A STUDY OF STUDENTS' ATTITUDE TOWARDS TEACHERS' ASSESSMENT STRATEGIES IN MATHEMATICS

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ABSTRACT

A Study of Students' Attitude Towards
Teachers' Assessment Strategies in Mathematics

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Form Three students, at the researcher's school, seem to allow their perceptions of teachers' assessment strategies to influence their disposition towards mathematics. Therefore this has prompted the researcher to do a study to investigate the impact of teachers' assessment strategies on students' attitude.

The research takes the form of a pilot study. The 37 targeted participants ranged in age from 13 to 14 years, and belonged to Class1, at a girls' school in one educational district. The survey research employs a mixed method approach. The report is based on data collected over a six week period by means of checklist, Likert scale and qualitative interview protocol.

This pilot, or feasibility study, is a small procedure designed to test logistics prior to the main study. The pilot study helps by providing data needed to plan the larger study and identifies areas where things can go awry in the main study. Although no viable conclusions can be drawn from a pilot study, it reveals that a limited variety of assessment strategies is employed in Class1 and that students differ in their attitudes towards teachers' assessment strategies. Interviews with students reveal that they exhibit individual preferences for traditional or alternative assessment strategies. Hence, it is crucial that teachers decide which forms of assessment are most appropriate for collecting data and measuring student achievement in order to enhance students' disposition towards mathematics.

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- My spiritual guru, my family and dear friends, for all their support during the past two years.

Patrick Ramdath

DEDICATION

This study is dedicated to all teachers who are passionate about promoting positive dispositions, in students, towards assessment strategies.

If classroom teachers hold the keys to students' success...
assessments are the doors that can open on ways of
recognizing students' growth and achievement."
(Clark, 1999, p.719).

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PRELUDE

As an educator, I appreciate and understand the significance of properly assessing my students. By learning about the different classroom assessment techniques and understanding my students' emotional attitude towards them, I can strive to meet the needs of all my students.

Assessment allows teachers and students to better understand students' progress throughout the year. I believe it is extremely important that all students know exactly how, what, where, when, why, and to what extent, they are being graded, and what they are being graded on.

Teachers need to consider how their classroom activities, assignments, and tests support learning aims and allow students to communicate what they know. Teachers should then use this information to improve teaching and learning.

As an educator, I take time from my schedule to evaluate my own assessment methods and how they are working in my classroom. I decide how assessments will be weighted, how my students feel about them, and how I will present the information according to the needs of my students.

Motivating young children and adolescents can be a very challenging job for teachers. I consider assessment as a tool for measuring progress, which cannot be measured by a single test score. Assessment should document the quality of performance and demonstrate a student's depth of understanding, which will allow both the teacher and the students to decide the next logical step in the learning process. I strongly believe that using a variety of assessment techniques is more beneficial for my students, because every student has different learning styles.

CHAPTER 1

Title

A study of students' attitude towards teachers' assessment strategies in mathematics.

Introduction and Background to the Study

At all levels of schooling in Trinidad and Tobago, testing is a common experience in the life of students. The researcher, a mathematics teacher with thirteen years teaching experience at the secondary level, has observed during this period that teachers rely heavily on pencil-and-paper "problem" tests to assess students' mathematics learning. Teachers seem to assume that tests are the proof that learning has taken place.

Testing at the researcher's school has been the norm. This is evident by the demand to complete a scheme of work within an allotted time, meetings summoned by heads of departments to designate teachers to write test items for certain classes, three end of term tests conducted during the year, exam schedules specifying dates and times for administering the tests, development of mark schemes by teachers, entering comments and recording test scores in report books by teachers, and distribution of report books to students at the end of each term.

Teachers at the researcher's school simply perceive assessment as a means to audit students' learning by recording scores for report books and reporting the scores to parents. Parents expect to see such test scores and have learned to rely on them to monitor performance. In Trinidad and Tobago, grades/scores are still the primary means to satisfy parents', administrators' and society's need to know the level of student achievement.

Teachers at the researcher's school "teach to the test" and so students are expected to

do well. Thus, if assessment calls for memorization of facts, the teacher imparts lots of facts; if the assessment requires reasoning, then the teacher structures exercises and experiences that encourage students to think.

According to Schilling & Schilling (1994), "teaching to the test" may have a negative effect on learning for some students because of the way students memorize information. Testing may also have a negative effect if students do not see the relevance of it, since these tests require one correct answer whereas real life situations involve multiple solutions.

Teachers at the researcher's school expect scores to have a positive impact on students' learning, motivation, attitude, and other outcomes, yet they use scoring practices that do not have that effect. Assessment ends with scoring test items and recording results. Scores are rarely ever used to improve student learning, report student accomplishments or indicate progress to clearly defined outcomes/objectives. Yet the primary use of scores must be to inform and motivate students.

Occasionally, students are ranked and compared based on test results. Consequently, some students feel "a lot of pressure" because of the scores they receive in mathematics. Pressure is put on them to receive and maintain high scores if they wish to become future scholarship winners or if they wish to continue participating in certain school activities. Some students feel that future opportunities will largely, or in part, be determined by their scores, especially if they want to continue studies beyond secondary level, or if they are aspiring to a competitive job or profession. Despite these external pressures, many students are still internally motivated to do their best and set high standards for themselves, believing that the scores they receive will be a measure of their success or failure in meeting these standards.

While grades do constitute a necessary reality of school life in Trinidad and Tobago, students at the researcher's school allow grades to interfere with the most important aspect of school life - the opportunity to get a rounded education. Students know that each graded assignment will be evaluated, and so they are cautious although taking risks is more valuable educationally, since taking risks generates more meaningful feedback. The more students worry about grades, the more they play it safe, not taking intellectual risks, getting upset when challenged too much, and narrowing their focus to just those components of mathematics that are likely to improve their grade.

Some students are simply unable to function very well in a traditional test setting because they feel overwhelmed by the length or format of the test. They believe that mathematics testing is about applying formulas and that it is boring, confusing and not practical since each question has only one correct answer. Students perceive that mathematics is not a living subject and that it is not a creative, thinking activity. As a result, teachers are occasionally confronted by low test grades, unresponsive classes and poor attendance.

Teachers adopted alternative methods of assessment in 1999 when the school volunteered to pilot the Secondary Education Modernization Programme (SEMP). The Ministry of Education conducted several workshops to update teachers on alternative assessment strategies since teachers were required to integrate alternative assessment as part of continuous assessment in the classroom.

The National Certificate of Secondary Education (NCSE) curriculum was first proposed in the Draft Education Plan 1992-2002. This was in recognition of the need to modify the education system to cater for varied abilities and talents of students entering the secondary schools, and to better equip students for the 21st century. The proposal recommended a shift

away from the traditional summative examination at the end of the three-year or five-year period, to a programme of continuous assessment comprising 60% of continuous assessment marks and 40% of the written examination (Ministry of Education, 2003; Ministry of Education, 2007). It was envisaged that the continuous assessment would assist both teachers and students to improve students' grades, to motivate them and to maintain their interest in mathematics.

Consequently, teachers realized that they had to consider using various assessment strategies that would reflect the goals and objectives of curriculum and instruction (Moon, 1993). The NCSE curriculum required that the mathematical knowledge being assessed, the characteristics of the individual or group who were to respond and the purpose for assessment should all be in alignment.

Since alignment was a major issue and much more was demanded of students than demonstrating simple knowledge, no longer could teachers rely on multiple-choice and short-answer tests at the end of the term to provide all the information on students' mathematical attainments, progress and proficiencies.

More established traditions of focusing assessment on testing at the end of instruction had to be supplemented by assessment during instruction. Therefore, alternative assessments were introduced. These included performance tasks, portfolios, exhibitions, demonstrations, journals, and other forms of assessment that required active construction of meaning rather than the passive regulation of isolated facts. Therefore, rather than a mere course grade or percentage in an instructor's record book, it was envisaged that alternative assessment could be an enjoyable learning tool, one which students could reflect upon long after the course itself had finished.

According to NCTM (1995), although examinations assess only a moment of learning process and can be demotivating, alternative assessments encourage learner autonomy and competence while assessing the learning process over an extended period of time. Therefore, alternative assessments give students an opportunity to document their growth.

Initially, students seemed astonished and confused when these new assessment strategies were implemented since they had become accustomed to traditional pencil-and-paper tests. These newer forms of assessment provided opportunities for multiple answers rather than a single correct answer and they relied on multiple sources of information. They also engaged students in acquiring thinking skills which they would need for an increasingly complex workplace.

The newer forms of assessments seemed to provide a link between teachers' assessment strategies and students' attitude. The NCSE curriculum envisioned that a variety of assessment methods/techniques would target students of varying learning styles. Thus, every child would be able to achieve certain outcomes, leading to enhancing positive dispositions to assessment strategies.

More and more, students began to recognize their learning styles as they became aware of a variety of assessment strategies. Therefore, students started to question and challenge teachers' assessment strategies. The information from these alternative assessment strategies was meant to be used to reduce the gap between what had been learnt and what was now needed to be learned. However, did students perceive assessment as assisting to bridge a gap in learning or did they view assessment as a debilitating practice that continued to demean them while inflating their teachers' egos?

Teachers continued to have high expectations of students. Some students perceived

these expectations as impossible demands. Students were overwhelmed with too much to do between all their courses and participation in extracurricular activities. Although alternative assessments were implemented, some students continued to complain about scores received, the nature of the assignment and even occasionally accused teachers of being unfair. It seemed that some students had become accustomed to restricted low-level questioning and recall and so they were resisting high-level learning.

According to Senk, Beckham & Thompson (1997), students may perceive assessments arising from high-level learning as 'unfair', especially perhaps when these students are successful with the low-level tasks. Fiore (1999) contends that teachers wield tremendous power over student's academic success. In addition, he observed in his study that as students move from one educational level to the next, they become dissatisfied, cynical and suspicious about assessment practices, increasingly viewing them as unfair and as a means of distributing rewards and punishment (Evans & Engelberg, 1988; Paris, Lawton, Turner & Roth, 1991).

Some Form Three students at the researcher's school seemed to feel uncomfortable with the new assessment strategies. According to Beattie and Algozzine (1982), if students are not made to feel comfortable with assessment strategies, they will almost certainly not be responsive to it. Assessment strategies that are perceived by learners as a means of controlling their behavior and continuous use of a single type of assessment can frustrate students, diminish their self-confidence, and make them feel anxious about mathematics (Schweinle, Meyer, & Turner, 2006).

Teachers at the researcher's school faced the challenge of motivating students by ensuring that assessments were carefully constructed; relevant to the students' backgrounds and goals; challenging but possible; and structured to give student's immediate feedback about their

performance.

According to Tuckman (1998), providing students with substantive feedback about competence and progress in goals increases self-efficacy, enhances interest and persistence, and increases intrinsic motivation. However, in order to provide viable feedback the student-teacher relationship is important. There is need for effective communication between teacher and student.

Ryan and Deci (2000) suggest that student-teacher relationships are influenced by the nature of assessment. Assessment affects the way students perceive the teacher and gives them an indication of how much the teacher cares about them and what they learn. If students know what will be assessed and how it will be scored, and if they believe that the assessment will be fair, the teacher-student relationship is strengthened thereby paving the way for the development of positive attitudes. Conversely, if students have the impression that the assessment is disorganized, not matched with course objectives, and provides little feedback, the relationship can be weakened.

Therefore, one can conclude that it is imperative that teachers use appropriate assessment strategies to collect data in order to provide corrective actions as instruction occurs. Such procedure will enhance students' learning. Consequently, the lack of appropriate assessment strategies may defeat the entire learning experience for students in mathematics.

Statement of the Problem

Students allow their perceptions about teachers' assessment strategies to influence their disposition to the subject.

Purpose of the Study

This study seeks to investigate the impact of teachers' assessment strategies on students' attitude.

Research Questions

The study will be guided by the following questions:

1. Are Form Three students exposed to a variety of assessment strategies?
2. Do Form Three students differ in their attitudes towards assessment strategies?
3. Do students prefer alternative assessment strategies to traditional tests in mathematics?

Operational Definitions

Assessment:

Setting appropriate criteria and high expectations for learning quality; systematically gathering, analyzing, and interpreting evidence to determine how well performance matches those expectations and standards (Angelo, 1995).

Assessment strategy:

Administration of an assessment task (e.g. essay, short written response, oral response) to students, collecting data by one of several methods (e.g. reading, listening), and analysis of the data by an evaluator (e.g. teacher, self, peer) using an assessment tool (e.g. scoring guides, rubrics).

Mathematics Anxiety: The panic, helplessness, paralysis and mental disorganization that can arise among some people when they are required to solve a mathematical problem (Tobias & Weissbrod, 1980).

Student attitude: relatively stable predispositions by students to respond favorably or unfavorably to specified situations, concepts, objects, institutions or persons. According to Forsyth (1999), attitude comprises an affective component of positive or negative feelings; a cognitive component describing worth or value; and a behavioral component indicating willingness or desire to engage in specific actions.

Limitation

A limitation to the study is that the researcher's role as a facilitator of the subject area may foster a lack of objectivity by participants who might aim to please or impress the researcher for fear of appearing unknowledgeable.

Delimitation

The sample will be delimited to three Form Three classes at one girls' school. Therefore, the findings cannot be generalized to other groups, places, and times.

Significance of the Study

Although assessment is a common experience in the life of students, little is known locally about students' attitude towards assessment strategies used by teachers in the classroom.

This study should generate data that will be valuable to the researcher's understanding of this issue and contribute to the general body of knowledge on this issue.

