), suggests that assessment tools should be able to demonstrate continuous improvement, and help students to focus on their own learning while the measurement methods should be consistent, increase student understanding and give them opportunities to learn and reflect on their own learning outcomes.

Most research studies in both education and cognitive psychology have recorded weaknesses in the way mathematics is taught. The most serious weakness is the psychological assumption about how mathematics is learned which is based on many psychologists and educators who believe that children construct their own knowledge as they interact with their environment Cathcart, et al. (2001). 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 become aware of and solve their own problems (Althouse, 1994). 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.

There is general concern among mathematics educators about the state of mathematics education in Ghana. Test information has consistently indicated problems in the way students learn and these problems have persisted over a decade. Ghanaian students who participated in the 2003, Trends in International Mathematics and Science Study (TIMSS) performed poorly such that Ghana placed 45<sup>th</sup> position on the overall mathematics achievement results table (Anamuah-Mensah, Mereku and Asabere-Ameyaw, 2004). In TIMSS 2007, Ghana's JHS students score were lower than those obtained by all participating African countries although; there was an improvement in performance from that of 2003. Ghana's scores were among the lowest, and were statistically significantly lower than the TIMSS scale score average of 500 (Anamuah-Mensah, Mereku, & Ghartey Ampiah, 2008).

At the primary level, the National Education Assessment (NEA) results indicated that the mean scores percent in mathematics for P3 and P6 respectively were 36.6% and 34.4% which revealed poor performance in mathematics. The nation is simply failing to reach reasonable standard of mathematical proficiency with most of our students, forgetting that these students will become the nation's adults. Many become teachers equipped with the same mathematics education and it is a big problem.

Policy documents indicate that the main objectives of teacher training programmes are to raise the academic level of student teachers, to increase exposure to classroom experience and through specific education courses, make them aware of teaching strategies based on pedagogic principles. Thus the thrust of Pre-service Teacher Education (TE) programme in Ghana appears to be to develop a teacher knowledgeable in the subject areas, and equipped with some fundamental skills of teaching. In effect, it aims at producing a teacher who possesses a critical mass of pedagogical content skills and knowledge which are considered essential to the promotion of children's learning in classrooms.

Today, there is Teacher Education (TE) programme for Basic Education teachers in Ghana. Programme "A" for teachers who will be teaching at the Primary level and Basic Education Programme "B" for teachers at the Junior High School, and third, degree programmes in education. Teacher Education is provided through pre-service training within the context of training institutions.

Ghana has thirty-eight (38) Government Colleges of Education (CE). Individuals who are enrolled into the colleges are known as Pre-service teachers. Pre-service teachers are selected into the Colleges of Education by virtue of their performance in the West Africa Senior Secondary Certificate Examination (WASSCE) and a selection criteria set by the Teacher Education Division (TED) of Ghana and Ghana Education Service (GES). The Colleges of Education operate the semester system. Currently each pre-service teacher goes through four semesters in college and one academic year of internship in a Basic School. Pre-service teachers are taken through well planned series of courses offered at the Colleges of Education which comprises of content and methodology. The method courses are offered in the second year of the programme by which time the trainees had already been taken through the basic mathematics



content course. It is believed that the pre-service training mathematics curriculum will equip pre-service teachers with the mathematical knowledge needed for teaching at the Primary and JHS during their internship and upon completion of their training. Pre-service teachers in the country's Colleges of Education (CE) are assessed at the end of every semester by the Institute of Education, University of Cape coast.

The steps taken by Ministry of Education, Science and Sports (MOESS) to upgrade the standard of Basic Teacher Education Programme to ensure teachers' improvement are steps in the right direction. There is evidence that the quality of teacher's assessment practices may be deficient in many ways. Problems that have been identified include the use of poorly focused questions, a predominance of questions that require short answers involving factual knowledge, the evocation of responses that require repetition rather than reflection, and lack of procedures designed to develop students' higher-order cognitive skills. With some notable exceptions in francophone countries, the improvement of classroom assessment has received little attention in reforms.

In recent times, teachers give assignments and exercises to students to do after using more than two-thirds of their time for teaching. Many teachers fail to mark pupils' assignments and exercise on time. Little correction or no correction is done on student's error due to time frame of each subject on the time table. Many teachers also fail to record the actual scores of pupils work in their continuous assessment by guessing marks for them to show that they are doing the work it is expected of them. Some of my colleague teachers even accumulate the exercises for the pupils for a long period of time and give it to them only when they hear that supervisors are coming round. Others too fail to give the marked end of term's answer sheets to their pupils and award them marks and grades in their terminal reports denying the pupils the good purpose of feedback since they do not recognize areas that they went wrong or what is expected from them.

Also, teachers set lower cognitive questions to pupils since most of their questions are true or false with few fill in the blank spaces and essay questions are based on knowledge and understanding by recall of answers. Some teachers even give the answer sheets of term's examinations to their own children to mark and award marks without taking into consideration the level of the students they are dealing with and the type of subjects they are handling. 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 and then actively monitor the students through various classroom assessment methods as they engage in an investigation. The other role of the teacher is 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 particular point.

## **1.2 Statement of the Problem**

The world today recognizes the importance of achieving high levels of literacy and numeracy. Studies have shown that society with high levels of literacy and numeracy have lower levels of poverty (Policy Investment Framework of Malawi,2000).It has been generally accepted by the most industrialized countries that good education leads to economic growth hence reduced poverty and improved health. Although, Ghana like most developing countries, strive to improve the quality of education, the performance of students in mathematics both at the basic school and senior high school remains far below average.

In trying to improve the quality and increase the number of teachers, Ghana has moved from one policy to another through the upgrading of teacher training programme from three-year Post Secondary to Diploma Awarding Institutions (Ministry of Education, 2004).

. Kadyoma (2004) quotes a teacher's phrase in italics as *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 the true reflection of the student's performance as such. They tick so that when those concern 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* (p.124). Mbewe (2002) reports teachers having limited knowledge of classroom assessment.

### **1.3 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 teacher's perceptions on classroom assessment in mathematics and their current classroom assessment practices.

## **1.4 Objectives of the Study**

The general objectives of this study is to:

- i) Explore the views of Junior High School teachers on classroom assessment.
- ii) Identify factors affecting mathematics teachers on classroom assessment.
- iii) Investigate how teachers in schools practice assessment in their classrooms.

## **1.5 Research Questions**

This study investigated the current classroom assessment practices of Junior High School mathematics teachers in two selected circuits in Awutu-Senya District of central region of Ghana. The following questions guided the study:

1. How do Junior High School mathematics teachers perceive classroom assessment?
2. What factors influence teachers' classroom assessment practices on their students' performance?
3. What kinds of assessment methods and tools do JHS mathematics teachers use to assess their students?

## **1.6 Significance of the Study**

The term assessment in some schools means testing and grading (Stiggins, 2002). This study investigated teachers' perception on classroom assessment and their current practices. The results may assist Junior High School teachers and also college instructors, curriculum developers in Ghana and Ghana Education Service to plan proper assessment strategies for their various schools. Schools are to develop assessment guidelines for their respective schools.

The Ghana Institute of Education, which is responsible for the professional training of in-service teachers, may use the results to develop an in-service training course on classroom assessment. The results from this study would also add to the existing literature on classroom assessment practices.

### **1.7 Limitations**

Junior High Schools are found in every nook and corner in the country. The wide expanse of the country implies that it may not be easy to assess all Junior High Schools in the short time at the disposal of the researcher. Added to this, it is also expensive travelling around the country as the researcher with limited financial support, may not be able to go round all schools.

### **1.8 Delimitation**

This study was delimited to the investigation of Junior High School mathematics teachers' perception as well as practices of classroom assessment in schools in Ghana. It is also restricted to the Awutu and Kasoa circuits of Awutu-Senya district of Central Region in Ghana, because the researcher is a teacher in the District so he can easily distribute the questionnaire and collect them back.

### **1.9 The Organizational Plan of the Study**

The study was organized in five chapters. In chapter (1), background of the study, statement of the problem, purpose of the study, research questions, significance of the study, delimitation, limitation and organizational plan were presented. The relevant literature review was presented

in chapter (2). I described the research design methodology in chapter three (3). Results and discussions were done in chapter (4). Chapter (5) consisted of summary of key findings, conclusion, recommendations and suggestions for further study.

## **1.10 Operational Definitions**

*Assessment:* Assessment is the process of gathering information for the purposes of making decisions about educational policy, about curriculum and educational programs, or about individual student's learning.

*Assessment Practice:* A manner of conducting assessment for instance observations 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.

*Junior:* A section of Primary school comprising basic 7, 8 and 9.

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

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Overview**

For more than 30 years the investigation of students' attitude towards studying mathematics has been a substantive feature of the work of mathematics research community.

This chapter is divided into four main sections. The first section gives an overview on how basic school pupils 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 gives a brief description of Junior High School assessment in Ghana.

#### **2.1 Mathematics Learning in Basic Schools**

Constructivism is a view of learning influenced by the works of Brownell, Piaget, Vygotsky, Dienes, and Bruner which asserts that children build or construct their own knowledge by integrating new concepts and procedures into existing mental structures. Children must create or recreate mathematical relationships in their own minds. For example, before a child learns the value of various United State (U.S) coins, the child may believe that nickel is more valuable than a dime because of the relative sizes of the coins. Once the child has assimilated the idea of coin value and has learned that a nickel is worth five cents while a dime worth ten cents, the child will agree that a dime has more value than a nickel (Kamii, 2000).

