Public Secondary School Teachers' Knowledge and Application of Formative Assessment in the Teaching of Mathematics in Benin Metropolis.

Imasuen Kennedy
Institute of Education, University of Benin, Benin City
Email: kennedy.imasuen@uniben.edu
Tel: +234 812 896 3837

&

Dr. (Mrs.) I.F. Iyamu
Institute of Education, University of Benin, Benin City
Email: florence.iyamu@uniben.edu
Tel: +234 812 896 3837

Abstract

Teaching and learning is incomplete without assessment. Mathematics, as a subject is indispensable because it forms the bedrock of the development of any nation, hence, it is made a core subject. For the teaching and learning of Mathematics to be effective and meaningful, the teachers must learn the art of formative assessment, which is 'assessment as you go'. This study therefore, examined the knowledge and application of formative assessment in the teaching of Mathematics in public secondary schools in Benin Metropolis. To achieve it, three research questions were raised. The study adopted the survey research design, and the population of the study consisted of Mathematics teachers in Benin Metropolis, while the sample size was 188. A structured questionnaire was used for the data collection. It was validated by experts in Measurement and Evaluation, with a reliability index of 0.89. The data were analysed using descriptive statistics of mean and standard deviation and Chi-square statistics. A normative mean of 32.50 and 37.50 was used to ascertain teachers' knowledge and application of formative assessment. The findings revealed that the Mathematics teachers were knowledgeable in the art of formative assessment, but their application of it in teaching Mathematics was low. Also, only years of experience influenced the knowledge and application of formative assessment. It was recommended that the teachers should be trained on how to apply formative assessment in the teaching of Mathematics.

Key words: Mathematics, assessment, formative assessment, knowledge, application

Introduction

One of the significant components of the teaching and learning process is educational assessment. As noted by Stiggins and Conklin cited in Wyatt-Smith and Cumming (2010), teachers spend more of the classroom time assessing and evaluating students' learning. This has made assessment to be one of the key targets in educational research in recent years, thereby making the interest of scholars and policy makers in assessment to be very high. As a result, the way students are assessed in class has

undergone various changes all over the world. Classroom assessment these days do not necessary involve pencil and paper but rather, it can be in the form of a project, an observation or a task that shows that a student has acquired the mastery of concepts. Classroom assessment has a lot more functions and it is used for various purposes such as diagnosis, monitoring, grading, providing feedback, improving instruction, motivating and others (MacMillan, 2014).

Assessment was defined by various scholars. For example, Afemikhe (2014) defined assessment as the various approaches of obtaining information for decision making about students, curriculum, programmes and policies. Chagongo (2020) saw assessment as the collection of information to ascertain a student's knowledge and progresses so as to make sound instructional decisions. According to Nitko (2001) assessment is a process of collecting information that is used to make decision about student's learning, curricula, programmes and educational policy. On his part, Joshua (2005) conceptualized assessment as a process which encompassed testing, measurement and evaluation, an employed both direct and indirect methods for data collection. The core purpose of assessment is to consider student's learning styles, strength, weaknesses, and learning needs. It reflects a student's learning achievement against the objectives of the assessment.

The central part of any educational process is assessment. Hence, Black and William (2010) defined it as all activities that teachers and students undertook to get information which could be used to diagnose students and improve teaching and learning. Assessment here is seen as teachers' observation, classroom discussion and analysis of students' work, including homework and test. Harlen (2014) saw educational assessment as the process of gathering, interpreting and using evidence to make judgment about students' academic achievements in schools. According to the National Council of Teachers of Mathematics [NCTM] (2014), assessment is the process of gathering evidence about a students' knowledge of, ability to use, and disposition towards Mathematics, and drawing inferences from that evidence for a variety of purpose. This implies that it determines the quality of student growth development and achievement in learning.

Basically, there are two types of assessments. These are summative and formative assessments. Summative assessment is a periodic assessment or an assessment that comes at the end of a period or a course. Formative assessment is an assessment that is continuous throughout the instructional process. Hence Guzman (2014) saw it as an assessment as you go. Summative assessment allows a teacher to measure a student's understanding typically against standardized criteria. The purpose of summative assessment is to gauge students' comprehension of materials presented to them at the end of a particular unit of work, and is often measured with a grade or percentage depending on the subject. It provides a measure of what students have learnt by reporting their achievement at specific times. According to Guzman (2014), the results from a summative assessment are not necessarily used to take decisions for improvements in teaching and learning strategies. Teachers undertake summative assessment at the classroom level because it has extensively gained visibility due to its use by national educational systems for accountability purpose as part of their educational reform efforts.