It is hoped that teachers would conduct similar research at their schools with the aim of making mathematics challenging, yet enjoyable for students.

Ethical Considerations

Permission will be obtained from parents of the students and the principal.

Confidentiality and anonymity will be maintained throughout the study.

CHAPTER 2

LITERATURE REVIEW

One of the major challenges encountered by teachers in the classroom is engaging students in high-quality assessment to promote positive attitudes. To accomplish this task, it is imperative that teachers first understand the purpose for assessing students and then use appropriate assessment strategies.

Teachers sometimes misuse traditional pencil-and-paper tests because items are relatively easy to construct and grade when compared to other assessment strategies. To resolve this dilemma, teachers must examine the problems associated with grades and its impact on students' attitude.

To be fair to students, one must match assessment strategies with learning outcomes/objectives and students' learning styles, with the intention of enhancing positive dispositions. Once what to assess has been determined and what methods of data collection should be used to gather information, several criteria that determine quality such as validity, reliability and fairness of the assessment methods should be kept in mind. The impact of quality classroom assessment on intrinsic motivation of students is of paramount importance.

The Purpose of Assessment

According to Airasian (2001), classroom assessment includes all the processes involved in making decisions about student's learning progress. This includes determining purpose and learning outcomes/objectives, gathering, interpreting, and using information.

Assessment provides valuable information that allows teachers to: adapt instructional procedures to the learning needs of their students (Kovalik, 2002); provide feedback for diagnosis of students' strengths and weaknesses, and thus plan specific educational programs (Beattie, & Algozzine, 1982; McAloon, Robinson, 1987); report individual student achievement; guide decisions about the learner (Linn & Gronlund, 2000); consolidate students' knowledge prior to moving to the next unit of instruction (Bangert-Drowns, Kulik, & Kulik, 1991; Dochy & McDowell, 1997); direct students to instructional priorities and influence their approach to learning; indicate to students which parts of the curriculum have priority so that they might change their approach to the material accordingly (Crooks, 1988); enhance students' self-concept and sense of efficacy (Stipek, 2002).

Misuse of Traditional Tests, Problem with Grades (Points and Percentages) and its Impact on Students' Attitude

Fiore (1999) asserts that tests often encourage excessive reliance on drill and lecturing by teachers, and cramming by students. He argues that this practice results in teaching that is ethically questionable such as drilling students on content similar to those on a test months before, dismissing low-achieving students on test day to raise average scores, discouraging low-achieving students from taking challenging courses, and increasing the number of students retained in a particular level due to low achievement. Tests may also result in various forms of cheating, such as increasing test time and presenting test items word for word. Moreover, according to Golding (2003), confining teaching to what is readily testable has serious effects on the attitude and morale of both teachers and pupils. All of these practices pollute the test results and corrupt the inferences drawn from them about student attainment (Berk, 1988; Haladyna,

Nolan, & Hass, 1991; Madaus, 1991; Smith, 1991).

If the most obvious purpose of assessment is to provide feedback about student achievement as explained by measurement expert Airasian (2001), then why pollute the results? Do teachers focus too much on grades and less on feedback?

What Should be Included in Grades?

Research done by Wilson (1994) has shown that students tend to value what is graded. To be effective, teachers must make their grading criteria specific. Four factors that teachers normally include in grading are: academic achievement, and the non-achievement factors such as effort, behavior and attendance.

By far, academic achievement is the most commonly cited factor that should be included in grades (Stiggins, Frisbie, & Griswold, 1989; Wilson, 1994). When teachers use academic achievement as a grading criterion, they assign grades in a manner proportional to the amount of content students learn or are taught.

Problem with Grades

The traditional method of scoring classroom assessments using points or percentages do not facilitate evaluation or judgments. Teachers assume that the scores are an accurate reflection of students' understanding or performance. However, it is impossible for teachers to make a judgment whether the difference between the percentage scores of 70 and 75 represents the same difference in achievement indicated by the difference between 90 and 95. Beattie and Algozzine (1982) argue that two students may obtain the same raw score and have the same grade equivalent scores but may have answered very different items correctly and have different skills. The point or percentage method makes sense assuming that all assessments address a single

topic. However, rarely is a single topic addressed within a grading/scoring period. It is also common that multiple topics are addressed within a single assessment. If a teacher does not consider the different levels of achievement across the various topics addressed in a grading/scoring period, this can play havoc with the teacher's ability to provide accurate feedback to students.

Gosenpud and Miesing (1992) have reported that motivation and interest have the largest effect on student performance. The class situation and emphasis on assessment in turn affects what motivates students, or influences what they find interesting or relevant.

Feedback in the form of grades has been found to be motivating (Hosford, 1984) for some students, and demotivating (Cameron & Pierce, 1994; Kohn, 1999) for others. Students who do well are motivated by success and praise whereas students who do not do well choose to avoid failure by devaluing the assessment process and even school. Newman (1989) states that educators can motivate students to achieve if they fulfil students' needs for competence, extrinsic rewards and intrinsic interests.

Assessment can enhance student motivation by: emphasizing progress and achievement rather than failure; providing feedback to move learning forward; reinforcing the idea that students have control over, and responsibility for, their own learning; building confidence in students so they can and need to take risks; being relevant, and appealing to students' imagination; and providing the scaffolding that students need to genuinely succeed. Therefore, a better way to provide feedback and keep track of achievement of outcomes/objectives is the rubric approach which explicitly builds evaluation into the process. The measurement system employed is called the rubric while the scoring system used is the numbers representing the levels of the rubric.

Although there are different perspectives on the nature and function of rubrics (Stiggins, 2001; Wiggins, 1993a; Wiggins, 1993b), most advocates agree on at least one basic feature, namely that rubrics should describe levels of performance or understanding for a particular topic (Joyner, 1993). Rubrics require judgments about levels of knowledge for a particular topic ranging from severe misconceptions to complete and detailed knowledge. By this approach the teacher uses the data provided in an assessment to make a judgment of each student's achievement in a specific topic. Kortez (1998) reports that consistency among raters of eight-grade mathematics portfolios improved "with refinements of rubrics and training" (p.320).

Need for Alternative Assessment Strategies to Tap the Diversity of Learning Styles and Thus Enhance Positive Dispositions

Students preferentially take in and process information in different ways: by seeing and hearing, reflecting and acting, reasoning logically and intuitively, analyzing and visualizing. Teaching methods also vary: some instructors lecture, while others demonstrate or lead students to self-discovery; some focus on principles, while others focus on applications; and some emphasize memory, while others emphasize understanding.

According to Smith and Renzulli (1984), when mismatches exist between learning styles of most students in a class and the teaching style of the teacher, the students may become bored and inattentive in class, do poorly on tests, get discouraged about the courses, the curriculum, and themselves, and in some cases drop out of school.

Sound assessment begins with matching assessment strategies to clear and appropriate learning outcomes/objectives. Even though most outcomes/objectives may be measured by several methods, the reality of teaching is that certain assessment methods measure some types

of outcomes/objectives better than other methods do. Aspects of classroom learning outcomes/objectives for grading/scoring include: informational topics, process topics, thinking and reasoning, communication and non-achievement factors.

According to measurement experts such as Haladyna (1994), forced-choice items do a good job of assessing subject matter and procedural knowledge and simple understanding, particularly when students must recognize or remember isolated facts, definitions, spellings, concepts and principles. The questions can be answered and scored quickly, so it is efficient for teachers. These formats allow teachers to adequately sample from a vast pool of knowledge. However, forced-choice items are not rated high for any of the aspects of grading/scoring.

By design, forced-choice items are not well suited to be scored using rubrics. The focus is on outcomes/objectives which provide no insight into the processes students use to arrive at their conclusions (Herman, Aschbacher, & Walters, 1992; Kennedy, 1999). As a result, traditional approach to assessment has come into question as societal expectations for schooling have changed and the traditional role of assessment in motivating student learning has been challenged. Recent research conducted by Stiggins (2001) suggests that students will likely be motivated and confident learners when they experience progress and achievement, rather than the failure and defeat associated with being compared to more successful peers.

The results of one study conducted by Kellaghan, Madaus & Airasian (1982), on test anxiety implies that tests are a source of emotional discomfort for students. Giving students multiple assessments rather than a single assessment, lessens fear and anxiety because when students are less apprehensive they engage in risk taking, exploration, creativity and questioning. In addition, because students differ in their perceptions and thinking styles, it is crucial to

provide opportunities for them to demonstrate their individual capabilities (National Council of Teachers of Mathematics, 1989; Ross, Rolheiser, & Hogaboam-Gray, 2002).

Alternative assessments are growing in importance and respond to the criticisms of traditional assessment by attempting to tap higher level thinking and problem-solving skills, emphasizing real-world applications and focusing on the processes learners use to produce their products. Alternative assessments offer an assessment not available through traditional testing. A review of literature presents the benefits of alternative assessment as: reflection on learning; assessment occurring over a longer period of time; ample feedback from teachers and classmates on pieces of work in progress, leading to chances for goal-setting and self-assessment; co-operative learning opportunities; greater sense of achievement since more time and effort is required; and more enjoyment compared to traditional tests (Liebars, 1999; Newman, Secado, & Wehlage, 1995; Worthen, 1993).

Alternative assessments are quite amenable to scoring using rubrics. Research done by Marzano (2000) suggests that assessment strategies such as essays, short written responses, oral reports and student self assessment are best for grading/scoring informational topics. He asserts that skills are best assessed using performance tasks, teacher observation including interviews and student self assessment. For assessing thinking and reasoning skills he strongly suggests employing essays, oral reports, performance tasks and student self assessment. For assessing communication skills he recommends essays, oral reports, performance task and self assessment. Finally, for the non-achievement factors he declares that teacher observation and student self assessment are highly rated.

According to Marzano (2000), special mention needs to be given to performance tasks and self assessment since they are both highly rated for grading/scoring all aspects of academic

achievement. Self and peer assessment are also highly rated for scoring/grading the non-achievement factors.

Meyer (1992) declares that performance assessments and authentic tasks require students to construct their responses and apply their knowledge. Researchers such as Khattri, Kane and Reeve (1995), assert that authentic tasks are more "real life" in nature, whereas performance tasks are somewhat contrived. However, they claim that the distinction between authentic tasks and performance tasks are often so vague as to be not very useful. They also believe that performance tasks create a classroom culture in which instruction and assessment are "seamless," blending one into the other. There is evidence that performance tasks generate engagement from students from all backgrounds and engender a deeper understanding of the content being taught. An essay question that requires more than recall of information is a type of performance task (Marzano, 2000; Newmann, Secado, & Wehlage, 1995).

The performance may result in products such as a project, video/audio tape, spreadsheet, web page, exhibition, reflection, journal, graph, table and illustrations. All of these might comprise a portfolio which is a collection of student's work. Researchers Resnick and Resnick (1992) describe portfolios as collections of performance tasks because they hold evidence of a student's skills, ideas, achievements, interests and reflections.

The strength of self-assessment is that it is highly rated for all aspects of grading/scoring including the non achievement factors. However self-assessment (Adams, 1998; Golding, 2003) works best in classrooms where student are not afraid of risk-taking and exposing their errors and misconceptions, and where the outcomes/objectives are rewarding (e.g., academically, intrinsically, etc.), rather than in classrooms that place a premium on obtaining the correct answers (Parke & Lane, 1996).

Negative dispositions towards alternative assessment may result from the length of time required by students to complete assessments and length of time required by teachers to grade assessments. Lax (1989) addresses concerns about the time needed to grade these types of assessment. He contends that students need specific, clear directions about what the instructor expects from the assessment and how it is graded. However, he said that the time spent will lead to major savings in instruction time later on.

As teachers begin to implement new strategies for using assessment as an instructional device, they will recognize the ability of students to take control of their own success and accept responsibility for their own learning. These empowering feelings will inspire and motivate students toward greater achievement. Since attitudes influence motivation and learning (Ames & Ames, 1984; Keller, 1987) and, thus, effect students' performance (Bandura, 1977), it is imperative to obtain feedback from the students on the techniques that motivate them to perform (Keller, 1987).

Quality in Classroom Assessment and its Impact on Intrinsic Motivation of Students

Quality must be a concern at every stage: when designing assessment systems; when selecting or developing assessment procedures; when administering the procedures; and when scoring, reporting and using the results. Assessment which is of poor quality is of limited utility. Three major indicators of quality are validity, reliability and fairness.

Validity of Assessments

Does the assessment task actually measure what it claims to measure? In recent years, there has been a strong focus on validity, including an emphasis on the need for assessment tasks

to assess the intended learning outcomes/objectives of the course of study. According to Clark (1999), validity is a characteristic that refers to the appropriateness of the inferences, uses and consequences that result from the assessment. Muijs (2004) emphasizes that validity has three distinct aspects: content validity, criterion validity and construct validity. Validity is determined by professional judgment of the teacher for classroom assessment. Judgments that are based on unsound assessments can lead to unfair and unjust decisions and consequent inequitable treatment and opportunities for students, thus contributing to negative dispositions to the assessment strategies employed.

Validity is also dependent on the quality of the tasks used. Research done by Senk, Beckham and Thompson (1997) found that teachers generally select low-level abstract tasks. Torrance and Pryor (1998) express concern about the methods used by teachers in assessment, including ambiguous questioning and tasks that are poorly focused on the subject matter. Manouchehri and Lapp (2003) emphasize that asking good questions is a skill that needs practice, planning and reflection on an analysis of the mathematical and pedagogical goals of the lesson. They suggest that teachers be trained in the design and use of assessment task as a means of improving the quality of assessments.