To process information, one must interpret it in relation to what is already known or believed. Children should be active in the learning experiences in order to fully internalize the experience. Teachers who use the constructivist method of teaching encourage discovery learning and active

experimentation by their students. According to Kamii (2000), teachers need as much scientific knowledge about how children learn mathematics as physicians have about the causes of illness. Because of this need, teacher-preparation programs must change (Kamii, 2000).

With scientific research replicated worldwide, Piaget showed that all children construct, or create logic and number concepts from within rather than learn them by internationalization from the environment (Kamii, 2000). Studying research, leads teachers to understand that addition involves part-whole relationships, which are very hard for children to make and which cannot be taught through practice and memorization. To add two numbers, children must put two wholes together ("three" and "four", for example) to make a higher-order whole ("seven") in which the previous wholes become two parts. When young children cannot think simultaneously about a whole and two parts, they count-all by changing both "three" and the "four" into ones. Making children count-on is harmful when they cannot mentally make the part-whole relationship necessary to count-on.

Pierre and Van Hiele developed a theory in geometry 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. 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 than learners constructing their own knowledge by selectively using experiences around them. Cathcart, et al., (2001) view learners not as passive receivers of knowledge, but as active participant 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 pupils know that children enter school with some knowledge of mathematics (Baroody & Coslick, 1998). Children come to pre-school or school able to differentiate small quantities, short pieces from long pieces and they understand concepts such as “three ness” (Althouse, 1994; Baroody & Coslick, 1998). Althouse contends that children are inquisitive by nature. Whether in school or at home, they like to explore, feel, and smell (Althouse; Baroody & Coslick, 1998). Cruikshank 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 (Cruikshank & Sheffield, 2000). Some children perform better in a more structured setting while others prefer a class with a less structured environment (Bezuk et al., 2001). There are a number of factors such as motivation, puzzles, games that influence learners’ preferred learning styles. The critical point is that teachers need to be aware of the fact that differences in preferred learning style do exist and must provide for them by incorporating a variety of approaches and activities into mathematics class (Bezuk et al., 2001). 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 (Bezuk et al., 2001). As a result of this theory in mathematics, lengthy or complex computations are used as a major form of exercise. 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. Constructivist on the other hand, believed that learners construct their own learning; that is mathematics knowledge emerges (Baroody & Coslick, 1998; Bezuk et al., 2001). From the constructivist point of view, children construct their own understanding of mathematics ideas by means of mental activities or through interacting with physical models of mathematical ideas (Bezuk et al., 2000; NTCM. 2000)

Teachers who fail to engage students assume that their job is to put knowledge into children's heads (Cruikshank & Sheffield, 2000). They also assume that the proof of this transmission of knowledge is a high score on standardized tests (Cruikshank & Sheffield, 2000). 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.

## **2.2 Classroom Assessment Practices**

The introduction of new assessment practices into existing high stakes assessment creates a climate of change with immediate and direct consequences for policy and instruction at the level of school and classroom. The same can be said about espouse beliefs about assessment and the

actual teaching practice. Class size can contribute to the way teachers teach and manage their classes, but their perception of classroom assessment may contribute even the more.

Meek (2003) reported that testing time in schools in the US has increased drastically in recent years. In some schools the Standard-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 research 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.

McMillan, et al (2002) in their study, aimed at describing the nature of classroom assessment and grading practices. They 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.

There is enough evidence suggesting that in schools assessment mainly refers to tests, examinations and grading (Bezuk et al., 2001; Van de Walle, 2001; Lissitz & Schafer, 2002).

School leaders have reached a point of believing that one cannot assess without assigning grades (Lissitz & 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. It is very clear that the general aim of classroom assessment as mentioned previously is to change teaching and learning in a positive way. It is worth exploring this formative function, which provides the actual context of classroom assessment.

According to Lampert (2001), if criteria and goals reflect meaningful activity, student begins to develop a better sense of how to engage in that activity. Students' participation in classroom assessment allows them to glean valuable information about their performance. One of the key components of engaging student in the assessment of their own learning is providing them prompt feedback as they learn and discussing feedback on task they performed with them.

Teachers therefore stand in a unique position to gain insight into their students' understandings, actions, behaviors, interests and motivation.

### **2.2.1 Making Formative Use of Classroom Test**

Assessment that support student learning requires both quality assessment and effective use of results, and that both must be carefully crafted and aligned with goals for student learning (Herman & Baker, 2005; Herman, et al, 2005). Classroom tests serve as practice for students when teachers assess student learning for purely formative purposes. A test is formative if the feedback is use to adjust teaching and learning in the classroom (Chappuis, & Chappuis 2007). This is the most valuable formative assessment called "assessment for learning". Learning often takes place best when students get opportunities to express ideas and get feedback from their teachers: One of the key components of formative assessment is providing students with descriptive feedback as they learn. Descriptive feedback provide students with an understanding of what they are doing, and gives specific input on how to reach the next step in the learning progression. But for feedback to be most helpful to learners, it ought to be analytical, suggestive, and come at a time when students are interested in it.

In a study, Pashler, et al (2005) found that if people who missed an item on an initial test were given corrective feedback, they were very likely to get the item correct on a subsequent test, whereas people who were not provided corrective feedback on missed items performed poorly on a final test on these items. According to Carol (2002) the diagnostic use of assessment to provide feedback to teachers and students over the course of instruction is called formative assessment. Formative assessment is carried out during the instructional period to provide feedback to students and teachers on how well the

material is being taught and learned. Formative assessment which takes place during a learning activity provides the teacher with information regarding how well the learning objectives of a given learning activity are being met.

Feedback to students reinforces successful learning and identifies the learning errors that need correction (Trowbridge, Bybee & Powell, 2004). Formative assessment as used in teaching is essentially an ongoing activity that enables the teacher to observe and react to the way students perform activities that form part of the lesson. The teacher may assess students' understanding of the lesson in a variety of ways: by observing their facial expressions, looking at their written work, asking questions, listening to students' ideas, supporting discussions, observing activities and providing support for students to progress (Jones & Tannor 2003). In addition, formative assessment is particularly effective for students who have not done well in school, narrowing the gap between low and high achievers while raising overall achievement. Most instructors intuitively use questioning as a method of formative assessment but in large lecture class, not every student can be questioned because of time constraints. Formative assessment is also useful in virtually all learning activities such as preparing oral and written reports, fieldwork and as projects as case studies progress. According to Jones and Tannor (2003), formative assessment has the aim of modifying behavior through provision of support for learning. Feedback is a key aspect of formative assessment. Teachers gain feedback in a variety of ways from their students and in return provide feedback to their students.

Ruiz-Primo and Furtak (2006) identified two types of formative assessment as informal and formal formative assessment. Formal formative assessment usually starts with

students doing or carrying out an activity designed in advance by the teacher so that information may be more precisely gathered. The activity enables teachers to step back at key points during instruction, check students' understanding and plan on the next steps that they must take to move forward in their learning. This type of formative assessment takes place at the beginning, during or at the end of a unit. Informal formative assessment is more provisional and can take place in many student teacher interactions at the whole-class, small-group or one-on-one level. It can arise out of an instructional or learning activity at hand and it is embedded and linked to learning and teaching activities. The information gathered during formal formative assessment is translated and many times go unrecorded. It can also be non-verbal.

### **2.3 Relationship Between Perception and Practice**

If mathematics teachers are finally to connect assessment to school improvement in meaningful ways, they must come to see assessment through new eyes. Their failure to find a potent connection has resulted in a deep and intensifying crisis in assessment in American education (Stiggins, 2002). National surveys about high stakes testing suggest that the public supports high academic standards and that these tests are helpful for promotion or graduation decisions. Although the public viewed high stakes tests as useful, polls also revealed that the public does not think that promotion or graduation decisions should rest solely on the performance on one high stake test. The public preferred teacher grades, class work, homework, or a combination of these factors and high stakes tests to the single performance measure. Other issues that the public described as more pressing than testing is school funding, student funding, student discipline,

and class size. Closing the achievement gap is one of the main goals of No Child Left Behind (NCLB) and State high stakes testing. However, there appear to be mixed views of the impact of high stakes testing on teachers, students and achievement. Central issues to this debate include the impact on student learning, impact to the curriculum, dropout and graduation rates, evidence on educational improvement, emotional impact on teachers and students, and the cost versus the actual benefits of high stakes testing. Black (2000) posited that because of lack of focus, research has done little to change the practice or policy in educational assessment suggesting that there must be coordinated effort in the future to influence policy makers and the general public. Whether research informs practice or practice is supported by research, the significance of assessment in today's era of accountability cannot be denied. Hidden within this broad topic is the issue of teacher voice through their perceptions, beliefs, and practices.

#### **2.4 Assessment Reforms in Ghana**

When Ghana attained independence from Britain in 1957 she inherited an educational system bequeathed to her by the British colonial government. The system, described as the traditional education, comprised six years primary followed by four years middle school education, making a total of 10 years of elementary education (Government white paper for MoE, 1996). Administratively, primary schools were separated from middle schools, but the selection of pupils to middle schools was contingent on performance in teachers' assessments at Primary 6. However, at the end of the tenth year the pupils wrote the Middle School Leaving Certificate Examination (MSLC) as explained in the following paragraphs; The pre-educational reform assessment programme consisted of teacher assessment and external examinations. Teacher assessment encompassed classroom exercises, weekly class tests, end of term and academic year



examinations; they were used for two main functions: instructional and administrative. While classroom exercises and weekly tests were used for instructional purposes, end of term and year examinations were used to report pupils' achievements and also to inform decisions about progress to the next classes. With respect to external examinations, the Common Entrance Examination (CEE) and the Middle School Leaving Certificate Examination (MSLCE) were used for the purpose of selection and certification. The West African Examination Council (WAEC) organized both examinations. The Common Entrance Examination was used solely for selecting pupils for secondary education. Pupils in Primary 6 and Middle Forms 1, 2 and 3 (12-15 year olds) were eligible for the Common Entrance Examination. The MSLC examination, on the other hand, was taken by only middle form four pupils (16-years).