According to MacMillan (2014), one of the classroom assessment types aimed at "gathering evidence of student learning and providing feedback to students, and adjusting instructional strategies to enhance achievement" is formative assessment. It is also referred to as an assessment to promote learning by students. Formative assessment or assessment for learning (AFL) is a continuous way of checking and

balancing the teaching and learning process. This can be done at the beginning of instruction or at any time of the teaching. This method allows teachers to check their students' progress as well as difficulties and the effectiveness of the teachers' methods. This creates room for self – assessment.

Boston (2012) stated that formative assessment helped students believe that everyone could learn and achieve positive results in their studies. In other words, formative assessment has features that affect students on psychological and emotional levels, giving them an opportunity to avoid unwillingness and discouragement in learning. Therefore, formative assessment has been defined as the assessment for learning as it is able to impact students' performance and improve instruction.

Scriven in William (2006) made the distinctions in educational assessment and proposed the use of such terms as "formative" and "summative" assessments. He described formative assessment as an instrument for on-going improvement of teaching and summative assessment as an assessment of completed curriculum. To him, formative assessment was defined as a tool for making teaching more effective during the course, while summative assessment had more grading and evaluative purposes to check students' progress at the end of the course. Popham (2014) made another distinction. According to him, in the past, the main purposes of assessment were diagnosing students' weaknesses and strengths, keeping track of their progress, giving grades to students and saying whether one's teaching was effective or not, and the assessment in education then was done mostly for grading purposes. But these days, he reiterated that assessment was geared towards improving instructional quality, for teachers' evaluation and for determining public perceptions of the effectiveness of education. Thus, formative assessment was meant to form students' knowledge and skills as the information on students' progress in a particular subject was primarily used for improving teaching rather than for grading purposes.

According to McMillan (2014), evidence of students' progress is not used for judgment, instead, it helps to know what should be done to help the student in his learning. Thus, in formative assessment, students are seen as active participants who are responsible for their own learning. This gives students a chance to plan their further actions based on the teacher's recommendations.

Another important fact that may define formative assessment is that its effectiveness largely depends on teacher's diagnostic abilities (Earl, 2013). This means that the main aim is not only to collect evidence about student learning, but also to be able to analyse and reflect on it. Hence, it is clearly seen that formative assessment aims to facilitate and enhance students' learning through various in-class activities.

However, Shavelson, cited in Benett (2011), opined that achieving positive results in implementing formative assessment was quite a long and complicated process, and its effectiveness did not seem to appear immediately. Overall, formative assessment has turned into a global educational trend due to its effectiveness in promoting students' learning. Before now, assessments were conducted to find out what students had learnt. However, today, assessment now plays a systematic role in enhancing learning rather than just measuring it (Azmi & Kankarej, 2015). Assessment therefore, is one of the important tasks in the learning process. The primary aim is to ascertain if a student has achieved the objectives of the teaching.

Formative assessment places emphasis on the learning process rather than on the final result. The goal of formative assessment is to provide feedback and also enhance students' learning process. It also helps the teachers to improve their teaching. For effective teaching and learning to take place, then assessment becomes a necessity (Bramsford, et al, 2000). The key components of formative assessment are: it should

be learner friendly, that is, it should serve the learner and not the audience; it should be easy to use and understand; it should promote students' thinking ability; and it should be built on solid cognitive, developmental and educational research.

Tomlinson (1999) believed that formative assessment was today's means of understanding how to modify tomorrow's instruction. Black and William (2009) outlined five strategies related to formative assessment with respect to teachers, learners and peers as: clarifying and sharing learning intentions and criteria for success; engineering effective classroom discussions and other tasks that elicit evidence of students' understanding; providing feedback that moves learners forward; activating students as instructional resources for one another; and activating students as the owners of their own learning.