Reliability of Assessments

Reliability is concerned with the consistency, stability and dependability of the scores. It refers to the extent to which assessment task can be applied consistently to all students undertaking it and different markers reaching the same conclusions about the performance of a given group of students. For example, if one subgroup of students always scores well each time a quiz in given, while another subgroup always scores low, this consistency is logical evidence of good reliability.

The true score is what we really want to measure; however, according to Clark (1999), these scores are not without some degree of error. Muijas (2004) affirms that reliability is influenced by random internal and external factors which contribute to the true score. Internal errors refer to health, mood, motivation, test-taking skills, anxiety, fatigue and general ability. External errors refer to instructions, luck, item ambiguity, heat in the room, lighting, sampling of items, observer differences, test interruptions, scoring and observer bias.

Clark (1999) maintains that while a number of different sources of error will contribute to estimates of reliability, a few factors that affect results of reliability should be kept in mind. The larger the range of scores, number of items and number of students - the higher the reliability. The best reliability coefficients are obtained when items are not too easy or too hard. Items that are carefully constructed will improve reliability; poorly worded or unclear items lead to poor reliability; and the more objective the scoring, the greater the reliability. McAloon and Robinson (1987) claim that objective tests such as multiple-choice obtain better estimates of reliability than do constructed-response, performance, or portfolio assessments.

Higher reliability above 0.8 is needed when the decision has important, lasting consequences for individual students. Higher reliability can mean that teachers have devised a very good assessment instrument.

Fairness of Assessments

A fair assessment is one that provides all students an equal opportunity to demonstrate achievement of learning outcomes/objectives and yield scores that are comparably valid from one person or group to another.

Equity covers the way assessment is organized and administered as well as the fairness of the marking. Equity also means using a broad range of assessment methods in recognition of the

fact that students have diverse academic strengths and different approaches to learning. The issue of equity in assessment arises from the fact that the assessments of all students have far-reaching consequences to their future lives. According to Heubert and Hauser (1999), the following criteria determine whether or not an assessment is fair: student knowledge of learning outcomes/objectives, opportunity for the student to learn, necessary prerequisite knowledge and skills, avoiding teacher stereotypes and avoiding bias in assessment tasks and procedures.

For assessments to be fair it is essential that all students know the learning outcomes/objectives and scoring criteria in advance. By knowing this, it is likely that they will be more intrinsically motivated and involved to obtain true mastery, rather than mere performance.

Winfield (1995) identifies a number of aspects of assessments that can affect fairness including the relationship between the assessment and the instructional conditions. Such conditions include providing adequate time, resources and opportunities for all students to learn.

It is unfair to assess students on content that requires prerequisite knowledge or skills that students do not possess. Some students bring better test-taking skills to an assessment than other students do, such as knowing how to read directions carefully, pacing, initially bypassing difficult items, checking answers, and eliminating wrong answers to multiple-choice items rather than looking for the right answer.

Cultural differences that are reflected in vocabulary, prior experiences, skills and values may influence the assessment. These differences are especially important in our diverse society and classroom. Therefore, it is the responsibility of the teacher to judge each student on his or her performance on assessment tasks and not on gender, race, socioeconomic status, physical appearance and other characteristics which lower the validity of the inferences.

Research done by Kraiger and Ford (1985) reveals that there are consistent differences in the ways that people assess members of different racial groups. They argue that these differences may not disappear even after teacher training to increase general consistency. Thus, the presence of systematic bias demonstrates that increased reliability does not ensure equity. An assessment is also biased if performance is affected by a disability or other limiting characteristic when the student actually possesses the knowledge or skill being measured.

A number of potential sources of inequity arising from teacher participation in assessment have also been identified in the literature. Studies conducted by Filer and Pollard (2000) described how different teachers formed different relationships with one student during her progress through primary school and formed different assessments of her capabilities and achievement. Rapaille's (1986) analysis of mathematics teachers' assessment practices reveals that the same teacher could allocate different marks to similar answers from students depending on the images of the students that the teacher had formed.

Conclusion

Teachers and students can only gain accurate knowledge of achievement through quality assessments. Valid, reliable and fair assessments will clearly show the teacher and student what knowledge and skills have been learned. Teachers can boost student success and thus enhance intrinsic motivation by creating quality assessments. From the results of quality assessments further learning can be initiated, whether that means re-teaching or setting new learning goals (Clark, 1999; Morgan & Watson, 2002).

CHAPTER 3

METHODOLOGY

Design

Research design refers to the strategy used to integrate the different components of the research project in a cohesive and coherent way. It is a means to structure a research project in order to address a defined set of questions (Trochim & Land, 1982).

The research problem and research questions suggest that survey research employing a mixed method is appropriate. Survey research is a form of non-experimental research in which questionnaires and interviews are used to gather information with the goal of understanding the characteristics of a population.

According to Fowler (1988), survey research can be used to collect information that is not available from other sources (attitudes and opinions, behavior). Using a standardized instrument (questionnaire) provides comparable information from everyone taking the survey, which allows for meaningful analysis. With a good sample, the results can be generalized to the population in which one is interested.

The rationale for the use of mixed method is that it increases the quality of the final results and provides a more comprehensive and holistic understanding of analyzed phenomena since final inferences will be based on both qualitative and quantitative data analysis. In this case, interviews will add information about the assessment strategies and will qualify the statistics.

The mixed method approach is expected to enhance the study by stimulating new research questions or challenge results obtained through one method (Burke & Christensen,

2004). In this case, interviews with students are expected to provide new insights on how assessment strategies have been perceived and valued by them.

Patton (1990) asserts that when investigating human behavior and attitudes, it is most fruitful to use a variety of data collection methods. Combining the two methods is likely to produce better results in terms of quality and scope, pay off in improved instrumentation for all data collection approaches, and sharpen the researchers' understanding of findings (Burke & Christensen, 2004).

A mixed method approach may also lead the researcher to modify or expand the design and/or the data collection methods. This action can occur when the use of mixed methods uncovers inconsistencies and discrepancies that alert the researcher to the need for reexamining the research framework and/or the data collection and analysis procedures used (Burke & Christensen, 2004).

The study is bounded in place, that is, it is conducted in a single girls' school in one educational district.

Sample

This sample will comprise 114 students from three Form Three classes at the researcher's school. These students constitute a fairly homogenous group. They are all female students in the age range 13 to 14 years. All students pursue the eight subjects that constitute the NCSE core curriculum including: Language Arts, Mathematics, Physical Education, Social Studies, Spanish, Science, Technology Education, and Visual and Performing Arts.

The majority of students live in central Trinidad whereas the minority live in the areas of Port-of-Spain, San Fernando and Claxton Bay. The group is a multicultural one as students come from a diversity of backgrounds.

Data Collection

Data collection for this study will utilize three instruments: checklist, Likert scale and qualitative interview protocol.

1. Checklist

A checklist is a list of response categories that respondents check if appropriate. A teacher constructed checklist (see Appendix II), consisting of a wide range of assessment strategies will be distributed to three Form Three classes consisting of 114 students. The students will be required to check the assessment strategies employed by their Form Three mathematics teachers. Students will be given one day to complete the checklist.

To assist students in identifying the various assessment strategies employed by their mathematics teachers, a handout prepared by the researcher (see Appendix I), consisting of descriptions and examples of various assessment strategies will be distributed to students in the three Form Three classes two days prior to dispatching the checklist. Students will be required to read and familiarize themselves with the various assessment strategies.

2. Likert scale

A Likert scale is a summated rating scale. A Likert scale will be constructed by the researcher. It will be representative of both positive and negative attitudes towards teachers'

assessment strategies. The items for the Likert scale will be selected from students' response to a questionnaire (see Appendix IV). Students will be given one day to complete the questionnaire.

Each item selected from the questionnaire to make up the Likert scale will employ a format with a 5-point response scale labeled Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree. Items will be rephrased to reduce response error by students, hence increasing the validity of the scale.

The scale will be administered to the three Form Three classes consisting of 114 students. Students will be asked to indicate their degree of agreement with the items. They will be given one day to respond to the Likert scale items.

3. Qualitative Interview protocol

For this research proposal 20 students receiving the highest scores and 20 students receiving the lowest scores in the attitude test, will be interviewed to investigate why students prefer traditional or alternative assessment strategies. These 40 students will be interviewed individually using an interview guide approach ((Burke & Christensen, 2004). Each qualitative interview is expected to last approximately one hour.

In the interview guide approach to qualitative interviewing, the researcher will enter the interview session with a plan to ask specific open-ended questions to participants. Questions will be provided on an interview protocol written by the researcher before the interview session. The researcher may not follow these questions during the interview in any particular order. The researcher may also change the wording of any question listed in the interview protocol. In short, the interview session will be a relatively unstructured interaction between the researcher and the participant. At the same time, because of the interview protocol, the researcher will cover the

same general questions with all the participants. The researcher will try to keep the interview on track, bringing the participant back when she goes off on a question that is not relevant to the research purpose.

In order to validate the data in the interviews, the researcher will ask the participants to check the rough draft of writings that feature their actual words. This will lend itself to greater credibility by ensuring that whatever the informant says confirms what the researcher actually mentioned.

Data Analysis

Data will be analyzed with respect to the three (3) research questions. Data analysis will involve a wide variety of descriptive statistics as well as coding of themes from qualitative interview data.

Research Question 1

Are Form Three students exposed to a variety of assessment strategies?

Descriptive statistics will be used to provide a summary of the data collected by means of a teacher constructed checklist, which identifies assessment strategies used by Form Three teachers.

For each class, the response to the checklist will be analyzed. A table showing the frequency and percentage distribution of students exposed to each assessment strategy, at least once, will be constructed.

The number of students out of the total 114 students exposed to each assessment strategy and the corresponding percentage will also be calculated. This frequency distribution will be

illustrated on a bar graph and used for comparative purposes. This should help the researcher narrow the list and thus determine if students are exposed to a variety of assessment strategies.

Research Question 2

Do Form Three students differ in their attitudes towards assessment strategies?

Statistical procedures of the Likert scale will include descriptive statistics which will include measures of range, mean and standard deviation pertaining to attitudinal scores. The percentage of students conveying positive and negative dispositions towards teachers' assessment strategies will also be calculated.

Student Attitude

Range. For each class, an attitudinal score will be obtained for each student. The maximum and minimum scores will be identified and the range calculated for each class.

The range of scores obtained by the 114 students will also be calculated. These results will be used for comparative purposes. This will give the researcher an idea of variability in attitudes.

Mean and standard deviation. For each class, the mean attitudinal score and corresponding standard deviation will be calculated.

The mean attitudinal score and corresponding standard deviation will also be calculated for all 114 students. These results will be used for comparative purposes. This will allow the researcher to obtain a more accurate measure of variability of attitudes towards assessment strategies in mathematics.

Percentage of students conveying positive and negative dispositions. The minimum and maximum attitudinal score will be obtained for each class. The mid-range attitudinal score will be calculated. Scores above the mid-range score will signify positive dispositions and scores less than the mid-range score will indicate negative dispositions to teachers' assessment strategies.

For each class, a table showing the frequency and percentage distribution of scores greater than, less than and equal to the mid-range score will be constructed.

The minimum and maximum attitudinal score will also be obtained for all 114 students and the mid-range attitudinal score will be calculated. The frequency and percentage distribution of the 114 students receiving scores greater than, less than and equal to the mid-range score will be calculated. The results will be used for comparative purposes. The aim is to inform the researcher of the percentage of the population conveying positive and negative attitudes.

Research Question 3

Do students prefer alternative assessment strategies to traditional tests?

Transcripts of the audiotape from interviews with the 20 students obtaining the highest scores and 20 students obtaining the lowest scores from the attitude test, will be prepared. The researcher shall seek to capture the essence (Finlay, 1999) of students' experiences and preference for traditional or alternative assessment strategies employed by their teachers. This will be done by reducing qualitative interview data by coding themes and relating them to research question 3. These codes will then be grouped to form categories which shall be collated to provide an insight into students' attitudes and thus preferences for traditional or alternative assessment strategies.

CHAPTER 4

THE PILOT STUDY

The researcher engaged in a pilot study. A pilot, or feasibility study, is a small procedure designed to test logistics prior to the main study. The pilot study served as a model of the full research study.

Rationale for a Pilot Study

The pilot study addressed a number of logistical issues: Instructions given to students were checked to ensure that they were comprehensible; the reliability and validity of instruments were checked and improved; and the information obtained, during the pilot study, helped to estimate resource requirements. The pilot study was used to gather information prior to the main study, in order to improve the latter's quality and efficiency. According to Fowler (1988), a pilot study can reveal deficiencies in the design of a proposed procedure and these can then be addressed before time and resources are expended on large scale studies.

Sample

The selected research group for this pilot study was drawn from one Form Three Class (Class1), consisting of 37 students.

Data Collection

The relevant data collection procedures for this pilot study remained the same as for the research proposal.

1. Checklist

A teacher developed checklist (see Appendix II) was administered to the selected research group from Class1, consisting of 37 students. Students were required to check the assessment strategies employed by their Form Three mathematics teacher.

2. Likert Scale

Development

A questionnaire (see Appendix IV) was administered to 30 randomly selected students from Class2 and Class3. The selected research group, Class1, was not involved in filling out the questionnaire. Students from Class1, Class2 and Class3 were assigned numbers from 1 to 114 for selection purposes. Class1 was assigned numbers from 1 to 37, Class2 was assigned numbers from 38 to 75, and Class3 was assigned numbers from 76 to 114. An initial Likert scale (see Appendix V) was developed, using students' responses to the questionnaire.