The various assessment reforms practiced in Ghana are:

- i. Assessment in the pre-reform education system in Ghana
- ii. Continuous assessment in Ghana
- iii. School-based assessment

## **ii) Continuous Assessment in Ghana**

Until the educational reforms in 1987, “one shot” examination of paper and pencil was the mode of assessing pupils or students in Ghana. It was also the most common evaluative means used by various educational institutions. This method of assessment was carried out usually at the end of instruction, course, term or year before getting information on the learner. The Ministry of Education introduced continuous assessment in Ghana in 1987 to supplement the one shot examination. According to Tamakloe, et al

(1996), countries such as Britain, Kenya, Zambia and Nigeria among others took the lead in the implementation of continuous assessment. Nigeria introduced it in 1977. In Tanzania, it was associated with the Mozama Revolution in 1975.

Ghana introduced the continuous assessment (CA) scheme in 1987 based upon International Monetary/World Bank educational experts' CA recommendations (Kwawukume, 2006). The rationale of introducing the according to Bartels (2003) is to minimize the elements of risks associated with taken a single terminal examination. The belief is that any student who works conscientiously should not fail the final certificate examinations.

The hope of Ghana in implementing the continuous assessment system then was that the change would assist reducing the burden formally impose on the learner by the External-Terminal Assessments. "Assessment ... shall be by CA 40% of the overall assessment and shall be based on internal marks while the remaining 60% shall be by the external examinations" (Ministry of Education and Culture, 1987, p. 28).

Kwawukume (2006), however, pointed out that based on a study by WAEC, Accra, Ghana; the Ministry of Education reviewed the proportions for internal and external examinations for the first and second cycle institutions to 30% and 70% respectively.

Continuous assessment in Ghana takes the form of class assignment, class test, and project at the basic level. The policy is that each teacher should give class assignment or exercise fortnightly and record four of such performances with a minimum score of ten percent (10%) each. The sub-total is supposed to be forty percent (40%). In addition, they must give at least four projects or homework, which also has the sub-total of twenty

percent (20%). Finally, they must give four class tests each with a score of ten percent (10%). The sub-total is supposed to be forty percent (40%). The overall total marks give a sum of hundred percent (100%), which is scaled down to forty percent (40%) as the internal mark for each student. Whatever mark a student gets for the basic level can be computed to arrive at his or her final score with the forty percent (40%) for the final grading. However, the above internal grading was changed into thirty percent (30%) while the external examination now carry seventy percent (70%) from the 1996/97 academic year (Ministry of Education, 1996; Bartels 2003). This is the practice in our Junior High Schools currently.

Despite the fact that the proportions for both the CA and the external marks are clearly spelt out, it is not clear whether the examining bodies actually used continuous assessment as part of the overall results of the students as was proposed by its originators.

Kwawukume (2006), points out that a study by WAEC in Ghana, questioned the reliability of the continuous assessment score and indicated that, generally, some teachers abused the continuous assessment scores. The study further established that continuous assessment scores in certain subjects obtained by some students did not have any positive linear relationship with the scores obtained in the external examinations. This earlier finding of WAEC was further supported when WAEC cancels 386 students' entries in Ghana citing forged continuous assessments scores (Atiku, 2008).

Mukhtar, (1998) with regard to Teacher Training Colleges points out that in particular instance, a male student who scores 15 out of 30 marks in CA in Basic science obtained 62 out of 70 in the external examinations, whereas, a female who scored 25 out of 30 in

CA obtained 18 out of 70 in the external examinations. Bartels (2003) made similar observations to support earlier findings. He pointed that favoritism and victimization are the order of the day. He observes that either a student danced to the master's voice, or she/he is condemned.

Though the observations above cannot be generalized in order to make conclusive statements, they nevertheless, point to the fact of possible abuse in the use of continuous assessment scheme in Ghana.

### **iii) School- Based Assessment (SBA) in Ghana**

School- based assessment (SBA) refers to assessments administered in schools and marked by the students own teachers. As indicated above, in Ghana SBA was introduced into the curriculum in the last review of the teaching syllabus in 2007 to replace what used to be called Continuous Assessment (CA) with the aim of making assessment more comprehensive ie. to cover more applications profile dimensions (Mereku, Nabie, Appiah and Awanta, 2011)

In the new syllabus, hitherto the class exercises homework scores were recorded as part of continuous assessment but in new SBA, these are suppose to be done as part of the everyday formative assessment and not to contribute to the SBA score (This means after teaching for the first 3 or 4 weeks in a term, the teacher should administer a class test covering the topics (or content) and record this as SBA Task1. Then after the next 3 or 4 weeks in the term, the teacher sets and administers SBA Task2, etc. Also, unlike the continuous assessment where teachers use homework tasks that can be completed

overnight or over the weekend as project, in SBA projects are supposed to take at least six weeks to complete.

Task4, Task8 and Task12 are supposed to be undertaken throughout the term and submitted at the end of the term; and project for the second term are to be undertaken by teams of students as group projects. A project involves tasks or a series of tasks for students to carryout using one or more of the following processes: gathering data, observing, looking for references, identifying, measuring, analyzing, determining patterns and or relationships, graphing and communicating. An investigational task may also be set in the context of algebra, geometry and or measurements. A project requires students to take substantial amount of time (eg. a few days, weeks, or even months) to finish.

As part of project-based learning, the teacher is expected to give the students the opportunity periodically to present progress reports to the class for colleagues' feedback and suggestions. For SBA scoring, it is recommended that each class test (or task) should be scaled to the score 10, and project task to the score 20 (CRDD, 2007).

## **2.5 PERCEPTION INFLUENCES PERFORMANCE IN MATHEMATICS**

Perceptions and beliefs about mathematics originate from past experiences; comprising both cognitive and affective dimensions (Aguilar, Rosas and Juan Zavaleta 2012). It is widely claimed that negative perceptions and myths of mathematics are widespread among the students, especially in the developed countries (Mtetwa & Garofalo, 1989; Ernest, 1996; & Gadanidis, 2012). There is also a claim that mathematics is for the clever ones, or only for those who have inherited mathematical ability (Kimball & Smith, 2012).

## CHAPTER THREE

### METHODOLOGY

#### 3.0 Overview

This chapter is organized under the following headings: the research design, population and sampling procedure, the instruments used in gathering data, validity of the instruments, data collection and data analysis procedure.

#### 3.1 Research Design

The purpose for this study model is well suited for qualitative research methods. The study collected data using questionnaire for teachers on their perceptions about classroom assessment and practices in Junior High School (JHS). The questionnaire was used to obtain information on gender, socio-economic status and teaching experiences.

However, it could be argued that document analysis which involved the inspection of students' exercise books to gather evidence on teachers' assessment practices has the potential to reveal information that the respondent to the questionnaire is not ready to share. 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. Document analysis provides first-hand information on the kind of written feedback given to students and the nature of the activities they do.

#### 3.2 Population

A research population is a large well-defined collection of individuals or objects having similar characteristics (Castillo, 2009). Castillo distinguishes between two types of population as the

target population and the accessible population. The target population which is also known as the theoretical population refers to the group of individuals to which researchers are interested in generalizing the conclusions. Whilst the accessible population which is also known as the study population in research is one which the researchers can apply their conclusions.

The target population for this study was all the Junior High School Mathematics teachers in Awutu-Senya district in the Central Region of Ghana. However, the accessible population was all the mathematics teachers from both public and private schools at Awutu Beraku and Kasoa circuits. These two circuits were chosen due to the availability of mathematics teaching materials in the circuits. Besides these, they were also selected due to their proximity to the researcher and willingness of the mathematics teachers to accommodate the study.

### **3.3 Sampling**

The sample of the study was made up of the mathematics teachers of Junior High Schools in the Awutu-Senya district of Central Region of Ghana. It comprises sample of thirty (30) teachers of both public and private Junior high schools. There were twenty-eight (28) males and two (2) female teachers. Out of the twenty-eight male teachers, twenty-five (25) were from public sector and three (3) from the private sector schools. The two female teachers were all from the public sector. Twenty students participated in the study.

The selection of this district in the region is based largely on proximity, familiarity and accessibility of the subjects to the researcher. The researcher having taught in the district for three years could easily locate the various schools in the district. Additionally, the researcher has colleagues in each JHS in the district which he could count on for a good work. According to

Castillo (2009), sampling techniques are strategies applied by researchers during the sampling process.

### **3.4 Instrument**

Considering the nature of questions being investigated, the instruments used in the data collection were questionnaire on the perception of mathematics teachers' on classroom assessment, questionnaire on students perception on teachers' classroom assessment practices, analysis' of students' document, and interview of teachers. The questionnaire for teachers consisted of thirty-five (35) items categorized into four parts such as background information of participants, teachers' perception on classroom assessment, classroom assessment practices and influence of teachers' perceptions of classroom assessment on students' performance. This questionnaire was used in eliciting information on JHS mathematics teachers' perceptions on classroom assessment and practices in schools. Using Likert-type rating scale, on attitude being measured, these questionnaires were administered to the sample size. Questionnaire was designed for twenty (20) students', analyses of students exercise books were also done at the same time and interview of teachers.