Ikpi et al (2019), in their study of formative assessment practices and attitudes on learning outcomes of students in Mathematics in selected secondary schools in South-South, Nigeria, found that there was a significant effect of formative assessment culture and gender in learning outcomes of students in Mathematics. Zia, et al (2019), in their study showed that English Language formative assessment helped students to improve their writing skills by providing them with effective learning opportunities. They also pointed out that formative assessment encouraged learners' autonomy through self-motivation as it was believed that the frequency and accuracy of target behaviour or performance increased through a reflection on one's performance. Akyina and Oduro-Okyimeh (2019), in their study on formative assessment practices of Senior High School teachers in the Ashanti Mampong Municipality of Ghana, revealed that about half of the teachers lacked the concept of formative assessment and its sub-concepts. They further averred that the teachers were involved in certain practices which, unknown to them, were formative assessment practices. In the same vein, Amoaka et al (2019) who studied students' knowledge of formative assessment practices among Senior High School Mathematics teachers in Ghana, revealed that a strong positive correlation existed between Senior High School Mathematics teachers' knowledge and formative assessment practices.

Ajogbeje et al (2012), opined that formative assessment in Mathematics teaching improved both learning and examination results and also reduces test anxiety. They further stated that students taught Mathematics systematically using formative assessment performed better than those taught using conventional methods. Tazewell (2018) revealed that teachers' knowledge of formative assessment was not encouraging, but with training, the knowledge base was broadened. Clemons (2018), in his study of teachers' belief about and use of formative assessment in middle grades Mathematics classrooms in North California, found that teachers only used questioning and activities to generate feedback to guide their instructions. Vingsle (2014), studied teachers' knowledge and skills in formative assessment, a case study of teachers' formative assessment practices during Mathematics lessons in the Northern part of Sweden. The study revealed that formative assessment was very complex, demanding and a difficult task for the teachers in several ways. Udoukpong and Okon (2012) who studied the perception of formative evaluation practices and students' academic performance In Social Studies in Junior Secondary School Certificate Examination revealed that the students' performance differed significantly on the basis of their perception of teachers' formative evaluation practices.

Clark (2010) provided a list of sixteen formative assessment techniques. They were higher order questioning techniques, feedback from students as comments and not grades, oral feedback to students, sharing assessment criteria with students, peer assessment, collaborative goalsetting with and by students using feedback, self-

assessment and sharing learning goals. Others were assessment tools, test construction, performance measures, grading, interpreting of standards test scores, communicating results and taking decisions based on assessment results.

Formative assessment is often called on-going assessment or assessment for learning. It is used to form and change the learning process in order to achieve better results. Moon (2005) defined formative assessment as the sort of assessment that was done on a daily basis. It is closely related to the feedback pupils receive during lessons and indicates if they are doing better or not. Harmer (2001) stated that formative assessment was done at a micro-level every time we indicated that something was wrong. According to him, it can also take place when teachers go through the results of progress and achievement. Hence, this type of assessment is both student and teacher centred. In most schools, formative assessment is in rare use. Collaborating this, Sach (2015) stated that there was considerable pressure to meet government targets and the pressure had the potential to inhibit the use of more formative assessment methods. The beauty of formative assessment may not be fully appreciated in a country where emphasis is on certification. Alluding to this, Yan & Cheng (2015) observed that so much focus on summative assessment had affected teachers' implementation of formative assessment. They further averred that teachers might not use formative assessment in their teaching, even when they understood the advantages of practices because they felt the pressure to meet the institutional and instructional demands of high stakes testing.

Concept of Mathematics

Mathematics has no generally accepted definition, but it is seen as a subject that includes the study of quantity, structures, space and change. One major quality of Mathematics is the ability to seek and use patterns to formulate new conjectures. The Federal Government of Nigeria, in realizing the importance of Mathematics, embarked on rigorous Mathematics curriculum and reforms and the establishment of the National Mathematics Centre (NMC) to enable her educational system to work towards improving science and technology. The implementation of initiatives lies with the Millennium Development Goals (MDGs), and the National Economic Empowerment and Developmental Strategies (NEEDS).

The major aim of making Mathematics compulsory in our primary and secondary schools is for skill acquisition and mastery of content taught so as to apply its knowledge in Science and Technology in everyday life activities and for the growth and development of any nation. However, if there are any defects in pedagogy, its purpose and objectives will not be actualized. The Federal Government of Nigeria in 2007, in realization of the importance of Mathematics, produced the current Mathematics curriculum through the Nigerian Education Research and Development Council (NERDC) which is for all levels of the educational system in Nigeria. In line with the objectives of setting it up, NERDC was directed to review and re-align the existing Senior Secondary School curriculum with the targets of the reforms of NEEDS and the MDGs. The various formative assessments suitable for the teaching and learning of Mathematics include, classwork, class discussion question-answer session, homework, project work or performance-based assessment and test quizzes.