Still at the developmental stage, the initial Likert scale was administered to the same 30 students from Class2 and Class3. Once again, the selected research group, Class1, was not involved in the developmental stage of this scale. Students were asked to indicate their degree of agreement with the items. These responses were used to refine the initial Likert scale.

3. Qualitative Interview protocol

For this pilot study three (3) students, from the selected research group from Class1, receiving the highest scores and three (3) students receiving the lowest scores, in the refined attitude test, were interviewed about their attitudes towards assessment strategies.

Data Analysis

This pilot study investigated the impact of teachers' assessment strategies on students' attitude. The analysis is based on data collected over a six week period by means of checklist, Likert scale and qualitative interview protocol. The data for this pilot report include the responses of 37 students from one Form Three class.

Research Question 1

Are Form Three students exposed to a variety of assessment strategies?

For this pilot study, the checklist (see Appendix II) was administered to 37 students from Class1. Students were required to check the assessment strategies employed by their Form Three mathematics teacher.

A tally was done (see Appendix III) of the number of students exposed to each assessment strategy and the corresponding percentage of students was calculated.

The table in Appendix III illustrates that students from Class1 were exposed to seven major categories of assessment strategies, at least once, in Form Three. However, some of them were not exposed to certain subcategories. For example, for the forced-choice category, students were only exposed to the multiple-choice subcategory. The table in Appendix III was utilized to generate a bar graph as illustrated in Figure 1.

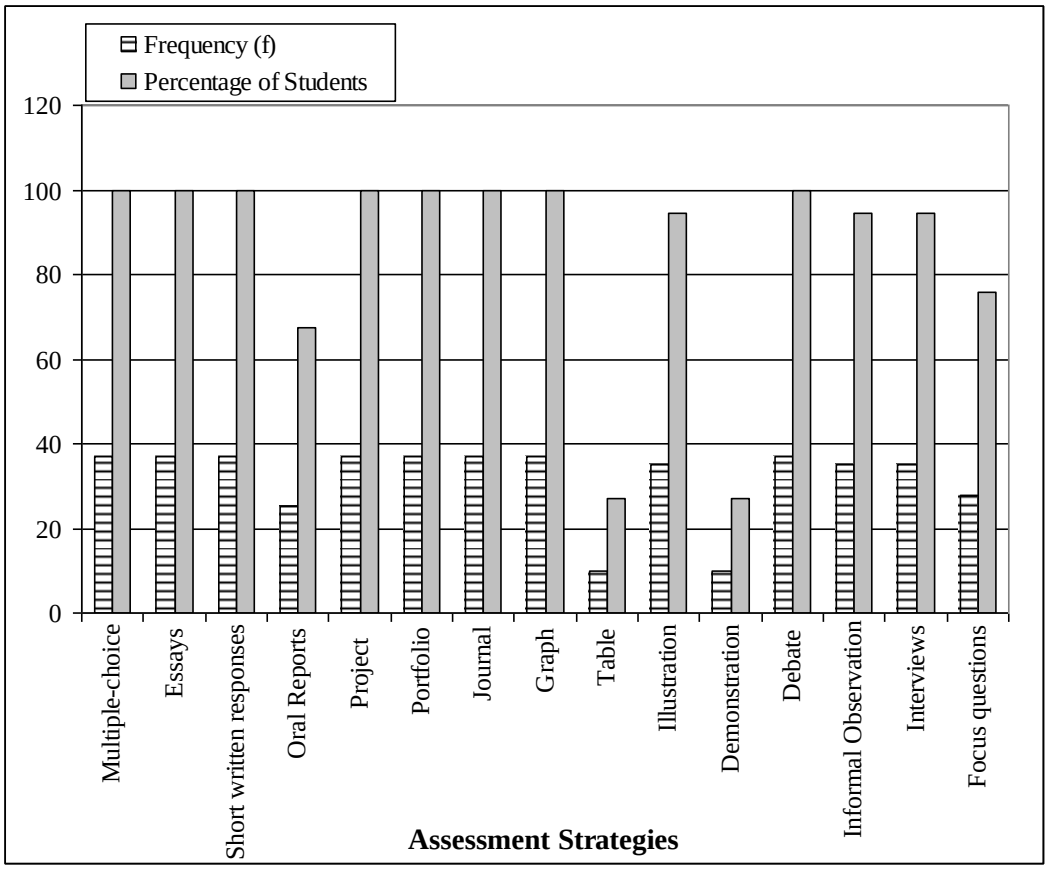

Figure 1. Bar graph showing frequency distribution and corresponding percentage of students exposed to each assessment strategy (*N = 37*).

As illustrated in Figure 1, 100% of students from Class1 can recall being exposed, at least once, to: forced-choice items of the multiple-choice type; essays; short written responses; and performance tasks like projects, portfolios, journal, graphs and debate. Ninety-five percent of students remembered being exposed to performance task of the type illustrations as well as teacher observation of both the informal and interview types. Seventy-six percent recollected being exposed to self assessment of the type focus questions, whereas 68% recalled being assessed by means of oral report. Only 27% of students can remember being exposed to performance tasks such as summarizing information in table form and demonstrations.

Besides students' ability to recall being engaged in a particular assessment strategy, differences in percentages may also be due to factors such as students' absenteeism when a particular assessment strategy was being introduced to the class. In general, each student from Class1 was exposed to an average of 13 subcategories of assessment strategies out of a total 23, presented in Appendix III. Exposure to such a limited variety of assessment strategies may not cater to students of all learning styles and may contribute to negative attitudes towards assessment strategies. A comprehensive view of a person's knowledge may require multiple measures, each of which contributes unique information to the picture.

Research Question 2

Do Form Three students differ in their attitudes towards assessment strategies?

An item analysis and reliability analysis was performed on the initial Likert scale, using students' attitudinal scores from Class1 and Class2, before the scale was pilot tested on the selected research group from Class1.

Item Analysis

The initial Likert scale, consisting of 24 items (see Appendix V) was, administered to 30 students from Class2 and Class3. The raw scores obtained by each student from Class2 and Class3 on each item are presented in Appendix VI. These scores were used to perform an item analysis.

Each item was examined to discover its strengths and flaws. The index of discrimination for each item was calculated (see Appendix VIII) using the top 10 scores (upper group) and the 10 lowest scores (lower group). Any item with a discrimination index of less than 0.25 (Ebel, 1965) was omitted or reworded, thus refining the scale. This index of a test item is a measure

which allows one to tell how the item differentiated between the students who achieved well (upper group) as against those who achieved poorly (lower group).

Based on the results obtained in Appendix VIII, items 1, 2, 3, 4, 8, 9, 13, 16, 17, 20 and 21 were removed from the initial Likert scale because of a discrimination index below 0.25. A reliability analysis was then performed on the remaining 13 items.

Reliability Analysis

Cronbach's (1951) coefficient alpha was calculated to obtain a measure of the internal consistency reliability (Muijas, 2004) of the refined scale. This commonly used index of the internal consistency reliability of a test, based on the average of the inter-item correlations, measures the extent to which the individual test items "stick together," such that test takers consistently respond to items measuring the same thing in the same ways.

A high Cronbach's coefficient alpha is desirable since it reflects that the test items are measuring the same underlying attribute (not a mixture of different attributes) with the same degree of sensitivity. As a correlation, alpha ranges in value from 0 to 1 (negative values can occur when items are not positively correlated with each other). DeVellis (1991) recommends an alpha: below 0.60 as unacceptable; 0.60 - 0.65 undesirable; 0.65 - 0.70 minimally acceptable; 0.70 - 0.80 respectable; 0.80-0.90 very good; and if much above 0 .90, excellent.

Shown in Appendix IX are the inter-item statistics on the tentative refined Likert scale consisting of the items remaining after the item analysis: 5, 6, 7, 10, 11, 12, 14, 15, 18, 19, 22, 23 and 24. This Likert scale consisting of 13 items indicated a relatively high reliability of 0.86. Having obtained a very good alpha value, items were renumbered from 1 to 13 and the refined Likert scale presented in Appendix X.

This refined Likert scale was pilot tested on the selected research group, comprising 37 students from Class1. Students were given two days to complete the attitude test.

Student Attitudinal Scores

An attitudinal score was obtained for each student from the selected research group from Class1. From students' attitudinal scores, the range, class mean and standard deviation, as well as the percentage of students conveying positive and negative dispositions were obtained.

Range. Students' attitudes were scored on a 1 to 5 Likert scale consisting of 13 items. Possible scores range from 13 (very negative attitude) to 65 (very positive attitude). From the table in Appendix XII, the maximum and minimum students' attitudinal scores were obtained.

The range of scores is the difference between the maximum score and the minimum score. For Class1, the maximum score was 52 whereas the minimum score was 25. The range of these scores is 27, which indicates that students show varying attitudes toward teachers' assessment strategies.

The range is useful as a rough estimate of how a score compares with the highest and lowest in a distribution. For example, the researcher might find it useful to know whether a students' attitudinal score is near to the student who scored the highest or lowest on the attitude test. However, a more accurate measure of variability is mean and standard deviation.

Class mean and standard deviation. From the table in Appendix XII, the mean and standard deviation of students' attitudinal scores, for Class1, were calculated.

Mean is a summary measure or index of the central tendency of a set of data. Unlike the range, the variance takes into account every score in the distribution. For Class1, the mean

attitudinal score of the refined Likert scale was 38.7, with a standard deviation of 7.4, which indicates a relatively wide variability in students' attitudinal scores. A comparison of raw scores in Appendix XII shows that 21 students have a score which is less than the mean score of 38.7 whereas 16 students scored greater than the mean score. Appendix XII shows that variability also exists in individual item scores and in the mean item scores. For Class1, students' attitudinal scores appear to have a normal distribution since the mean score (38.7), the median score (38), and one of the modes (38), are approximately the same.

The findings of this pilot study suggest that students from Class1 exhibit different degrees of attitudes towards teachers' assessment strategies.

Percentage of students conveying positive and negative dispositions. The maximum possible attitudinal score was 65 and the minimum possible attitudinal score was 13, therefore the mid-range score for this Likert scale is 39 (see Appendix XII). A student receiving a score greater than 39 implies that the student has a positive attitude towards assessment strategies whereas a score less than 39 suggests a negative disposition. A frequency count was made of the number of students exhibiting positive and negative dispositions from the table in Appendix XII and the result summarized in Table 1.

Table 1

Frequency and Percentage Distribution of Scores Around the Mid-Range Score (N = 37)

Student attitudinal score	**Number of students from Class1**	**Percentage of students from Class1**
Greater than 39	16	43.2
Less than 39	21	56.8
	37	100.00

Table 1 shows that 43.2 % of students have a positive attitude towards teachers' assessment strategies whereas 56.8 % have a negative attitude. This indicates that the proportion of students exhibiting negative attitudes towards teachers' assessment strategies is greater than those showing positive dispositions. These differences can be attributed to factors revealed in the Likert scale items such as: understanding the scoring criteria (rubrics), being informed of the assessment strategy, fairness, equality, availability of time, learning styles, teaching content, necessary pre-knowledge, skills, and opportunity to explore multiple solutions to a problem.

To obtain a deeper understanding of these factors and thus students' attitude towards teachers' assessment strategies, interviews were conducted.

Research Question 3

Do students prefer alternative assessment strategies to traditional tests in mathematics?

For this pilot study, three (3) students who received the highest scores and three (3) students who received the lowest scores in the attitude test, were interviewed to investigate why students preferred certain assessment strategies. The six candidates interviewed were students with numbers 6, 25, 29, 28, 16 and 3 (see Appendix XII). These students were given the names U, V, W, X, Y and Z respectively. U, V and W received the three lowest scores in the attitude test with U scoring 25, V 25, and W 26. X, Y and Z received the three highest scores, 50, 51 and 52 respectively.

The data used for this study came from qualitative interviews using an interview guide approach in which an initial set of questions was prepared in advance (see Appendix XIII (a)). These interviews were conducted at lunchtime in the conference room at the researcher's school.

The qualitative interviews for this pilot study lasted from thirty to seventy minutes. Each participant was informed of the purpose of the interview and assured that her identity would be protected. Participants spoke freely with the researcher who intervened only to keep the focus or to ask further probing questions. Students' responses to the interview questions focused on their reasons for preference of traditional tests or alternative assessments such as performance tasks, portfolios, journals, and questioning. A sample of the interview transcript is presented in Appendix XV and the corresponding interview coding process is presented in Appendix XIV. One of the aims of this pilot test was to refine the set of interview questions.

Traditional Tests

Five students out of the six interviewed admitted to feeling nervous under traditional test conditions. Traditional tests contributed to negative emotions in U and V. U claimed that she felt "shaky and foolish," when she was being tested, while V remarked that when she looked at the test paper it was "all gibberish." She added that she hated tests because they made her "feel nervous," and that she "must arrive at the right answer." She also argued that tests were "dragging, long and boring." For her, tests were "not interesting or creative" so she felt "relieved when it's all done."

Percentage scores (grades) from traditional tests seemed to contribute to U's undue stress and nervousness. U affirmed that she "would feel less stressed out if there were no tests." She believed that "too much pressure is put on you when you are tested because if you misinterpret a question, but you know the information, you can fail the test." She saw this situation as unfair and suggested that "students' participation ... and performance in other things [tasks] should count towards ... marks."

V and W emphasized that they failed to see the relevance of classroom testing to their lives as they viewed summative high-stake testing as more important. W commented that "students just don't think that classroom tests are important. ... [T]he big tests are important like C.X.C [CSEC-Caribbean Secondary Examinations Certificate examinations] because it determines your future job." U observed that her friends "fool around on the test ... because they write down answers randomly."