### **3.5 Validity of the Instruments**

The combination of several data collection or methods is called triangulation (Creswell, 2003). Triangulation involves corroborating evidence from different sources to throw 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.



According to Golafshani (2003), validity describes whether the instruments are actually measuring what they intended to measure. A test is valid if its results are appropriate and useful for making decisions and judgment about an aspect of students' achievement (Gronlund & Linn, 1990). The face validity of students' learning progress monitoring form and teaching documents were ascertained by two Senior lecturers in the University of Education, Winneba who have enormous experience in research in assessment and evaluation.

### **3.6 Data collection**

According to the Economic Commission for Europe of the United Nations (UNECE, 2000), data collection is the process in which data of a study is gathered. The initial data collection process included obtaining permission from the Ministry of Education through the District Education Office. 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 questionnaires for teachers 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.

### **3.7 Data Analysis Procedure**

Data analysis is the process of converting raw data collected into usable information. To answer the research questions posed earlier in this study, a systematic search for the entire data was conducted and data categories were created. Constant comparative method of data analysis was used (Merriam, 2001). The constant comparative is a technique often used in the grounded theory tradition of the qualitative research. It involves systematic search and arrangement of field

notes and 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. Look 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 emerging model to try and establish the influence among assessment, learning and teaching.

In summary, this chapter 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 analyzed.

## CHAPTER FOUR

### DATA ANALYSIS AND RESULTS

#### 4.0 Overview

This chapter presents the results and discussions from analysis of the data that were gathered in the study. The data collected were organized and presented using descriptive statistics including frequency tables figures. The results of the study were presented under the following headings:

- i) Background information of participants.
- ii) JHS mathematics teachers' perception on classroom assessment.
- iii) The influence of JHS mathematics teachers' perceptions of classroom assessment on their students' performance.
- iv) Assessment methods and tools JHS mathematics teachers use in assessing their students.
- v) Summary

#### 4.1.0 Background Information of Participants

This study was carried out among thirty (30) Junior High School mathematics teachers from the Awutu-Senya district in Central Region of Ghana to find out JHS mathematics teachers' perception on classroom assessment and practices. Questionnaire items 0 to 4 (see Appendix A) were to find out the demographic status of the participants (ie gender, class size, number of years

taught, the number of years of teaching mathematics at the class he/she is teaching mathematics in that school and the class taught by participants). The study involves twenty-eight (28) male teachers and two (2) female teachers.

Out of the male teachers, twenty-five (25) were from the public sector and three (3) others from the private sector. Additionally, the two (2) female teachers were from the public sector. The class size ranges from twenty-three (23) to sixty-five (65) pupils.

#### 4.1.1 Experience of Participants in Teaching

The findings of experience of the participating mathematics teachers is shown in table 4.1

**Table 4.1 Distribution of Respondents' Teaching Experience**

Number of years taught	Frequency	Percent
1-5	12	40
6-10	11	36.7
11-15	5	16.7
16-20	0	0
Above20	2	6.6
<b>Total</b>	<b>30</b>	<b>100</b>

It is observed from table 4.1 that twelve (12) constituting 40% of the participating JHS mathematics teachers had taught from 1 to 5 years, 6 to 10 years is eleven (11) constituting 36.7%, 11 to 15 years is five (5) representing 16.7%, none of the participated teachers had taught

from 16-20 years and two (2) making 6.6% of the participants said they had taught more than 20 years.

#### 4.1.2 Number of Years of Teaching Mathematics

The finding of the number of years for teaching mathematics is shown in table 4.2.

**Table 4.2 Distribution of Respondents' Experience in Teaching Mathematics**

Experience	Frequency	Percent
1-5	18	60
6-10	9	30
11-15	1	3.3
Above 15	2	6.7
<b>Total</b>	<b>30</b>	<b>100</b>

From table 4.2, it is observed that eighteen (18) constituting 60% of the participants had taught mathematics for 1 to 5 years, nine (9) representing 30% of the participants had taught mathematics for 6 to 10 years, one (1) representing 3.3% of the participants had taught mathematics for 11 to 15 years and two (2) constituting 6.7% of the participants had taught mathematics above 15 years.

#### 4.1.3 Class Taught by Participants

The finding of the class taught by each of the participants is shown in table 4.3.

**Table 4.3 Distribution of the Respondents' To Class They Teach**

Class	Frequency	Percent
JHS1	6	20
JHS2	8	27
JHS3	5	17
JHS1&2	2	7
JHS1&3	1	3
JHS2&3	1	3
JHS1,2&3	7	23
<b>Total</b>	<b>30</b>	<b>100</b>

From table 4.3 which focused on the class each participant is teaching or has taught before, it is observed that six (6) constituting 20% of the participants teach in JHS1 alone, eight (8) teachers constituting 27% of the participants teach at JHS2 alone and five (5) teachers constituting 17% of the participants teach at JHS3 alone. Also, two (2) teachers making 7% of the participated teachers said they teach in JHS1&2 only, one (1) teacher making 3% of the participated teachers said he/she teaches at JHS1&3 only and another one (1) teacher making 3% of the participated teachers said he/she teaches at JHS3 only whilst seven (7) teachers making 23% of the participated teachers said they teach at JHS1, 2&3 classes.

**Research Question 1: How do JHS mathematics teachers perceive classroom assessment?**

Section A was designed to find out teachers' perceptions of classroom assessment. To answer this question, six items were developed. Item 1 of the teachers' questionnaire dealt with teachers' perception about classroom assessment in which teachers were asked to select only one option.

**Table 4.4.0 Classroom assessment**

Classroom Assessment	Number of teachers	Percentage
A process of administering a test to students in order to assign grades and report to parents and officials.	3	10
A process which helps teachers to promote students from one class to another	2	6.7
Refers to all tests a teacher gives at the end of a topic or term	4	13.3
A tool that a teacher uses to inform him about how students have learnt	21	70
<b>Total</b>	<b>30</b>	<b>100</b>

(n=30)

The result showed that twenty-one (21) teachers representing 70% indicated that classroom assessment is a tool that the teacher uses to inform him/her about how students have learnt. Also, four (4) teachers representing 13.3% said classroom assessment refers to all tests a teacher gives at the end of a topic or term while three (3) teachers representing 10% indicated that classroom assessment is a process of administering a test to students in order to assign grades and report to parents and officials. Only two (2) teachers representing 6.7% indicated that classroom assessment is a process which helps teachers to promote students from one class to another.

Item 2 dealt with how often teachers assess their students. The result showed that out of thirty (30) respondents, seventeen (17) teachers representing 56.7% indicated that they assess their students about every lesson, six (6) teachers representing 20% indicated that they assess their students once in a week and five (5) teachers representing 16.7% indicated that they assess their students once in a month while two (2) teachers representing 6.7% of the respondents indicated that they assess their students every two weeks with no teacher indicated that he assesses his students twice in a term.

### Major finding 1

Majority of teachers 70% indicated that classroom assessment is a tool that the teacher uses to inform him about how students have learnt. About 57% of the teachers indicated that they assess their students on every lesson while 20% indicated that they assess their students once in a week.

Item 3 sought to find out if assessment is useful to teachers. The result of the analysis of usefulness of classroom assessment to teachers is shown in Table 4.5.

**Table 4.5 Usefulness of assessment to teachers**

Options	Number of Teachers	percentages
Strongly agree	27	90
Agree	3	10
Undecided	0	0
Disagree	0	0
Strongly disagree	0	0
<b>Total</b>	<b>30</b>	<b>100</b>

(n=30)



The results showed that all the thirty (30) teachers representing 100% of the respondents indicated that they agreed that classroom assessment is useful to them and their students of which twenty-seven (27) representing 90% of the teachers strongly agree. Some of the reasons the teachers gave in support of their decisions are; it informs the teacher about how the students have learnt and also it helps the teacher to apply remedial teaching, it helps both teachers and parents to determine the performance and how well their wards are learning. It also helps the teacher to identify students' learning needs and it's a way of giving the teacher a feedback on what students have learnt. With assessment, teachers get to know the academic level of students and design mechanism of addressing the problems. Assessment again enables teachers to know whether the students have understood the lesson and it tells them whether they have achieved their objectives. They also said that assessment helps one to determine the academic standard of the students and it helps them to identify weak students in their class and help them. The result indicated that all the teachers who participated in the study highly confirmed that classroom assessment is useful to them. Item 4 sought to find out from teachers whether assessment is useful for their students.

**Table 4.6 Usefulness of assessment to students**

Options	Number of years	Percentages
Strongly agree	20	66.7
Agree	10	33.3
Undecided	0	0
Disagree	0	0
Strongly Disagree	0	0
<b>Total</b>	<b>30</b>	<b>100</b>

(n=30)

The result showed that all the thirty (30) teachers representing 100% of the respondents agreed that assessment is useful to their students of which twenty (20) representing 66.7% strongly agree. This result again attests to the earlier assertion that classroom assessment is useful to both teachers and students.

### **Major finding 2**

Majority of teachers 90% indicated that classroom assessment is useful to them by strongly agreeing to the assertion while the remaining 10% agreed that classroom assessment is useful to them. About 66.7% of the teachers strongly agreed that classroom assessment is useful to their students while the remaining 33.3% agreed that classroom assessment is useful to their students.

Item 5 tried to find out whether their teacher preparation programme provided a variety of ways to assess students. The result showed that seventeen (17) teachers representing 57% of the participant strongly agreed that their teacher preparation programme provided them a variety of ways to assess students while the remaining thirteen (13) teachers representing 43% of the participants agreed to the assertion.