Mathematics is very essential in our everyday life. It does not only help to develop numeracy and skills but it helps students to improve competence and develop connection with and understanding of the world around them (Dela Cruz, 2019). Mathematics is not only a language and a subject in itself, but it has a greater role in developing logical and critical thinking in students. The role of the teacher in the

classroom is to inculcate concepts and competences of Mathematics in their students using various methods and strategies. For this to be achieved, the educational sector needs to be assessed, most especially its programmes and curriculum, to make it relevant and adequate in achieving the desired goals and needs of society and the nation in general. In Nigeria and some other countries of the world, it is obvious from available statistics that there is a decline in the performance of students in Mathematics. Therefore, carrying out an assessment of what the student knows in Mathematics is of paramount interest. Thus, assessing students' knowledge of Mathematics can be used as a benchmark to enhance its learning and assist good instructional practices (Dela Cruz, 2019).

In any Mathematics learning, there are three essential components of instruction. These are: the Mathematics teacher, the materials and the students. The ability of the teacher to bring about interaction among these three components is what makes the student to acquire the desired learning. For a teacher to deliver quality instruction, there must be a synergy among these three components. The basic fundamental role or function of the curriculum is to provide the basis for effective instruction that maximizes learning.

Another contentious issue bothers on the confusion teachers face about the difference between formative and summative assessments. In a study conducted by the Organization for Economic Co-operation and Development (OECD), (2013), it was reported that educators thought formative assessment was summative assessment. Moreover, educators carry out formative assessment more often and even see it as a practice for final summative assessment instead of a process used to assess students' understanding regularly and to inform teaching. Clark (2015) stated that there was confusion between formative and summative assessments. According to him, teachers believed that they use formative assessment when they use summative assessment. As a result, teachers often use formative assessment to grade instead of using it to help advance teaching and learning. This study therefore, took a cursory look at the knowledge and application of formative assessment in the teaching of Mathematics by public secondary school teachers in Benin Metropolis.

Statement of the Problem

One of the critical components of teachers' activities is assessment because it serves as a basis for every decision made about students' learning. Teachers makes regular decisions about their teachings, particularly what to do, how to go about it and how to ensure that it is done to specification. Assessment enables the teacher to modify her teaching methods to meet students' learning needs (Nsikak-Abasi & Akanaono, 2017; Okyere et al, 2018).

In Mathematics, the primary purpose of assessment is to improve student's learning. The first thing in any assessment procedure is to determine the prior knowledge base of the students. This enables the teachers to plan their instruction based on the data collected. A good Mathematics classroom assessment should be designed to change the instructional approaches/techniques in the following ways: using assessment to establish and describe the students' misconceptions; turning the misconceptions into teaching and learning opportunities; and giving students a second chance to demonstrate success. For these to be achieved, in the classroom, formative assessment becomes a necessity. However, most of the secondary school Mathematics teachers seem not to fully key into formative assessment in Mathematics for obvious reasons. Can the non-usage of formative assessment by Mathematics teachers, be that they are not knowledgeable in the art of formative assessment? Can it also be that they find its

application difficult or that they use it but are not aware? Thus, this study examined public secondary school teacher knowledge and application of formative assessment in the teaching of Mathematics in Benin Metropolis.

Research Questions

1. Are secondary school teachers knowledgeable in the use of formative assessment in the teaching of Mathematics?
2. To what extent do public secondary school teachers apply formative assessment tools and strategies in their teaching of Mathematics?
3. Do demographic variables of sex, educational qualifications, years of experience and location of schools influence public secondary school teachers' knowledge and application of formative assessment in the teaching of Mathematics?

Methods

The descriptive survey design was adopted for the study. The population of the study consisted of all the secondary school Mathematics teachers in Benin Metropolis. There were seventy-five public secondary schools in Benin metropolis. The sample size for the study was one hundred and eighty - eight Mathematics teachers in the seventy-five public secondary schools in Benin Metropolis. The instrument for the data collection was a questionnaire. It consisted of three sections: A, B and C. Section A elicited information on the demographic variables of the study, Section B had 15 items based on the knowledge of formative assessment by the teachers, and Section C was on the tools and strategies of formative assessment. The modified four-point Likert scale was used for Sections B and C

The instrument was validated by experts in Measurement and Evaluation. The Cronbach alpha reliability statistics was used to ascertain the reliability. It gave an alpha value of 0.89. The data collected were analysed using mean and standard deviation. Chi-square statistics was used to answer research question three. A mean criterion value of 2.50 which was the Arithmetic mean of the four-point Likert scale was used for acceptance for the items, while normative means of 32.50 and 37.50 were used to ascertain the knowledge and application of formative assessment by the teachers.