U provided a possible explanation why classroom testing may not be appealing to students as she shared similar sentiments with V and W. U alleged that teachers misused tests by encouraging cramming:

> You can't tell when a question will come your way. We're required to cram a set of formula and know when to apply it, and to make things [matters] worse there is only one right answer. ... Not everyone can respond immediately and correctly. ... The real world is full of ... problems and there are many right answers to ... [those] problems but only in math you've one correct answer.

However, not all students shared negative dispositions towards traditional tests. Z declared that she felt "very motivated by tests" because she "study hard and get good marks." She claimed, "If the situation wasn't testing ... I wouldn't study for anything." Y suggested that "if students know more about the importance of tests, they might appreciate them."

Alternative Assessments

U preferred alternative assessment strategies because "it's fun and not boring," which motivated her to "pick up quickly." She added that "Students ... should be assessed in many ways that ... include what we like." W believed that alternative assessment fostered interest in the

subject because it “opens you to a whole new world on the topic when doing ... research.” For example, she explained that “diaries help you to express your feelings to the topic, and a portfolio shows your performance and improvement.” She suggested that “Students need to become more involved in ... designing the assessment strategies.”

The six students interviewed agreed that: students need to be informed about what they were going to be assessed on and when; teachers should give examples, do demonstrations and give practice questions; and students should have access to the scheme of work.

Projects. Although X and Z shared positive dispositions to traditional tests, they did not seem to favor performance tasks such as projects. X believed that “projects are unfair because parents help.” She alleged that the “elaborate projects students ... or ... say parents produce. ...is cheating. There is a lot of flash.” She added that “teachers don’t provide enough guidance.”

Z agreed with X that “Some students have plenty help like parents, computers, libraries, and things like art supplies in creating their projects, while other students don’t have resources.” She argued that some assessments are very time consuming and she became annoyed because “it takes away a lot from my studying time.”

Although U and W believed that performance tasks such as projects were time consuming, they concluded that it was more fun than traditional tests. U reflected on an occasion in class when she made “shapes out of straws,” she recalled that the activities “were fun but took plenty time.” “I felt like I had more control over what I made in the class,” she declared. U continued “Tests sometime don't show our full abilities ... when you aren’t stressed, you’re open to learn more because you aren’t worried about what you’re going to make on the test.” W further declared that she “enjoy projects more” and believed that it would “help ... me more, later in life,” She attested that the projects she did in class “helped us study for the tests.”

Portfolios. Of the six students interviewed, two students W and X, expressed positive attitudes to portfolio assessment in their responses to interview questions. Two others, U and V, indicated how beneficial portfolio assessments were, while not explicitly commenting that they liked it better than tests.

X was eager to explain what she had experienced in Form Three, telling the story behind the experience. She expressed concern that she solved a problem her way, and not the way that it was taught in class because "it made more sense ...., how ... I solved it." She said that the experience of writing the steps involved in solving the problem, in her journal, which had to be added to her portfolio, was "good but ... wow! It took a long time." She felt confident that she could "put ... stuff together and learn for ... myself."

X liked the fact that she had to choose her own materials for her portfolio. She particularly enjoyed when she wrote "articles in a group," because "completing ... work with others ... [is] more fun." She affirmed that while doing portfolios, she did not "feel lonely like in test conditions." X appreciated that she "did not have to worry about stringent exam times."

W expressed similar sentiments to X, that she could work without being supervised by a teacher and still achieve. She deemed that she could not "score beyond 60 in ... maths tests." However, she claimed that in portfolio assessment she could "do well and score." She was delighted that she could " plan ... [her] own learning" and there was "no need for a teacher to be breathing down ... my neck," to make sure that she was not cheating.

X believed that portfolios allowed her to demonstrate unique accomplishments and allowed her to assess herself as well as her growth:

> I made an observation about my work. Last term I did the essay assignment halfway and didn't really put much effort into it. ... I'm trying not to do it again. I think I'm a better

learner now. My essays in the beginning of last term were really bad.... The ones at the beginning of this term were much better.

Students enjoyed assembling their portfolios. “I liked the idea of the portfolio because it provided a summary of my work in the class which I could refer ... in the future,” proclaimed X as she reflected on the benefits of looking back at what she had learned.

W declared that creating a personal booklet is fun and so she felt like doing more work. She said that she “felt like studying harder because it [the portfolio] is my own.” She confessed that she “may not be strong in tests” but, she is “strong in this [portfolio].” She also kept in mind that she “had to turn in the portfolio at the end of the term.” She admitted that she preferred portfolio to traditional tests because for tests she studied “only for one week,” but for portfolios, she made the “same effort throughout the term” so she learnt more.

Portfolio assessment was enjoyable for four out of six students. Y and Z found that portfolio construction was much more difficult than tests. These two students gave relatively negative comments on portfolio assessment, stating reasons such as portfolio construction was “time-consuming,” “too much work,” “complicated,” and “difficult.”

Z admitted that sometimes she did not understand what the teacher wanted in alternative assessments and so she “prefer normal pen and paper tests.” Y supported Z, “students are often uneasy ... wondering if they did the assignment correctly.”

Y alleged that teachers did not develop proper criteria, that scoring was unfair and that teachers had little time to meet with students. She argued that in traditional tests she got an opportunity to “see a mark scheme”. But in portfolio assessment, “there is no mark scheme.” As far as she was concerned, she was “marked on how much work the teacher feel” that she had put

into her portfolio or “how nice it looks.” For these reasons she believed that she was “treated unfairly, yes there is bias.”

Y observed, “Even the teacher ... have difficulty allocating a score or deciding on the best portfolio.” She attested that “some students’ portfolios are far better than others and sometimes they get the same marks.”

Journals. U believed that by having students write about what they learned in the classroom, teachers could discover students’ misunderstandings. She said that she “write about topics that are difficult ... to understand so that the teacher can help ... when he reads it.” According to her, it allowed students to tell their teachers about themselves on paper what they might not be able to verbally: “I like English Language so I can use my writing skills to tell [teacher’s name] about myself and where I’m having problems in maths ... and boy, do I tell him off.”

V liked to communicate personally with her teacher because her teacher “goes over” what she “complained about in the journals” and “teaches ... the topic again ... the next day.” She liked journal writing because she “feel[s] free to express in writing feelings” that she “can’t express in front of ... friends.”

U admitted that her “attitude to journal writing has changed,” because her “writing has helped [her] to better understand ... steps ... to solve the problems.” She said that when she expressed the steps to solving a problem “in words.... It’s easier to see the trouble spots.” She said that she had “more opportunities to write in mathematics,” and, because of this, she had “come to like mathematics and, study by myself at home.”

Teacher Observation (Questioning). U felt embarrassed when she did not know the answer to a question:

> I get annoyed when he [the teacher] asks a question in front of all my friends and I don't know the answer. ... [T]hat can be embarrassing. ... Students who are quick and are more noticeable in class get marks and stars. Not because we aren't brilliant we are retarded.

U pointed out that sometimes her teacher posed questions in the closed form. She said that her teacher "asks many yes/no questions and so we guess sometimes." She alleged that when her teacher "gets bored and wants to end class discussions ... he controls the direction of the answer to a question with a yes/no question." Sometimes teachers asked questions which could leave students baffled. U claimed that her teacher asked questions which "tie us up. ... [B]ut I go home and read the book." V also expressed a negative attitude to questioning. She said that each time she was called on in class by her teacher she would "panic and freeze."

Z had a more positive view to questioning. Although her "teacher asks more and more tough questions," she knew that her teacher had her "interest at heart." She affirmed that questioning helped her to "keep up to date" with her work. Y shared similar sentiments that questioning was important. She said that her teacher "involves the entire class or group in a single question.... [N]ot just those ... [who] will answer correctly. He concentrates on those who aren't paying attention."

By appropriately sequencing questions, a teacher could encourage students to explore mathematical relationships and to build connections among topics, Z said that her "teacher states questions clearly, takes the answers and asks other questions and he's patient because he allows sufficient wait time for students to respond ... that way we see how topics link up."

No viable conclusions could be made from such a small scale pilot study. The responses to the interview questions are only valid for the six students since the sample size is small and the sample may not be representative of students from Class1.

Summary

The frequency distribution of students exposed to each assessment strategy as revealed by the checklist, indicated that on an average students from Class1 were exposed to a limited variety of assessment strategies, which may not cater to students of diverse learning styles, thus contributing to negative attitudes towards assessment strategies.

For Class1, differences in students' attitude towards teachers' assessment strategies can be attributed to factors revealed in the Likert scale items such as: understanding the scoring criteria (rubrics), being informed of the assessment strategy, fairness, equality, availability of time, learning styles, teaching content, necessary pre-knowledge, skills, and opportunity to explore multiple solutions to a problem.

Interviews with the six students revealed that those who were successful and those who had positive dispositions to traditional testing situations comprehended the purpose for testing, realized how the results were used, understood the importance of the test, recognized the relevance of the test to instruction, expected to do well on tests and were confident in their abilities to do well on tests.

Some students preferred traditional assessments, some preferred alternative assessments, whereas others did not have any particular preference. In this pilot study it appeared that students from Class1 who scored high in traditional tests preferred traditional methods of assessment and were resistant to change as their main goal was scoring high marks.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

This small-scale pilot study provided useful information in several areas including: the ability to obtain a sample of students and the methodology to use, the logistical aspects of conducting research, the potential feasibility of interviewing students, and challenges with respect to the reliability of information obtained through interviews with students.

To ascertain if students were exposed to a variety of assessment strategies a checklist (see Appendix II) was administered to 37 students from Class1. Students were required to check the assessment strategies employed by their Form Three mathematics teacher. The pilot survey, conducted by means of a checklist, revealed that although all students from Class1 were exposed to the seven categories of assessment strategies illustrated in Appendix III, at least once, their exposure to the subcategories was limited. This suggests that although students from Class1 were being exposed to alternative assessments to some extent, traditional tests were still prevalent. This seemed consistent with Mitchell (1992) who said that most students are still tested. He addressed the distinction between assessment and testing. According to him, assessment is an activity that can take many forms, can extend over time and aims to capture the quality of a student's work. In addition he stated that a test is a single-occasion, timed exercise, usually in a multiple-choice or short-answer form.

Studies in assessment use, conducted by Stiggins and Bridgeford (1985), found that teacher designed objective tests were the assessment methods teachers primarily relied on for decision making. According to Johnson (1989), teachers tend to utilize multiple choice tests because they have some advantages, including a lower probability of correct guesses than

ordinary true-false tests do; they can be used to measure many levels of learning; they allow for extensive sampling of material; and they are easy to administer and grade. Multiple-choice is less time consuming than most other forms of assessment. It is also relatively easy to validate and relatively easy to determine the internal consistency of multiple-choice tests.

This pilot study helped tremendously to inform the main study. While the checklist was being constructed the researcher consulted with the selected research group from Class1, consisting of 37 students and discovered that some students had problems in identifying a few of the assessment strategies included in it. The researcher attempted to distribute a handout consisting of "definitions" but discovered that giving "definitions" was useless.

Students required practical examples that would enable them to recall if they had encountered a particular strategy. The researcher believed that it was important for all students to understand what each assessment strategy entailed. Therefore, the researcher decided to produce a handout giving descriptions and examples of assessment strategies (see Appendix I). Students were required to familiarize themselves with the strategies before filling out the checklist.

Although students were given two days to acquaint themselves with the handout on descriptions and examples of assessment strategies and one day was given for students to respond to the checklist, some students took over a week to return the completed checklist to the researcher. Some students claimed that they required extra time to study the handout before filling out the checklist, some claimed that they had prior commitments at home and needed extra time, while others claimed that there were no incentives to fill out the checklist.

For these reasons, the researcher suggests that for the main study, the handout on assessment strategies be distributed to students one week before dispatching the checklist. In addition, the researcher recommends that a session on assessment strategies be conducted with

participants to ensure that they fully understand the information presented in the handout. During that session, the researcher should take the opportunity to clarify any misconceptions that students may have about assessment strategies.

To investigate if students differed in their attitudes towards assessment strategies, a Likert scale was constructed and developed using Class2 and Class3. The selected research group for the pilot study, Class 1, was not involved in the development of the scale. The Likert scale composed of multiple items that were designed to measure the same idea or the same construct. The use of multiple items to measure a construct was done to increase the reliability and validity of the measure (Burke and Christensen, 2004). The ratings on the multiple items were then summed for each research participant, providing a single score for each person.

The most challenging step for the researcher in constructing the Likert scale, was to collect a number of statements from Class2 and Class3 pertaining to students' attitude towards teachers' assessment strategies. The researcher decided to use a questionnaire to uncover students' attitudes. However, asking the right question and phrasing it properly proved to be a challenge. In addition to knowing what the researcher wanted, there was the difficulty of wording the questionnaire clearly. The researcher discovered that the same words meant different things to different students.

Therefore, the researcher suggests that anyone planning and constructing questionnaires should get all the help possible. Items should be submitted for criticism to those who have had experience in questionnaire construction. In addition, the researcher recommends administering the questionnaire on a few friends and acquaintances to identify and remove ambiguous items. These "dry runs" should reveal defects before the final questionnaire is printed.

Development of the Likert scale was a crucial step. The researcher had to meticulously choose statements from responses to the questionnaire pertaining to students' attitudes. It was essential that statements chosen expressed definite positive or negative attitudes to a particular point of view and that the number of positive and negative attitudes was approximately equal.