### **Major finding 3**

Majority of teachers about 57% indicated that their teacher preparation programme provided them with a variety of ways to assess their students by strongly agreeing to the assertion while the remaining 43% also agreed to the assertion.

Item 6 sought to find out the type of feedback teachers provide for students based on their way of assessment, respondents gave the following reasons to indicate the type of feedback they provide to their students on their assessment practices. Some of them said they provide remedial classes

after assessment of their students, they do revision before every lesson starts, they make corrections on their students mistakes and they ask students to backup if they don't do well in class as a form of encouragement to the students. Others said they take students through salient points in order to help the students do their corrections. They ask students to clap for those of them who do well in the class during their assessment and they praise students by giving grades to them. For example, 55% displays assessment results for everybody to see.

#### **Major finding 4**

Teachers give different feedback to students in order to inform learning and to serve as a form of reinforcement to students. Also to correct daunts in students mind and to encourage students to learn the right things.

#### **Research Question 2: What factors influence teachers' classroom assessment practices on their students' performance?**

Section B was designed to find out the factors that influence teachers' classroom assessment practices on their students' performance. To answer these questions, fifteen items were developed. The results of the teachers' classroom assessment practices are shown in Table 4.7 below.

**Table 4.7 Teachers classroom assessment practices**

Item	Never	Sometimes	Frequently	Always
1	0(0)	8(27)	7(23)	15(50)
2	0(0)	5(17)	13(43)	12(40)
3	0(0)	8(27)	12(40)	10(33)
4	2(7)	2(7)	10(33)	16(53)
5	0(0)	6(20)	12(40)	12(40)
6	0(0)	3(10)	10(33)	17(57)
7	0(0)	5(17)	6(20)	19(63)
8	0(0)	7(23)	6(20)	17(57)
9	0(0)	7(23)	6(20)	17(57)
10	0(0)	2(7)	7(23)	21(70)
11	0(0)	6(20)	6(20)	18(60)
12	0(0)	6(20)	8(27)	16(53)
13	0(0)	6(20)	3(10)	21(70)
14	0(0)	7(23)	6(20)	17(57)
15	2(7)	3(10)	10(33)	15(50)

Note. Figures in parentheses are in percentages (n=30)

Observing tables 4.7 and 4.8 closely, when teachers' view were sought to find out whether they design their lessons to allow them monitor their students' progress, 15(50%) of them said they do it always but about 16(80%) of the students said their teachers monitor the progress of their learning. When they were asked whether their instructional methods and activities reflect attention to issues of access, equity and diversity of students, more than 25(80%) of the participating teachers said they do that frequently and always. On their design of lessons incorporating tasks, roles and interactions consistent with investigative mathematics, only

10(33%) of the participated teachers said they do it always whilst 12(40%) said they do that frequently.

### **Major finding 5**

Half of teachers 50% indicated that they monitor their students' progress in the classroom but 80% of the students indicated that their teachers monitor their learning progress in the classroom. Over 80% of the teachers said their lessons reflect attention to issues of access, equity and diversity of students. About 73% of the teachers said their lessons corporate tasks, roles and interactions consistent with investigative mathematics always and frequently.

Also, when the teachers who participated in the study were asked whether they probe their students' reasoning during teaching and learning, 16(53%) of them said they do it always whilst 10(33%) said they do that frequently. This was partially supported by the views of their students since only 10(50%) of the students who participated in the study said they agreed to the corresponding statement in their questionnaire. Over 26(80%) of the participated teachers said they provide their students' adequate time and structure for reflection and this was highly supported by the views of the students since 18(90%) of the students who participated in the study agreed to the corresponding question in their questionnaire. On questionnaire item seven (7) for teachers which focused on their interactions with their students during teaching and learning, 19(63%) of the participated teachers said they do that always but the result from the students' questionnaire did not support the views of the teachers since 14(70%) of their students disagreed with the corresponding question in their questionnaire.

### **Major finding 6**

Majority of teachers 83% indicated that they probe their students' reasoning during teaching and learning but only 50% of the students supported this finding. About 50% of the teachers indicated that they provide their students' adequate time and structure for reflection and 90% of the students over warmly supported this finding. Also, over 63% of the teachers said they interact with their students during teaching and learning but about 70% of the students disagreed with their teachers. These shows that teachers view differ from their students view.

Again, over 25(80%) of the participated teachers said that their instructional methods and activities reflect attention to students' experiences and readiness. This view of the teachers was supported by the views of their students because 14(70%) of the participated students said their teachers always start lessons from what they already known. This means that teachers teach their lessons based on the principles of teaching from known to unknown. More than 21(70%) of the participated teachers said that their lessons progress based on their students response. This assertion of the teachers was highly confirmed by the views of the students because 16(80%) of the students who participated in the study said their teachers continue their lessons after they had understood the lesson they had been taught. About 17(60%) of the participated teachers said they encourage their students to talk and share ideas during teaching and learning. This was again supported highly by the views of the students who participated in the study because 16(80%) of them said their teachers encourage them to talk and share ideas during teaching and learning.

### **Major finding 7**

Majority of teachers 80% indicated that their instructional methods and activities reflect attention to students' experiences and readiness and 70% of the students confirmed this finding. More than 70% of the participated teachers said their lessons progress based on their students response and

80% of the students supported this finding. Over 80% of the students indicated that their teachers encourage them to talk and share ideas during teaching and learning while 60% of the teachers said they encourage their students to talk and share ideas during teaching and learning. Furthermore, 23(77%) of the participated teachers said that they give their students immediate feedback when they need directions to proceed during the lesson and the views of their students supported this since 16(80%) of the students who participated in the study said their teachers mark and help them to do their corrections immediately they finish doing their work. 20(100%) of the students who participated in the study said their teachers take time to explain their lessons to them and give them work to do after every lesson but only 17(57%) and 15(50%) of the participated teachers view supported the views of the students respectively on those two issues.

### **Major finding 8**

Majority of teachers 57% said they give feedback when the students' need directions to proceed during the lesson and 80% of the students supported the views of their teachers. 100% of the students said their teachers take time to explain their lessons to them and give them work to do after every lesson but only 57% and 50% of the teachers respectively supported the views of their students.

Lastly, 21(70%) of the teachers who participated in the study said they take into consideration the prior knowledge of their students before they prepare their lessons. Half of the participated teachers said they identify students who have difficulties in understanding the main ideas of the lesson during teaching and learning and they help the students to solve their problems.

## Major finding 9

Majority of teachers 70% indicated that they take into consideration the prior knowledge of their students before they prepare their lessons. About 50% of the teachers said they identify students who have difficulties in understanding the main ideas of the lesson during teaching and learning.

### 4.3 JHS Students Perception of Their Mathematics Teachers' Classroom Assessment Practices

For a sound analysis of JHS mathematics teachers' classroom assessment practices, a questionnaire item of ten (10) questions was given to twenty (20) selected students from JHS 2 to answer. This questionnaire was designed to find out the views of students on their teachers'. Table 4.8 shows the percentage of the JHS students view about their mathematics teachers' classroom assessment practices.

**Table 4.8 JHS students' perception of teachers' classroom assessment practices**

Aspect of classroom assessment practices	Yes	No
My teacher monitors our learning	16(80)	4(20)
My teacher probes our reasoning during teaching and learning	10(50)	10(50)
My teacher gives us time to think about the question he/she asks us before we are made to answer them	18(90)	2(10)
My teacher calls us to do some activities during teaching and learning	6(30)	14(70)
My teacher starts his/her lesson from what we already known	14(70)	6(30)
My teacher continuous his/her lesson after we have understood the lesson	16(80)	4(20)
My teacher encourages us to talk and share ideas during teaching and learning	16(80)	4(20)
My teacher marks and helps us to do our corrections immediately we finish doing our work	20(100)	0(0)
My teacher takes time to explain his or her lesson to us	20(100)	0(0)
My teacher gives us work to do after every lesson.	20(100)	0(0)



Note. Figures in parentheses are in percentages (n=20)

The result shows that sixteen (16) representing 80% of the participated students indicated that their teachers monitor their learning while four (4) constituting 20% of the students said they disagree with the assertion. Also, ten (10) students representing 50% of the participated students indicated that their teachers probe their reasoning during teaching and learning but the other ten (10) students representing 50% of the students who participated in the study said that they don't support the views of their colleagues.

Item 3 on the questionnaire dealt with the time teachers give to students to think about the questions they ask students before the students are made to answer them. The result showed that eighteen (18) students representing 90% of the participated students indicated that their teachers do that but only two (2) students representing 10% of the participated students said they disagree with the assertion. Also, when students were asked whether their teachers call them to do some activities during teaching and learning, only six (6) students constituting 30% of the participated students said they agree with the assertion but fourteen (14) students representing 70% of the students who participated in the study indicated that their teachers don't call them to do some activities during teaching and learning in the classroom.

In item 5, where students were asked whether their teachers start their lessons from what they already known, fourteen (14) students constituting 70% of the participated students indicated that their teachers do that but six (6) students representing 30% of the students said their teachers don't do that. In item 6, students were asked whether their teachers continuous their lessons based on their understanding of the lesson taught. Sixteen (16) students constituting 80% of the participated students indicated that their teachers do that but four (4) students making 20% of the student said they disagree with the assertion.

In item 7, students were asked whether their teachers encourage them to talk and share ideas during teaching and learning. The result shown that sixteen (16) students constituting 80% of the students said that their teachers do that but four (4) students constituting 20% of the participated students said that they disagree. Also, in item 8, students were asked whether their teachers mark and help them to do their corrections immediately they finish doing their work. The result indicated that all the twenty (20) students making 100% of the students who participated in the study indicated that their teachers do that. Again, item 9 was designed to find out whether teachers take time to explain their lessons to them. The result shown that all the twenty (20) students constituting 100% of the students who participated in the lesson indicated that their teachers do that.

Lastly, item 10 was designed to find out whether teachers give students work to do after every lesson. The result once again shown that all the twenty (20) students constituting 100% of the students who participated in the study indicated that their teachers do that. These findings corresponds to the findings of Sgori (1995) who believes that using assessment to monitor students' understanding of mathematics concepts is very critical and classrooms should be organized to promote active participation and give students freedom to explore mathematical ideas. Also, Adeyegbe (1992) submitted that a more representative view of the students' capabilities be obtained through teachers' assessment in the classroom, than a single-shot examination. Again, 2007 mathematics syllabus for Junior High Schools in Ghana recommended that project work and exercises of students will involve them in problem-solving and other meaningful tasks, allows them to work autonomously to construct their own learning, and culminates in realistic, student-generated problems.

**Research Question 3: What kinds of assessment methods and tools do mathematics teachers use to assess their students?**

Section C of teachers' questionnaire was designed to find out the type of assessment methods and tools JHS mathematics teachers use in their classrooms. To answer this question, ten items were developed. The responses to these items are shown in Table 4.9.

**Table 4.9 Teachers' classroom assessment methods and tools**

Assessment Tools and Methods teachers use	Strongly Agree	Agree	Undecided	Disagree
Demonstration by students in class	17(57)	9(30)	3(10)	1(3)
Journal writing in class	4(13)	10(33)	11(37)	5(17)
Every two weeks class test by my students	10(33)	14(47)	0(0)	6(20)
Students designing project tasks	9(30)	15(50)	5(17)	0(0)
An investigational task such as 'finding the relationship between rectangle and a triangle	12(40)	13(43)	5(17)	0(0)
Students class exercises before, during and after a lesson	11(37)	13(43)	4(13)	2(7)
Clinical interview of students in a mathematics classroom	7(23)	20(67)	3(10)	0(0)
Organization of quiz in mathematics classroom	12(40)	17(57)	1(3)	0(0)
Copying and completing statistical table in mathematics classroom	6(20)	18(60)	5(17)	1(3)
Thinking aloud by my students	7(23)	20(67)	3(10)	0(0)

Note: Figures in parentheses are in percentages (n=30)

From table 4.9, the participants were asked to tick the appropriate box to show how they agree with the statements on assessment pedagogic (tools). 17(57%) of the participants strongly agree

that demonstration by students in class is a form of assessment method or tool, 9(30%) agreed, 3(10%) said they have not decided whilst 1(3%) of the participants said they disagreed that demonstration by students in class is a form of assessment pedagogic (tool). On journal writing in class as assessment tool, 4(13%) strongly agreed, 10(33%) agreed, 11(37%) said they have not decided and 5(17%) said they disagreed that journal writing in class is a form of assessment.

### **Major finding 10**

Majority of teachers 87% indicated that demonstration by students in a class is a form of assessment method used in the classroom but about 46% of the teachers said that journal writing by students is a form of classroom assessment.

Concerning every two weeks class test by students 10(33%) strongly agreed with the statement, 14(47%) agreed to the statement, and 6(20%) disagreed with the statement. On students designing project tasks, 9(30%) strongly agreed to the statement, 15(50%) agreed and 5(17%) disagreed to the statement. 11(37%) strongly agreed, 13(43%) agreed, 4(13%) said they have not decided and 2(7%) disagreed that students class exercise before, during and after lesson is a form of assessment pedagogic (tool) used in classroom.

### **Major finding 11**

Majority of teachers about 80% indicated that they organize class test every two weeks for their students. About 80% of the teachers said that their students design projects as a form of assessment in the classroom. Also, 80% of the teachers indicated that students class exercise before, during and after lesson is a form of assessment pedagogic used in classroom.

Also, 12(40%) of the participants indicated that they strongly agreed that an investigational task such as 'finding the relation between rectangle and triangle is an assessment pedagogic (tool)

while 13(43%) indicated that they agree that an investigational task is assessment pedagogic used in classroom, 5(17%) said they have not decided and no teacher disagreed. On clinical interview of students in a mathematics classroom, 7(23%) indicated that they strongly agreed to the statement, 20(67%) said they agreed and 3(10%) said they have not decided that the statement is a form of assessment used in classroom. With organization of quiz in mathematics classroom, 12(40%) strongly agreed to the statement, 17(57%) agreed to the statement and 1(3%) said they have not decided that the statement is a classroom assessment pedagogic.

### **Major finding 12**

Majority of teachers about 83% indicated that investigational task is a form of assessment method teachers' use in their classroom. About 90% of the teachers said clinical interview of students is an assessment tool they use in classroom. Also, over 90% of the teachers indicated that they organize quiz in their classrooms as a form of assessment pedagogic.

Again, concerning copying and completing statistical table in mathematics classroom, 6(20%) indicated that they strongly agreed to the statement, 20(67%) said they agreed and 3(10%) said they have not decided that the statement is a form of classroom assessment pedagogic. 7(23%) out of the thirty mathematics teachers who participated in the study, strongly agreed that thinking aloud by students is a form of classroom assessment pedagogic, 20(67%) of the participants agreed to the statement and 3(10%) said they have not decided that the statement is a classroom assessment pedagogic (tool).

### **Major finding 13**

Majority of teachers over 90% indicated that copying and completing statistical table in mathematics classroom is a form of assessment method and tool they use in their classroom.

About 90% of the teachers said thinking aloud by students is a form of classroom assessment pedagogic they use in their classrooms.

#### **4.4 Inspection of Students Exercise books**

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 most of the pupils exercise books inspected, there were no written feedback comments from the teachers in the student exercise books. Students who mostly got class exercises wrong had more crossed off work in their exercise books. There were only two options, right or wrong but students were taking through their corrections to allow them improve upon their performance in the future. Students were also given credit for good efforts or partly done work and they are encouraged to learn hard through the award of marks on number of right strokes they get. Each student had a separate exercise book for mathematics.

It was evident that some teachers marked every written exercise they gave to their 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 the students do not copy the questions for class test, it becomes hard to revisit the work at a later date either to practice or to correct wrong answers.

In others, 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 or she went wrong. Also, some written exercises were not marked making it hard for students to know whether they got the problems correct or not and how to improve.

#### **4.5 The Response of JHS Mathematics Teachers to Interview Questions**

Some of the questions to the interviewees were: Some people said that 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. Assessment therefore, is an important aspect of the work of every teacher and school. Do you agree to this assertion? Can this be achieved by using test alone in the classroom? Is there any difference between assessment of learning and assessment for learning? The responses given by all the teachers interviewed in the study agreed to the assertion because they said that assessment informs teaching and learning in the classroom and they felt that classroom assessment benefits students by helping them to know what they do and do not understand. Some of them also said if teachers fail to imbed assessment within their lessons, it is difficult to understand what individual students are able or not able to do.

Some of them also agreed that classroom test can be used to achieve the above assertion because test helps the teacher to check what students have achieved and it helps them to grade and promote students to the next class. But others said although classroom tests are part of

assessment and could be used to assess students' learning, students do not answer all the questions that a teacher may be interested into find out students' progress in a particular lesson and what knowledge or skills they need in order to progress and a test does not provide such information because tests are normally given at specific intervals. They also said that it is not possible to administer tests everyday but it is possible to assess students on daily basis. Some of them again said that when they move from testing for achievements to assessing how students are learning that help them to explore better ways of supporting the students in learning mathematics.

Once again, the teachers that were interviewed were with the view that assessment of learning involves the use of standardized tests which are most often associated with summative aspect of assessment. They said information gained from a child's mastery of particular concepts and skills can be used to plan lessons for that child in the future. They also said that the administration of formal diagnostic tests in curriculum areas such as mathematics can facilitate an interpretation of the nature of students learning difficulties, and enables the class teacher or learning-support teacher the need to draw hypotheses on how such difficulties can be addressed during the teaching and learning process.

According to them, assessment for learning involves an ongoing process of recognizing and responding to the child's learning in order to enhance his/her development. For the teacher, this process involves engaging children in their own learning by providing rich feedback, using effective questioning, and engaging children in peer and self-assessment. They further said that the goal of assessment for learning enables learners to further their own learning and through assessment for learning, the teacher will gather extensive, continuous information about a



student's progress and attainment through observing his/her performance in and engagement with the day-to-day learning activities in the classroom.

Lastly they said that in recording assessment information for the purpose of assessment for learning, their focus is on using the assessment information gathered to provide ongoing feedback to the child and to plan learning experiences which meet his/her learning needs but assessment information in relation to assessment of learning will constitute a record of the child's progress and attainment, whether at class or school level, at the end of a given period of learning, at the end of a unit of work, at the end of a term or at the end of a year.

#### **4.6 Discussion and Implication of Findings**

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. 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. 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.

##### **4.6.1 Research question 1: How do JHS mathematics teachers perceive classroom assessment?**

Major findings 1, 2, 3 and 4 answered this question. In major finding 1, about 70% of the teachers indicated that classroom assessment is a tool that the teacher uses to inform him about

how students have learnt. About 57% of the teachers indicated that they assess their students on every lesson while 20% indicated that they assess their students once in a week. This finding is in contrast to what Susuwele-Banda (2005) reported that the teachers in his study perceived classroom assessment as tests and they used test alone to assess their students' learning.