One of the objectives of this pilot study was to develop and refine the Likert scale, using students from Class2 and Class3, thus providing internal consistency of the scale. The results of this investigation indicated that the Likert scale reliably measured students' attitude towards teachers' assessment strategies since the scale had a very good reliability coefficient of 0.86 (DeVellis, 1991). This refined scale was then pilot tested on 37 students from Class1. No problems were encountered during this pilot test. This informed the researcher that the scale is suitable for use in the main study which will be conducted in the future.

Future improvements and further support of reliability and validity measures of the attitude test may include variables such as administration of the Likert scale to a larger population in the same school or to Form Three students with similar characteristics from other schools. This would add to external validity.

There are a few reasons why the attitude scale may be useful. This scale may not only help convey the factors that contribute to students' attitudes to assessment strategies but may provide teachers with essential knowledge required to reflect on their teaching practice. Moreover, the results of the attitude test might provide insights into the nature of student-teacher relationships since such relationships are influenced by the nature of assessment (Ryan & Deci, 2000). The items on the attitude test can provide a good starting point for teachers to talk to students about their attitudes and opinions about assessment strategies. This could perhaps result in the successful use of assessment strategies to promote positive

dispositions in students.

Data was also collected by means of interviews to investigate reasons for students' preferences of assessment strategies. For this pilot study qualitative, in-person interviews were conducted, which means that interviews were done face-to-face. Qualitative interviews were conducted to obtain detailed information about participants' thoughts, beliefs, knowledge, reasoning, motivations and feelings about why they preferred certain assessment strategies. For this pilot study, three (3) students who received the highest scores and three (3) students who received the lowest scores in the attitude test were interviewed.

Only after conducting the interviews did the researcher discover that no conclusions could be drawn about reasons for students' preferences of assessment strategies because students commented on different combinations of assessment strategies. Some students commented on multiple strategies and the researcher observed that those responses were superficial. This indicated to the researcher that the sample used in the pilot study was not representative of students from Class1. In addition, the pilot study informed the researcher that if the intention of the main study is to draw viable conclusions pertaining to reasons for students' preferences for an assessment strategy, then the sampling procedure for the main study would have to be altered.

After carefully studying the characteristics of the entire population and the purpose of the study, the researcher suggests that stratified random sampling be used to select students for interviews in the main study. The researcher recommends that a question be inserted at the bottom of the checklist in Appendix II (for research question 1) which asks: "Which assessment strategy indicated above do you prefer?" The students will be subdivided into smaller homogenous groups depending on their preference of assessment strategies. Each student in the

main study will be identified by a number from 1 to 114 which will be placed at the top of the checklist. The proportion of students from the population who prefer each assessment strategy will be calculated. For example, in the population consisting of 114 students, if the proportion were 15% preferred traditional tests, 10% preferred portfolios, 20% preferred interviews, and 55% preferred journals, the sample should include approximately the same proportions to be considered representative. Within each subgroup a random selection would be used. Thus, for a sample size of 40, the researcher would randomly select 6 students who preferred traditional tests from the subpopulation of all students who preferred traditional tests in the population, 4 students who preferred portfolios from the subpopulation of all students who preferred portfolios, 8 students who preferred interviews from the subpopulation of all students who preferred interviews, and 22 students who preferred journals from the subpopulation of all students who preferred journals. This process will give the researcher a more representative sample than one selected from the entire population of Form Three students, which might be unduly weighed by a prevalence of students who prefer journals (in this example).

The pilot study informed the researcher that recruitment and retention problems may be encountered in the main study. Initially, some students were hesitant to participate in this pilot study but consented after a little persuasion pertaining to the importance of their role in the study. Therefore, in the main study one can envisage that some students may refuse to participate in the study.

Preparation for the interview was a critical step. This pilot study served as a training ground for the researcher since it is not the norm for the researcher to conduct substantial

interviews of this extent. The researcher's skills in developing rapport, asking probing questions and preparing for an interview were enhanced.

According to Patton (1990), qualitative interviewing allows a researcher to enter into the inner world of another person and to gain an understanding of that person's perspective. One of the major challenges encountered by the researcher was establishing trust and rapport with participants. The initial task of securing the confidence and co-operation of the participant was crucial. To establish sufficient rapport, the researcher had to be friendly but at the same time be sensitive to gender, age and cultural differences of the participant. There are, of course, sensitivities and confidentiality issues associated with interviewing students on a subject as personal as attitudes.

A clear conception of just what information was needed was crucial in conducting interviews in this pilot study. Leading questions had to be rephrased to avoid unconsciously implying a certain answer. In order to produce the desired responses, the researcher needed to outline the best sequence of questions. It was imperative that the participant understood exactly what the researcher was asking. The researcher had to maintain control of the interview and keep the interview focused by utilizing appropriate probes and follow-up questions that naturally emerged during qualitative interviews to gain clarity and depth of responses. The experience gained during this pilot was very enlightening and should help the researcher conduct interviews more efficiently in the main study.

Information from the pilot study helped the researcher estimate resource requirements. The qualitative interviews for this pilot study lasted from thirty to seventy minutes, informing the researcher that the time required to conduct interviews could vary considerably. The time

allotted for an interview also gave the researcher an idea of the volume of data to be transcribed and reduced.

In this pilot study, students who preferred strategies such as projects and portfolios seemed to require more time for interviews than those who preferred traditional tests. Students who preferred alternative assessment strategies were enthusiastic to share their classroom experiences and give examples. This would suggest that more time and resources may be required for such interviews. Recording interviews on tape was preferred because they were convenient and inexpensive. Both the time spent per participant and money spent per participant are critical for preparing the budget for the full study.

The pilot study revealed the interview questions which contributed significantly to answering research question 3. Out of the 28 questions presented in Appendix XIII (a), 10 questions were eliminated either because students had problems in comprehending them or participants provided no answers. Removing these items should improve the validity of the interview questions and students' responses in the main study. Validity is greater when the interview is based on a carefully designed structure, thus ensuring that the significant information is elicited (content validity).

The remaining 18 questions, renumbered from 1 to 18 and presented in Appendix XIII (b) should serve as a better interview protocol for the main study, as these questions prompted relevant conversations by students in the pilot study. Further analysis on a question-by-question basis may be of interest in helping to guide the structure of questions for future interviews.

Future Research

Through a review of literature, the findings of this pilot study and the subsequent conclusions, the researcher has proposed the following recommendations for future research:

- Investigation of students' attitude to each of the seven assessment strategies presented in this study.
- An analysis of teachers' attitude towards assessment strategies.
- The degree to which teachers perceive themselves to be competent in the assessment process.
- How is the assessment information from each of the seven assessment methods in this study used?
- Correlational analysis between teachers' attitude towards assessment, competence in assessment and use of individual assessment methods.
- Most students in this study had been accustomed throughout their education to having tests and grades as part of their class format. What happens when grades from tests are removed?

CHAPTER 6

CONCLUSION

This pilot study on students' attitude towards teachers' assessment strategies contributed significantly to the researcher's understanding of the phenomenon.

The current NCSE syllabus highlights the need for teachers to reflect on their practices and to use alternative assessment methods; merely adding scores on written tests will not give detailed insights into what students know. It is imperative that teachers use a variety of assessment strategies in order to capture students' diverse ways of knowing. However, it is not enough to talk about alternative assessment. If teachers are expected to adopt multiple assessment methods, they must experience them because alignment is not easy to accomplish in classrooms.

Firstly, teachers need considerable subject matter and instructional expertise to transform national standards into achievement outcomes which they can use in their classrooms. Secondly, they need to be "assessment literate" and know, for example, that each assessment method not only has its own merit related to drawing confident conclusions about student achievement, but also each has sources of bias that can distort the results and mislead users (Stiggins, 2001).

As teachers seek to employ alternative techniques to aid them in the improvement of mathematics teaching and learning, they should not by any means ignore traditional techniques. Before accepting new assessment methods and rejecting the ones already established, the advantages or benefits of each must be carefully examined. Hence, the need for doing studies like this. Only then will we be able to develop and implement assessment techniques, alternative or otherwise, that will support students' mathematics learning.

The challenge for teachers is to experiment with different ways of grading, scoring and reporting to determine the best ways to describe students' knowledge of mathematics as indicated in the NCSE standards. However, the extent to which a variety of assessment strategies become an integral part of students' experience depends on the classroom teachers' understanding of, support for and expertise in implementing the process.

Change is difficult, often lonely and frequently unappreciated. Teachers are being asked to develop expertise in practices they may have never experienced and may have difficulty envisioning. Therefore, implementing a variety of assessment strategies within the classroom is a challenge to be embraced, explored and refined by every teacher.

Considering this pilot study, the researcher believes that there is a need to improve students' attitude towards assessment strategies and a need to increase their motivation for doing well. Students need to feel comfortable in assessment situations and yet more confident in their abilities to perform creditably. Assessment should be a process that allows teachers to adjust their instruction continuously to match the needs of students. Assessment should not be seen as diverting teachers' energy away from their major task of instruction, bearing in mind that assessment is not separate from instruction. Therefore, teachers must decide which forms of assessment are most appropriate for collecting data and measuring student achievement.

This pilot study is a model of the full research study but on a smaller scale. The pilot study helped by providing data needed to plan the larger study and identified areas where things can go awry in the main study. The pilot study was most helpful in detecting blind spots and oversights. Many things happened during the pilot study which the researcher never envisaged when planning the research proposal. The researcher thought that it was an advantage to have

this oversight before undertaking the full study. Although the researcher sought advice from colleagues on whether there was anything overlooked in the proposal, the researcher has concluded that it was worthwhile to run a pilot study. After all, the researcher's colleagues seemed to have the same blind spots as the researcher.

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Student Number:….

Appendix I

Description/ Examples of Assessment Strategies Encountered in Form Three

You are **NOT** required to do these questions. These are merely descriptions/ examples to help you identify assessment strategies in the checklist .

1. Forced-choice

a) Multiple-choice

I was asked to choose the correct answer from among several options.
For example:
56.78 written in standard form is

A. 0.5678×10^{-2} **B.** 5.678×10^{-1} **C.** 5.678×10^{1} **D.** 56.78×10^{2}

b) Matching

I drew an arrow from the items to the correct option or I matched each letter of the item to a number from the option.
For example:
For each item below, select the option that accurately completes the statement

Items	A. 4 x 5 =	B. 4/5 =	C. 12 x 14=	D. 6 x 7=
Options	42 25 125	168 24 20	0.8 116	16

c) Alternate Choice

I had to choose between two answers.
For example:

The inclusion of one set within another is called a
A Subset B. Venn Diagram

d) True/ False

I was asked to state whether the statement presented was true or false.
For example:
Mark **F** if the statement is false and **T** if the statement is true
.....pi is equal to the circumference of a circle divided by its diameter.
.....Congruent means 'the same'.

e) Multiple response items

I was asked to identify all correct answers from a list of options:
For example:
Which of the following are factors of 12

1) 3	2) 6	3) 24	4) 12
A. 1 & 2	B. 2 & 3	C. 1, 3, and 4	D. 2,3, and 4

(f) Fill in the blank

I worked out the answer mentally and wrote the answer on a blank line.
For example:
The L.C.M of 6 and 12 is _____

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2. Essays

I attempted essay type questions in mathematics which consisted of several parts OR I was asked to write a literary piece on a topic of interest.
For example:
A cylindrical tin has a radius of 14cm and a height of 9cm. Take $\pi = 22/7$
(i) Calculate the area of the top of the tin.
(ii) Calculate the area of the curved surface of the tin.
(iii) What is the area of paper used to cover the top and curved surface of the tin?
OR
Write an essay on John Venn's (1834-1923), contribution to the Venn diagram and its impact on mathematics (150 words).
OR
Write a personal essay entitled "The Mathematical Part of Me" (250 words).

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3. Short written responses

I was required to show the necessary working to a question:
For example:
(i) "Provide a brief explanation of…"

(ii) Show the steps necessary to perform the following calculations:
½ ÷ ¾

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4. Oral Reports

I was required to provide a description, explanation or answer a question similar to an essay, but had to do so verbally.
For example:
(i) Describe how you would find the length of arc from the formula for circumference of a circle.

(ii) What is meant by enlargement and scale factor?

(iii) Give a verbal explanation of processes involved in writing numbers to the required number of significant figures.

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5. Performance Tasks (a to f –Students' Products; g to i – Students' Skills)

I was required to do a performance-based task. I had to produce a product or demonstrate a skill or do a performance. Performance tasks can also be done in groups.

a) Project

For example:

(i) Produce the net of a cube.

(ii) Calculate the amount of material needed to make a circular frame and produce it.

(iii) Investigate, in groups of four, whether information on volume stated on labels of cans and boxes are correct.

b) Portfolio

I collected samples, artifacts, or documents that provided evidence of my mathematical development during a specific period. The contents were selected by me, sometimes in collaboration with my teacher. I also included a reflective explanation offering the rationale for the selection and a rationale for the order of the pieces.

For example:

Compile pieces of work which include: the definition and historical development of rational numbers, samples of solutions to simultaneous equations, and journal articles of classroom experiences.

c) Journal

I wrote about what I learned in class and wrote about my reactions to activities that I encountered during the week. I expressed in written form concerns about the class teaching or mathematics in general.

For example:

(i) Write about the main idea of today's lesson.

(ii) Write to a friend in a letter how the formula for area of a circle was developed.

d) Graph

I drew graphs using graph paper

For example:

(i) Draw the graph of the straight line y= x+1

(ii) Draw a quadratic graph

(iii) Construct of a frequency polygon

e) Table

I used a table to summarize my knowledge of certain topics.

For example:

Tabulate similarities and differences in the properties of translation, reflection, rotation, and enlargement.

f) Illustration

I used pictures, figures, diagrams, photographs, images, graphics or visual for answering a question.

For example:

(i) Illustrate the rules for multiplication and division of decimals.

(ii) Representation of solutions to inequalities on a number line.

(iii) Display differences between simple and compound interest on a display board.

(iv) Students display of statistical data using pie charts, bar graphs etc.

g) Demonstration

I used visual, audio, art, drama, movement, and/or music to explain a solution to a non-routine math problem.

For example:

I demonstrated what a rotation was by making a complete turn

h) Debate

I presented arguments for and against an issue in mathematics.

For example:

(i) Use of debate to present arguments to investigate the meaning of 0/0

(ii) For subsets, debate the relationship among groups in the society and compare the relationship among numbers with the relationship among different groups in the society.

i) Enactment

I created a simulated version of a grocery where students purchase groceries.

6. Teacher Observation

My teacher observed students in a learning situation, looked for evidence of understanding and mathematical development, and made written notes about students' comments, insights, and behaviors.

a) Informal Observation

For example

(i) My teacher observes how students represent fractions in their notebooks.

(ii) My teacher observes how students display concretely, visually and in symbols, the use of equivalent fractions. How students add and subtract fractions with same denominator, and relate different denominators.

(iii) My teacher observes how students draw quadratic graphs on graph paper.

(iv) My teacher watches students interacting with classmates and comments on our effort, behavior and attendance.

(v) My teacher asks a student to describe her thinking while reading a graph.

b) Interviews

I have been asked a series of questions by my teacher. Questions were asked to assess my thinking and reasoning. My teacher was interested in my background, knowledge, interests, and attitudes about a topic in mathematics.

For example:

(i) What would happen if…? How do you know that…? Can you predict…?
(ii) The teacher might ask "Can you say more about what you mean?" or "Can you explain that to me in a different way?"

7. Student Self-assessment

Students are encouraged to participate in setting goals and monitoring their own learning.

a) Attitude survey

I filled out a survey which consisted of direct questions or rating scales that requested information about my products, attitudes, and interests in mathematics.

For example:

(i) I strongly agree that producing the net of a cube was challenging but enjoyable.
(ii) I agree that students feel motivated when they contribute to what is assessed.

b) Focus questions

I ask myself questions and reflect on the answers

For example:

(i) What have I learned?
(ii) How well have I learned it?
(iii) What do I need to learn next to move to the next level?

c) Checklist

I used a checklist to assess my knowledge of certain concepts.

For example:
I know the following properties of a cube:
√ It has 6 sides
It has a circular base
√ It has 8 vertices
√ It has 12 edges

Appendix II
Checklist of Assessment Strategies

Dear Students,
I will appreciate if you can fill out this checklist which will assist in my study.

With thanks.

Which of the following type of assessment strategies have you been exposed to in your **Form Three** mathematics class? (PLEASE TICK).

	Type of assessments	PLEASE TICK
1.	**Forced-choice**	
	a) Multiple-choice	☐
	b) Matching	☐
	c) Alternate Choice	☐
	d) True/ False	☐
	e) Multiple response items	☐
	f) Fill in the blank	☐
2.	**Essays**	☐
3.	**Short written responses**	☐
4.	**Oral Reports**	☐
5.	**Performance Tasks**	
	a) Project	☐
	b) Portfolio	☐
	c) Journal	☐
	d) Graph	☐
	e) Table	☐
	f) Illustration	☐
	g) Demonstration	☐
	h) Debate	☐
	i) Enactment	☐
6.	**Teacher Observation**	
	a) Informal Observation	☐
	b) Interviews (Questioning)	☐
7.	**Student Self-assessment**	
	a) Attitude survey	☐
	b) Focus questions	☐
	c) Checklist	☐

Appendix III
The Frequency and Percentage Distribution of Students, From Class 1, Exposed to Each Assessment Strategy at Least Once

See Excel File Attached

Appendix IV
Questionnaire

1. What do you think about the assessment strategies employed by your mathematics teacher? Explain.

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2. Why is the choice of assessment strategies employed by your teacher important?

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3. How does your teacher inform and prepare you for the assessment strategy before you are assessed?

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4. How do you contribute towards what assessment strategies the teacher uses?

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5. Describe the class climate before assessment.

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6. Describe your emotions during the assessment process.

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7. How does your teacher demonstrate confidence in administering the various assessment strategies?
Explain.

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8. Do you believe that you should be assessed by multiple techniques? Why?

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9. What are the assessment results used for?

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10. How do you generally feel about the way that assessment results are presented?

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11. Any other comments:

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…….....

Student Number:……

Appendix V
Initial Likert Scale with 24 Items
My Attitude Towards My Teachers' Assessment Strategies
(see Nature of Items in Appendix VII)
Please indicate by circling your degree of agreement with the items below:

KEY

SA- Strongly agree	A-Agree	U-Undecided	D-Disagree	SD-Strongly disagree

		SA	A	U	D	SD
1.	I am not treated fairly when certain assessment strategies are used.	1	2	3	4	5
2.	Assessment strategies give everyone an equal opportunity to demonstrate achievement.	5	4	3	2	1
3.	Assessment strategies allow me to demonstrate what I know.	5	4	3	2	1
4.	Assessment strategies allow me to demonstrate what I can do.	5	4	3	2	1
5.	Assessment strategies place me at a disadvantage because of lack of time.	1	2	3	4	5
6.	Assessment strategies are not sensitive to my learning style.	1	2	3	4	5
7.	Assessment strategies do not suit my learning style.	1	2	3	4	5
8.	My teacher clarifies which assessment strategy should be used.	5	4	3	2	1
9.	My teacher clarifies the level of understanding I am required to demonstrate.	5	4	3	2	1
10.	I can see a clear link between what is taught in class and the assessment strategies.	5	4	3	2	1
11.	I have the necessary pre-knowledge for the assessment strategies.	5	4	3	2	1
12.	I have the necessary skills for the assessment strategies.	5	4	3	2	1
13.	I am assessed on things requiring previous knowledge that I do not possess.	1	2	3	4	5
14.	I am informed of the assessment strategy so I know how to study.	5	4	3	2	1
15.	I do not understand the scoring criteria (rubrics) for the assessment strategies.	1	2	3	4	5
16.	My teacher provides us with sample questions or examples to familiarize us with the assessment strategies.	5	4	3	2	1
17.	I am taught the necessary test taking skills such as reading directions carefully, checking answers etc.	5	4	3	2	1
18.	I am given assessments without prior notice.	1	2	3	4	5
19.	Assessment strategies make me anxious.	1	2	3	4	5
20.	I feel motivated because I help to choose the assessment strategy.	5	4	3	2	1
21.	I feel involved because I help choose the assessment strategy.	5	4	3	2	1
22.	Assessment strategies are fair because I receive feedback on my work.	5	4	3	2	1
23.	Assessment strategies are fair because my teacher ensures that I understand them.	5	4	3	2	1
24.	Assessment strategies do not allow me to explore because they allow only one right answer.	1	2	3	4	5

Appendix VI
Raw Scores Obtained in the Initial Attitude Test

See Excel File Attached

Appendix VII

Determination of the Nature of Each Item of the Initial Attitude Test

Item Number	Nature of the item	**SA**	**A**	**U**	**D**	**SD**
1.	-	1	2	3	4	5
2.	+	5	4	3	2	1
3.	+	5	4	3	2	1
4.	+	5	4	3	2	1
5.	-	1	2	3	4	5
6.	-	1	2	3	4	5
7.	-	1	2	3	4	5
8.	+	5	4	3	2	1
9.	+	5	4	3	2	1
10.	+	5	4	3	2	1
11.	+	5	4	3	2	1
12.	+	5	4	3	2	1
13.	-	1	2	3	4	5
14.	+	5	4	3	2	1
15.	-	1	2	3	4	5
16.	+	5	4	3	2	1
17.	+	5	4	3	2	1
18.	-	1	2	3	4	5
19.	-	1	2	3	4	5
20.	+	5	4	3	2	1
21.	+	5	4	3	2	1
22.	+	5	4	3	2	1
23.	+	5	4	3	2	1
24.	-	1	2	3	4	5

Appendix VIII
ITEM Analysis
Calculation of the Discrimination Index for Each Item on the Attitude Test

See Excel File Attached

Appendix IX
Calculating Cronbach's Alpha of the Refined Likert Scale

See Excel File Attached

Student Number:……

Appendix X
Refined Likert Scale with 13 Items
My Attitude Towards My Teachers' Assessment Strategies
(see Nature of Items in Appendix XI)

Please indicate by circling your degree of agreement with the items below:
KEY

SA- Strongly agree	A-Agree	U-Undecided	D-Disagree	SD-Strongly disagree

		SA	A	U	D	SD
1.	Assessment strategies place me at a disadvantage because of lack of time.	1	2	3	4	5
2.	Assessment strategies are not sensitive to my learning style.	1	2	3	4	5
3.	Assessment strategies do not suit my learning style.	1	2	3	4	5
4.	I can see a clear link between what is taught in class and the assessment strategies.	5	4	3	2	1
5.	I have the necessary pre-knowledge for the assessment strategies.	5	4	3	2	1
6.	I have the necessary skills for the assessment strategies.	5	4	3	2	1
7.	I am informed of the assessment strategy so I know how to study.	5	4	3	2	1
8.	I do not understand the scoring criteria (rubrics) for the assessment strategies.	1	2	3	4	5
9.	I am given assessments without prior notice.	1	2	3	4	5
10.	Assessment strategies make me anxious.	1	2	3	4	5
11.	Assessment strategies are fair because I receive feedback on my work.	5	4	3	2	1
12.	Assessment strategies are fair because my teacher ensures that I understand them.	5	4	3	2	1
13.	Assessment strategies do not allow me to explore because they allow only one right answer.	1	2	3	4	5

Appendix XI

Determination of the Nature of Each Item of the Refined Attitude Test

Item No.	Nature of the item	SA	A	U	D	SD
1.	-	1	2	3	4	5
2.	-	1	2	3	4	5
3.	-	1	2	3	4	5
4.	+	5	4	3	2	1
5.	+	5	4	3	2	1
6.	+	5	4	3	2	1
7.	+	5	4	3	2	1
8.	-	1	2	3	4	5
9.	-	1	2	3	4	5
10.	-	1	2	3	4	5
11.	+	5	4	3	2	1
12.	+	5	4	3	2	1
13.	-	1	2	3	4	5

Maximum possible score (13 * 5)

65

Minimum possible score (13 * 1)

13

+ Means that the statement is a favourable one.

- Means that the statement is an unfavourable one and points must be reversed.

Appendix XII
Determination of Range, Mean and Standard Deviation for the Refined Attitude Test

See Excel File Attached

Appendix XIII (a)
Initial Interview Questions

1.	What is your attitude towards assessment strategies employed by your mathematics teacher?
2.	Do you think that there is a connection between your teacher's assessment strategies and your attitude? Explain.
3.	What would you say from your experience is one effective assessment strategy employed by your Form Three mathematics teacher?
4.	How have these strategies helped you to learn?
5.	Which assessment strategy, if any, do you prefer in mathematics?
6.	What is it about this strategy that you enjoy?
7.	We have identified at staff level that some students perceive our assessment strategies to be unfair. What in your opinion are some contributing factors towards this attitude?
8.	What can teachers at school do to help students foster a more positive attitude towards our assessment strategies in mathematics?
9.	Do you believe that you are treated fairly in assessment strategies employed?
10.	What factors, if any, do you believe placed you at a disadvantage for a specific assessment strategy?
11.	Is your teacher aware of these factors? What does he/she do about it?
12.	What has your teacher done to ensure that you understand the various assessment strategies fully?
13.	Does your teacher give you a reason for each assessment strategy used?
14.	Does your teacher explain the scoring criteria to you?
15.	In your opinion, is it important to know the rationale for the assessment and scoring criteria? Why?
16.	Do you help your teacher decide which assessment strategies are to be used?
17.	What about assessment techniques like portfolio? To what extent are you involved in selecting items and helping to develop the scoring criteria?
18.	Do you see a link between assessment strategies and teaching methods?
19.	Do you believe that teachers should use students' ideas to develop assessment strategies? Why?
20.	What assessment strategies do teachers use to encourage you to learn?
21.	How are these strategies effective?
22.	Should teachers use a wide range of assessment strategies? Why?
23.	To what extent are students given the opportunity to help in selecting assessment strategies?
24.	Does your teacher encourage students to ask questions, give reasons and ask for reasons, clarify and ask for clarifications?
25.	How do you see your role in assessment?
26.	How do you see the role of teachers in assessment?
27.	What are your goals for the future?
28.	Do you believe that assessment strategies used at school will help you to achieve your future goals?