In major finding 2, about 90% of the teachers indicated that classroom assessment is useful to them by strongly agreeing to the assertion while the remaining 10% agreed that classroom assessment is useful to them. About 66.7% of the teachers strongly agreed that classroom assessment is useful to their students while the remaining 33.3% agreed that classroom assessment is useful to their students. These findings supported the finding of Stepanek (2002) that when teachers place meaningful assessment at the center of their instruction, they give students insights into their own thinking and growth, and students gain new perspectives on their potential to learn mathematics.

In major finding 3, about 60% indicated that their teacher preparation programme provided them with a variety of ways to assess their students by strongly agreeing to item on it while the remaining 40% also agreed to the assertion. This means that our Colleges of Education should continue training their students' on different ways of assessing students in their classrooms.

In major finding 4, teachers give different feedback to students in order to inform learning and to serve as a form of reinforcement to students. Also, to correct daunts in students mind and to encourage students to learn the right things. This means that teachers should give students both oral and written feedback to enhance effective teaching and learning. Linn and Gronlund (1995) pointed out that feedback, no matter the form it may take affects students' learning either

negatively or positively. Therefore, feedback to students should provide reinforcement of success learning while identifying the specific learning errors that need to be corrected.

Chester and Quilter (1998) believed that studying teachers' perception 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. 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 classroom assessment practices.

#### **4.6.2 Research Question 2: What factors influence teachers' classroom assessment practices on their students' performance?**

Major findings 5-9 answered this question. In major finding 5, half 50% of the teachers indicated that they monitor their students' progress in the classroom but 80% of the students said their teachers monitor their learning progress in the classroom. Over 80% of the teachers indicated that their lessons reflect attention to issues of access, equity and diversity of students. About 73% of the teachers said their lessons incorporate tasks, roles and interactions consistent with investigative mathematics always and frequently. These findings correspond to the findings of Sgroi (1995) who believes that using assessment to monitor students' understanding of mathematics concepts is very critical and classroom should be organized to promote active participation and to give students freedom to explore mathematical ideas.

In major finding 6, majority of teachers 83% indicated that they probe their students' reasoning during teaching and learning but only 50% of the students supported this finding. About 50% of

teachers indicated that they provide their students' adequate time and structure for reflection and 90% of the students over warmly supported this finding. Also, over 63% of the teachers said they interact with their students during teaching and learning but 70% of students disagreed with their teachers. Teachers who fail to engage students assume that their job is to put knowledge into children's head (Cruikshank & Sheffield, 2000). They also assumed that the proof of this transmission of knowledge is a high score on standardized tests (Cruikshank & Sheffield, 2000). 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 teacher and the learner.

Although, the quality of lesson delivery is a result of many factors, failure to assess the students as they learn impacts on the learners negatively. Students' behavior, comments and answers create opportunity for the teacher to understand their conceptions and misconceptions they hold.

In major finding 7, majority of teachers 60% indicated that their instructional methods and activities reflect attention to students' experiences and readiness and 70% of the students confirmed this finding. Teachers teach from known to unknown. More than 70% of the participated teachers said their lessons progress based on their students response and 80% of the students supported this finding. Over 80% of the students indicated that their teachers encourage them to talk and share ideas during teaching and learning while 60% of the teachers said they encourage their students to talk and share ideas during teaching and learning.

In major finding 8, majority of teachers said they give feedback when their students need directions to proceed during the lesson and 80% of the students supported the views of their teachers. 100% of the students indicated that their teachers take time to explain their lessons to them and give them work to do after every lesson but only 57% and 50% of the teachers respectively supported their students. Giving thoughtful feedback can be challenging even to teachers who understand the concept of assessment (Angelo & Cross, 1993, Davis, 1993). 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.

In major finding 9, majority of teachers 70% indicated that they take into consideration the prior knowledge of their students before they prepare their lessons. Teachers follow principles of teaching from known to unknown. About 50% of the teachers said they identify students who have difficulties in understanding the main ideas of the lesson during teaching and learning.

The findings from this section, implies that teachers that attached less value to classroom assessment used standardized tests most of the times in their classroom. Chester and Quilter went further to say that teachers with negative experiences in classroom 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.

### **4.6.3 Research Question 3: What kinds of assessment methods and tools do mathematics teachers use to assess their students?**

Major findings 10-13 answered this question. In major finding 10, majority of teachers 87% indicated that demonstration by students in class is a form of assessment method used in the classroom but about 46% of the teachers indicated that journal writing by students is a form of classroom assessment method and tool.

In major finding 11, majority of teachers about 80% indicated that they organize class test every two weeks for their students. About 80% of the teachers said that their students design projects as a form of assessment in the classroom. Also, 80% of the teachers indicated that students class exercises before, during and after lesson is a form of assessment pedagogic used in classroom by them.

In major finding 12, majority of teachers about 83% indicated that investigational task is a form of assessment method they use in their classroom. About 90% of the teachers said clinical interview of students is an assessment tool they use in their classrooms. Also, over 90% of the teachers indicated that they organize quizzes in their classrooms as a form of assessment pedagogic.

Lastly, in major finding 13, majority of teachers over 90% indicated that copying and completing statistical table in mathematics classroom is a form of assessment method and tool they use in their classroom. About 90% of the teachers indicated that thinking aloud by students is a form of classroom assessment pedagogic they use in their classrooms.

In this study, the use of classroom assessment as a tool for learning was highly highlighted. Classroom assessment needs to be part and parcel of a day-to-day teaching and learning as it was

reviewed by this study. It should not be seen as add on activity as it was perceived by some primary school teachers that participated in the Improving Educational Quality Project (Kadyoma, 2004). 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.

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 the conceptions and misconceptions they hold. 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. Also, a well- managed classroom assessment could result in improvement of educational standards which Ghana is striving to achieve through external examinations and tests.

#### **4.7 Summary**

Chapter 4 focused on the analysis of the results to find out JHS mathematics teachers' perception on classroom assessment, the kind of assessment methods and tools they use in assessing their students, classroom assessment practices and the influence of the mathematics teachers 'perceptions of classroom assessment on students' performance.

From the chapter, the following observations were made by the researcher. Majority of participating JHS Mathematics teachers perceived classroom assessment as a tool that the teacher uses to inform him/her on what students have learnt. These Teachers assess their students in about every lesson, they use correct methods and tools to assess their students in classroom, their classroom assessment practices are good but most of them do not provide written feedback

comments to their students. The reason for these attitudes is to be investigated in further research work.

The study also revealed that the teachers perceived classroom assessment as a tool useful to both teachers and students.

The study also revealed that teachers use correct assessment methods and tools in their classrooms. The teachers indicated that they use different classroom strategies such as journal writing, learning logs, probing questions, thinking aloud, observation and clinical interview to monitor students' progress in mathematics.

The study again revealed that JHS mathematics teachers' classroom practices are good except that most of them do not give students written feedback on their marked work. It also revealed that the teachers' perceptions of classroom assessment had influence on their classroom assessment practices.

Mbewe (2002) reports teachers having positive attitudes towards classroom assessment but having limited knowledge of classroom assessment. This does not apply to this study since the participated teachers exhibited high knowledge of classroom assessment methods and tools with good classroom practices.



## CHAPTER FIVE

### SUMMARY, RECOMMENDATION AND CONCLUSION

#### 5.0 Overview

This chapter provides a summary of the study. It includes a summary of the findings, discussions, recommendations and conclusion. The discussions were based on the major findings identified in chapter four. It further outlines some of the limitations and avenues for further research studies.

#### 5.1 Summary

Students point 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 was an attempt to find how Junior High School mathematics teachers perceive classroom assessment. The study also sought to find the kinds of assessment methods and tools mathematics teachers use in assessing their students, and the influence of teachers' perceptions of classroom assessment practices.

The study was targeted to cover all the JHS mathematics teachers in Ghana. In all, there were thirty (30) JHS mathematics teachers as the participants. The instruments used were questionnaire for teachers' which comprises of thirty (35) questions, questionnaire for students, and analyses of documents and interview of teachers.

A survey research design was used in the study and the instrument used in data collection is questionnaire for teachers. The questionnaire consists of thirty-five (35) items categorized into three parts. The questionnaire was used in eliciting information on JHS mathematics teachers' perception of classroom assessment, the kind of assessment methods and tools they use in assessing their students, and the influence of the JHS mathematics teachers' perception on their classroom assessment practices.

Using a Likert-type rating scale, including statements, some positive and negative results were achieved. The questionnaire was administered to the sample size. Questionnaire was designed for twenty (20) students', analyses of students exercise books were also done at the same time and interview of teachers. Vygotsky (1987) contends that teachers who embed assessment in their lessons become more effective in understanding their students learning and in informing their teaching.

For validity and reliability, expertise of my supervisor as well as the views of my colleagues before, during and after the construction of the questionnaire was solicited on to validate the questions set by the researcher. The data was analyzed qualitatively.

## **5.2 Findings**

The findings show that (21) 70% of JHS mathematics teachers (participants) defined classroom assessment as a tool that the teacher uses to inform him about how students have learnt and over (17) 57% of these teachers said they assess their students about every lesson. All the thirty (30) participants either strongly agreed or agreed that classroom assessment is useful to them and their students so it must be encouraged and done before, during and after every lesson.

Mbewe (2002) reports that teachers having positive attitudes toward classroom assessment but having limited knowledge of classroom assessment. Brooks and Brooks (1999) regard students' point of view as windows into their reasoning. 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. Assessment also needs to tap and build upon the strengths that learners in all diversity bring to the learning situation.