Appendix XIII (b)
Refined Interview Questions

(Some items have been deleted and some items reworded from the initial interview questions)

1.	What is your attitude towards assessment strategies employed by your mathematics teacher?
2.	What would you say is one effective assessment strategy employed by your Form Three mathematics teacher? How did it benefit you?
3.	Which assessment strategy, if any, do you prefer in mathematics? Why?
4.	We have identified at staff level that some students perceive our assessment strategies to be unfair. What in your opinion are some contributing factors towards this attitude?
5.	What can teachers at school do to help students foster a more positive attitude towards assessment strategies in mathematics?
6.	How effective are teachers at making sure that you are treated fairly in assessment strategies employed? Could you explain how you reached this conclusion?
7.	What factors, if any, do you believe placed you at a disadvantage for a specific assessment strategy?
8.	What has your teacher done to ensure that you understand the various assessment strategies fully?
9.	In your opinion, is it important to know the rationale for the assessment and scoring criteria? Why?
10.	How strong is the link (connection) between assessment strategies and teaching methods? How effective is that link in motivating you to learn?
11.	How can teachers use students' ideas to develop assessment strategies? How effective would that be?
12.	How effective are teachers at using a wide range of assessment strategies? Could you explain how you reached this conclusion?
13.	To what extent are students given the opportunity to help in selecting assessment strategies?
14.	How effective is your teacher at encouraging students to ask questions, give reasons and ask for reasons, clarify and ask for clarifications? Could you explain how you reached this conclusion?
15.	How do you see your role in assessment?
16.	How do you see the role of teachers in assessment?
17.	What are your goals for the future?
18.	How will assessment strategies help you to attain your future goals?

Appendix XIV
The Interview Coding Process

Legend for themes

PATE	Positive attitude towards essays
NATE	Negative attitude towards essays
PATJ	Positive attitude towards journals
NATJ	Negative attitude towards journals
PATP	Positive attitude towards portfolio
NATP	Negative attitude towards portfolio
SPATT	Student positive attitude towards teacher
SNATT	Student negative attitude towards teacher
NATPR	Negative attitude towards projects
PATPR	Positive attitude towards projects
PATQ	Positive attitude towards questioning
NATQ	Negative attitude towards questioning

Description of the main categories

PATAA	Positive attitude towards alternative assessment
NATAA	Negative attitude towards alternative assessment
PATTA	Positive attitude towards traditional assessment
NATTA	Negative attitude towards traditional assessment

Appendix XV
Sample of Interview Transcript
(see Appendix XIV for the interview codes)

Interview with Student: **U**

Location: **School's Conference Room**

Key: **I- Interviewer** **S- Student**

Interview with Student U

I - What is your attitude towards assessment strategies used by your mathematics teacher?

S - Oh God ... Tests. Yuck! Puh! Aagh! I've always hated test. **(NATTA)**

I - Why do you hate tests so much?

S - Well, actually, it's good for certain people ... but I find that traditional pen and paper test is boring because you leaving people with actual talent behind. **(NATTA)**

I - How are we leaving them out?

S - Because really and truly, like, people who get more paid than doctors and stuff are, like, sports people, people who do arts and singing and so on. With pen and paper you just leaving people with good talent behind and that is just unfair. I hate tests too because my teacher does always like to give test and mark too hard. **(NATTA)** **(SNATT)**

I - Why do you think he likes to mark hard?

S - I don't know but I does hide my paper when I do bad. You know that sometimes I does feel to crumple up and throw away de paper, and root out my hair, especially when I don't know de answer to a question. **(NATTA)**

I - Why do you feel to do those things?

S - Well, I does feel so pressured and frustrated and stressed and sometimes I does feel as if de world going to end. **(NATTA)**

I - So, do you think that there is a connection between your teacher's assessment strategies and your attitude?

S - Well ... Yea! Definitely!

I - What is the connection?

S - Well if he doesn't teach well and I don't understand then I does do bad in tests. If he teaches good ... I geh good marks. **SNATT)/ (SPATT)**

I - So, do you normally get good or bad marks?

S - Sometimes I do good and sometimes bad. But ... my teacher always make we feel that it's de end of de world if we fail a test ... your life is doomed. He always rants and raves and kicks up a fuss when we do badly. **(SNATT)**

I - Really?

S - Yeah ... he doesn't really explain properly and I geh loss so I do badly in tests. You should be there when we having tests, the class does be in utter chaos and tension. Students does be anxious and a bit restless about how they would do. The class is full of worries, fear and nervousness, all at de same time. **(NATTA)**

I - Do you think that assessments only mean tests?

S - No. It means tests, portfolios, projects and the entire list you gave us.

I - What would you say from your experience is one effective assessment strategy employed by your Form Three mathematics teacher?

S - Well the am ... the portfolio, in that am ... it entails, like, the journal article and what not..., so whenever, like, you feel strongly about a topic, you can always write it down so that he could see how you feel and how to help you and also am ... give you essays to, like, research about stuff, like about, for example sets - about how it originated. Yeah ... I like projects and journals ... anything that deals with writing. **(PATP) (PATJ) (PATE) (PATPR)**

I - How does writing help you in math?

S - You are able to know why you do it - not just doing it because of just doing things and getting marks. You understand what you are doing. I understand de work better cuz it's fun and not boring so I pick up quickly. Some people might be able to succeed in tests all the time but I can't. For me, I understand maths better when I write in my journal. **(PATJ)**

I - What is it about journals and essays that you enjoy?

S - When you doing traditional pen and paper – certain people, they get the top marks. They do not really have am ... say ... talent and stuff. They just have the ability to cram and understand certain things in maths. But people who could put portfolio together could understand the importance of creativity and they are able to display their talents in different ways without doing things in a traditional old fashion kind of way. I have more opportunities to write in mathematics. Cuz of this I have come to like mathematics and, study by myself at home. I like English Language so I can use my writing skills to tell [teacher's name] about myself and where I'm having problems in math ... and boy, do I tell him off. But he says that we are free to do that. **(NATTA)** **(PATP)** **(PATAA)** **(SPATT)**

I - What do you write about?

S - I like to write about de topics I like the most. I also write about topics that are difficult for me to understand so that the teacher can help me when he reads it. Sir you know what I like too ... the projects, like making shapes out of straws, were fun but took plenty time. **(PATJ)** **(PATPR)**

I - What do you like about projects?

S - I felt like I had more control over what I made in the class. Tests sometime don't show our full abilities, you see sir, when you aren't stressed, you're open to learn more because you aren't worried about what you're going to make on the test. **(PATPR)**

I - Why would some students think that our assessment strategies are unfair?

S - Well we are always scared of those tests. I always feel shaky and foolish. In fact, you know what ... when I look at the test paper, it's all gibberish. **(NATTA)**

I - But what can teachers do to help students develop a more positive attitude?

S - Give simpler questions or change from tests to something else. You all do not exploit different ways of testing us. **(NATTA)/ (PATTA)**

I - What would you suggest?

S - Well first of all asking them what they would like to do and not just telling them what they should do. Ask them the different ways they should be assessed and maybe you should have, like, a am ... a democratic vote where students can vote for what they want for a particular week and teachers should use that to keep the class entertained and attentive. Students geh bored that's why ... am ... we should be assessed in many ways that am ah include what we like. Some children would be good at one thing while another person will be good in something else. Teachers need to realize that different people have different strengths. Say for instance, right…I score badly in tests, but I do very good in projects and portfolio so I like them. **(PATPR)** **(PATP)**

I - Do you believe that you are treated fairly in assessment strategies used?

S - Am ... No. Not in tests. **(NATTA)**

I - Why not?

S - Well ... I always geh stressed out around test time. I don't know how I does feel so ... am ... am. You know what ... I would feel less stressed out if there were no tests. Well I know that I can display my qualities in portfolios and am ... for instance building stuff. But usually the pen and paper is usually corrected fairly, but I think I can get more marks in different types. **(NATTA)** **(PATP)** **(PATAA)**

I - What is it about tests that make you feel stressed out?

S - Sir you know what, I think too much pressure is put on you when you are tested because if you misinterpret a question, but you know the information, you can fail the test. And that's so unfair cuz we know we work. **(NATTA)**

I - How can teachers be fair to you?

S - I think that students' participation, in class in many things, and performance in other things should count towards your marks. Sometimes I does feel fed up. I feel I could take a test and geh zero. I observe that most of my friends fool around on the test, yeah they does do that all the time, you can tell because they write down answers randomly. **(PATAA)** **(NATTA)**

I - So, you see yourself being placed at a disadvantage with traditional tests?

S - Well yeah ... it's really a lot of work they are going to push down at you at the last minute, and you know you just have to memorize all these formulas. It's more like a cramming process and the thing about is that it's a waste of time because at the end of exam most students forget what they learn and they don't really see how it applies to real life. You just say "I want to get a grade One at C.X.C" or a distinction and that's their goal. They not thinking about how they can help people and apply it in their life. **(NATTA)**

I - What has your teacher done to ensure that you understand the various assessment strategies fully?

S - Nothing much. Well, sometimes he would have a criteria and he would go through it and am ... place it on the board and let us know what we should do in order to get a certain amount of marks. He needs to do that much more often if he wants us to get the highest marks we can possibly get. Sometimes he would tell we that we are going to be tested, he would gives examples and sometimes demonstrations, and that's good. **(SNATT)** **(SPATT)**

I - In your opinion, is it important to know the rationale for the assessment and scoring criteria?

S - Yea ... of course!

I - Why?

S - So I can know what he's giving marks for and geh some more. I wish he would give criteria more often. **(SNATT)**

I - Do you help your teacher decide which assessment strategies to use?

S - No. He makes all de decisions ... he's de boss in the class. **(SNATT)**

I - To what extent are you involved in selecting items and helping to develop the scoring criteria for assessments like portfolio?

S - He does tell us what he expects ... and he marks it, and am, we have no say. **(SNATT)**

I - Do you see a link between assessment strategies and teaching methods?

S - I see a link in traditional pen and paper test because there are mark schemes ... but portfolios no. Sometimes we are assessed on what wasn't taught in class. Sometimes in de test paper we geh strange questions. **(PATTA)** **(NATP)** **(NATTA)**

I - Do you believe that teachers should use students' ideas to develop assessment strategies?

S - Yes, I think so, because ... different people learn at different rates and they have different talents that teachers should understand. Teachers should not leave them behind because one student might be good at pen and paper, and one is good at mental, and one is good at putting portfolios together. Yeah ... and we can make the class more interesting and enjoyable and less stressful. **(PATTA)** **(PATAA)**

I - What assessment strategies do teachers use to encourage you to learn?

S - Well he does use a lot of questions but I still prefer journals. **(PATJ)**

I - Is his questioning effective?

S - Well for me it's not effective. I get annoyed when he asks a question in front of all my friends and I don't know the answer. **(NATQ)**

I - Why do you get annoyed?

S - Am ... ah now, that can be embarrassing. Well you see, he'll always ask the so called 'brilliant' children and usually they know it [the answer]. Students who are quick and are more noticeable in class get marks and stars. Not because we aren't brilliant we are retarded. Yea, he makes the smarter children feel good and the weaker children; he really picks on them and embarrasses them in front of the entire class. I prefer journals anytime. **(SNATT)** **(NATQ)** **(PATJ)**

I - What do you like about journals?

S - I used to think it was a lot of work, but my attitude to journal writing has changed. My writing has helped to better understand the materials so now I feel more confident. I think a lot about what I'm writing and so I realize the steps I use to solve the problems. You see, I understand better when I explain it in words. It's easier to see the trouble spots. **(PATJ)**

I - So do you believe that your teacher should use a wide range of assessment strategies?

S - Yes. Because ... students need to explore their options and know that, ok, maths is not this one way, boring subject, that everyone thinks it is, but it can be enjoyable, in that, you can write your feelings about maths and find out about why you do things in maths, find out about people who was involved in creating stuff in maths and not just learning things because you want to get a grade in C.X.C. to get into A' Levels. Well take me for instance, I don't like tests but I do pretty ok in projects and journals. **(PATAA)** **(PATPR)/ (PATJ)**

I - Are you given the opportunity to help in selecting assessment strategies?

S - Nah, you must be joking ... I aren't given that privilege! [Laughing]. He decides when he is giving tests or portfolios or projects or whatever. **(SNATT)**

I - Does your teacher encourage students to ask questions, give reasons and ask for reasons, clarify and ask for clarifications?

S - No. But he asks many yes/no questions and so we guess sometimes. Sometimes my teacher gets bored and wants to end class discussions so he controls the direction of the answer to a question with a yes/no question. **(NATQ)** **(SNATT)**

I - Do you believe that he should put more thought into his questions?

S - Well ... Yes. Sometimes he asks confusing questions. Let us say that my teacher asks a lot of questions which sometimes tie us up. In my mind I say "What?"... Sometimes I leave de class more confused but I go home and read the book. **(SNATT)** **(NATQ)**

I - How do you see your role in assessment?

S - Well I have to do what my teacher tells me too in tests, but in other assessments like portfolio I can express my creativity. **(NATTA)** **(PATAA)**

I - How do you see the role of teachers in assessment?

S - Well he knows everything ... I suppose ... he makes all de decisions for tests. But in other assessments we have control over our work and what we present to him. **(SNATT)** **(PATAA)**

I - What are your goals for the future?

S - Well ... I want to be a lawyer and humanitarian for women's rights.

I - Do you believe that assessment strategies used at school will help you to achieve your future goals?

S - Well in school we are mostly tested. In tests we are asked to select or write. You can't tell when a question will come your way. We're required to cram a set of formula and know when to apply it, and to make things worse there is only one right answer. Teachers does expect too much from we. **(NATTA)**

I - In what way do we expect too much from you?

S - Well ... Not everyone can respond immediately and correctly. I am anxious and excited to see what is on de paper. Everyone panics, cold sweat while cramming extra work hoping that we remember it. The place is always silent. **(NATTA)**

The real world is full of very very difficult problems and there are many right answers to many ... many problems but only in math you've one correct answer. Back to your question about my future- the portfolios and journals are able to help me to express myself and being a lawyer and humanitarian is really about debating; about helping people's lives and improving it... **(PATP)** **(PATJ)**

I - Well, in the future, assessment strategies should pertain to real life.

S - Highly unlikely...

I - Well thank you very much for your straightforwardness and co-operation.

S - Yeah...anytime.