### **5.3 Major Findings**

When teachers place meaningful assessment at the center of instruction, they give students insight into their own thinking and growth, and students gain new perspectives on their potential to learn mathematics. This study revealed that (27) 90% of the participating JHS mathematics teachers said classroom assessment is useful to them and their students and must be done frequently before, during and after every lesson in order to help students practice and develop the concepts that they have been taught. This importance of classroom assessment can only be achieved if JHS mathematics teachers' knowledge base on classroom assessment is strongly enhanced. Thus in-service training should be frequently organized for teachers.

The results also showed that teachers use correct assessment methods and tools in their classrooms since the response of majority (over 24) out of the thirty (30) teachers who participated in the study said they perform the classroom assessment methods and tools outlined in the questionnaire always in their classrooms. Teachers need to use different strategies to monitor students' progress in mathematics. Strategies such as journal writing, learning logs, probing questions, thinking aloud, observation and clinical interview may help teachers to

understand the mental processes that students engage in as they solve mathematics problems (Fennema & Romberg, 1999).

Again, JHS mathematics teachers' classroom assessment practices are good except that most of them do not give written feedback comments to their students apart from awarding them marks to right answers they provide denying them of the important role that written feedback comments played in the teaching and learning process. Teachers therefore should give students written feedback comments in order to achieve the benefits such as encouragement, competition and incentives that written feedback comments brings to the teaching and learning process. Research on cooperative learning however, 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 (Fox & Soller, 2001, Schmidt, Miske & Santhe, 2003). Assessment is an important aspect of the work of every teacher and school, more especially if it can be used to promote teaching and learning.

It is true that teachers that perceive classroom assessment as testing failed to understand the learning potentials and difficulties experienced by their students during the learning process as reported by Susuwele-Banda (2005) since only (3) 10% of the JHS mathematics teachers who participated in the study defined classroom assessment as a process of administering a test to students in order to assign and report to parents and officials. Even though, tests help the teachers to check what students have achieved, it is not possible to administer tests every day, but it is possible to assess students on a daily basis.

Considering the influence of teachers' perceptions on classroom assessment practices, the findings shown that more than (15) 50% of the participants said they perform the various

classroom assessment practices in this study always. This supports the previous findings by Susuwele-Banda (2005) that the teachers' perceptions of classroom assessment had influence on their classroom assessment practices. The finding was backed by the findings of Chester and Quilter (1998) who found that teachers' perceptions of classroom assessment affected their classroom assessment practices.

## **5.5 Recommendations**

From the findings and the foregoing discussion, the following are recommended as a way forward:

- i) Mathematics teachers at the JHS level of education need to use different classroom assessment strategies to monitor student progress in mathematics. Strategies such as journal writing, learning logs, probing questions, clinical interview and thinking aloud may help teachers to understand the mental processes that students engage in as they solve mathematics problems.
- ii) Students should be made to copy questions for exercises before answering them in their exercise books.
- iii) Teachers must organize their classrooms to promote active participation of students by involving students in class activities and to give students the freedom to explore mathematical ideas.
- iv) Teachers should be properly supervised by their head teachers and members of the monitoring team in their various education offices in order to check unmarked exercises for students and written comments as feedback.

### **5.5 Suggestions For Further Research Studies:**

- i) The influence of the perception of both teachers and students on classroom assessment and its impact on the academic performance of students performance.
- ii) Training needs of teachers on classroom assessment.
- iii) Investigation of college tutors' perceptions of a good classroom mathematics teachers may be useful in assessing him on assessment.

### **5.6 Conclusion**

The importance of classroom assessment can therefore not be overemphasized. The findings of this study reviewed that classroom assessment is useful to both teachers', students and parents. It is therefore important that assessment of students should be covered in details when teachers are in training and should not be confused with testing which is only one component of assessment.

Classroom assessment should provide information to teachers for their own self evaluation and the evaluation of their students. 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 needs to tap and build upon the strengths of learners that their diversity brings to the learning situation.

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. It is important also to note that grades have important consequences and communicate students' achievement to parents about students' performance in class. Teachers need to use different assessment strategies to monitor students' progress in mathematics.

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**APPENDICES**

**APPENDIX A**

**University of Education, Winneba**

**Faculty of Science Education**

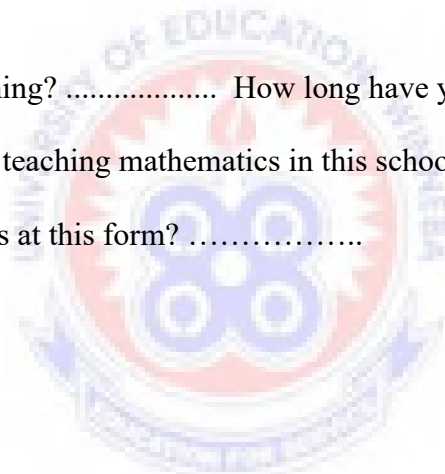
**Department of Mathematics Education**

**Questionnaire for Teachers' Perception of Classroom Assessment Practices**

**Background Information**

Name of school..... Sex: Male [ ] or Female [ ] Class size.....

How long have you been teaching? ..... How long have you been teaching mathematics?  
..... At what form are you teaching mathematics in this school? ..... How long have  
you been teaching mathematics at this form? .....



**Section A**

1 Indicate below your perception about classroom assessment.

Classroom assessment:

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

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

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

[ ] d. is a tool that the teacher uses to inform him about how students have learnt.

2. Mark one option that best describes how often you assess your students.

[ ] a. once a week



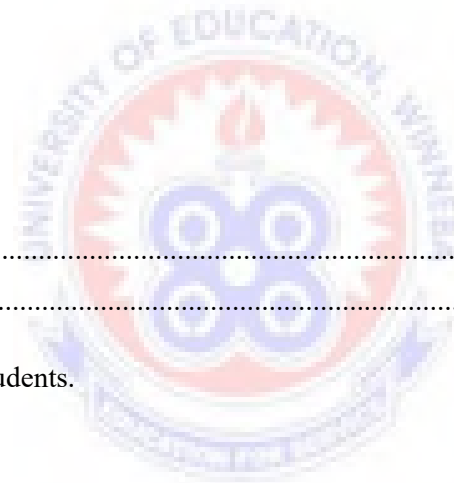
- b. once a month
- c. every two weeks
- d. twice a term
- e. about every lesson
- f. specify any other .....

For Questions 3-5, (Mark one of the scales)

3. Assessment is useful.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree

Why?.....  
.....



4. Assessment is useful to my students.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree

5. My teacher preparation programme provided a variety of ways to assess students.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree

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

.....  
.....

### Section B

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

1. I design my lesson to allow me monitor my students’ progress.
2. My instructional methods and activities reflect attention to issues of access, equity and diversity of students.
3. The design of my lessons incorporate tasks, roles, and interactions consistent with investigative mathematics.
4. I probe students’ reasoning during my teaching.
5. The instructional methods and activities I use reflect attention to students’ experiences and readiness.
6. I provide my students’ adequate time and structure for reflection
7. I interact with my students during the lesson.
8. I encourage my students to talk and share ideas during the lesson.
9. I give students immediate feedback when they need directions to proceed during the lesson
10. Before the lesson, I take into account prior knowledge of my students.
11. I make sure the pace of the lesson is appropriate for the developmental level or needs of the students and the purpose of the lesson.
12. My questioning skills are likely to enhance the development of students’ conceptual understanding /problem solving.
13. My lesson progresses based on students’ response.

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

15. I identify students who have difficulties in understanding the main ideas of the lesson during my teaching.

**Section C**

**Please Tick ( ) the appropriate box to show how you agree with the following statements as assessment pedagogic (tools):**

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. Demonstration by students in a class					
2. Journal writing in class					
3. Every two weeks class test by my students					
4. Students designing project tasks					
5. An investigational task such as 'finding the relationship between rectangle and a triangle'					
6. Students class exercises before, during and after a lesson					
7. Clinical interview of students in a mathematics classroom					
8. Organization of quiz in mathematics classroom					
9. Copying and completing statistical table in mathematics classroom					
10. Thinking aloud by my students.					

Thank you for completing this questionnaire.

## Appendix B

### Questionnaire for Students

Name of school..... Class.....

1. My teacher monitors our learning. Yes /No
2. My teacher probes our reasoning during his/her teaching. Yes /No
3. My teacher gives us time to think about the question he/she asks us before we are made to answer them. Yes /No
4. My teacher calls us to do some activities during his /her teaching. Yes /No
5. My teacher always starts his /her lesson from what we already known. Yes /No
6. My teacher continues his /her lesson we have understood him or her. Yes /No
7. My teacher encourages us to talk and share ideas during his or her lesson. Yes /No
8. My teacher marks and helps us to do our corrections immediately we finish doing our work.  
Yes/ No
9. My teacher takes time to explain his or her lesson to us. Yes /No
10. My teacher gives us work to do after every lesson. Yes /No

## Appendix C

### Teachers' Interview Questions

- 1a. What type of school are you teaching mathematics?
  - b. Is there anything particular that you do for your students to improve upon their learning of mathematics? If yes explain.
  - c. How do you plan to further assess your students' learning?
2. Some people said that 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. Assessment therefore, is an important aspect of the work of every teacher and school.
- a. Do you agree to this assertion?
  - b. Can this be achieved by using test alone in the classroom?
  - c. Is there any difference between assessment of learning and assessment for learning?