Results

Table 1: Knowledge of formative assessment of public secondary school teachers in Benin Metropolis

Items on teachers' knowledge of formative assessment	Mean	Standard Deviation	Remarks
Formative assessment allows instructors to amend, adjust and monitor the process of teaching to reach their desired goals.	3.31	0.78	Agree
Formative assessment process starts from lesson plan periods and continues to the actual implementation of lessons in the classroom.	3.47	0.96	Agree
Formative assessment is the assessment carried out at the end of a course or training.	1.92	0.98	Disagree
Teachers carry out formative assessment more often for final assessment	2.68	0.92	Agree
Formative assessment is used for final grading.	2.05	0.97	Disagree
Teachers use formative assessment to have insight into educational instructions objectives.	3.19	0.98	Agree
Formative assessment is a complex process and it is difficult to implement.	3.24	0.97	Agree
Formative assessment involves different strategies, tools and techniques	3.16	0.92	Agree

Students can benefit from formative assessment by discovering their own learning.	2.89	0.88	Agree
Formative assessment is a focus to change the way teachers teach.	2.85	0.76	Agree
Formative assessment increases the use of problem-solving skills in the classroom	2.63	0.89	Disagree
Formative assessment helps to measure the quality of learning and teaching	2.69	0.98	Agree
Formative assessment is for instructional decision	2.64	0.96	Agree
Cluster	**32.82**	**4.07**	

Table 1 showed that the teachers agreed that: formative assessment allowed instructors to amend; adjust and monitor the process of teaching to reach their desired goals; formative assessment process started from lesson plan periods and continued to the actual implementation of lesson in the classroom; teachers carried out formative assessment more often for a final assessment; teachers used formative assessment to have insight into educational instructions objectives; formative assessment was a complex process and it was difficult to implement; formative assessment involved different strategies, tools and techniques; students could benefit from formative assessment by discovering their own learning; formative assessment was a focus to change the way teachers taught; formative assessment increased the use of problem solving skills in the classroom; formative assessment helped to measure the quality of learning and teaching; and formative assessment was for instructional decision. However, they disagreed that formative assessment was the assessment carried out at the end of a course or training, and formative assessment was used for final grading. The cluster mean of 32.82 and standard deviation of 4.07 indicated that the teachers in Benin Metropolis were knowledgeable about formative assessment in Mathematics teaching.

Table 2: Extent of public secondary school teachers' application of the tools and strategies for formative assessment in the teaching of Mathematics

Tools of and strategies for formative assessment	Mean	Standard Deviation	Remarks
Higher order questioning techniques	1.69	0.98	Sometimes
Feedback from students as comments and not grades	1.64	0.96	Sometimes
Oral feedback from students	1.69	1.02	Sometimes
Sharing assessment criteria with students	1.91	1.15	Sometimes
Peer assessment	2.35	1.13	Sometimes
Collaborative goal setting with and by students using feedback	2.80	0.97	Very often
Self-assessment	2.65	1.01	Very often
Sharing learning goals	2.60	0.98	Very often
Assessment tools	2.28	1.07	Sometimes
Test construction	1.67	0.96	Rarely
Performance measures	1.19	0.53	Rarely
Grading	3.28	0.65	Rarely
Interpreting standard test scores	1.41	0.88	Rarely
Communicating results	1.28	0.63	Rarely
Taking decisions based on assessment results	1.47	0.96	Rarely
Cluster	**32.08**	**5.18**	

Table 2 showed that the teachers agreed that they very often applied collaborative goal setting with and by students using feedback, self-assessment, sharing learning goals and grading. They also sometimes applied higher order questioning techniques, feedback from students as comments and not grades, oral feedback from students,

sharing assessment criteria with students, peer assessment, assessment tools and test construction. However, the teachers rarely applied interpreting standard test scores, communicating results and taking decision based on assessment results. The cluster mean of 32.08 and standard deviation of 5.18 implied that public secondary teachers in Benin Metropolis application of formative assessment in Mathematics was to a low extent.

Table 3: Influence of demographic variables on the knowledge of formative assessment by teachers in Benin Metropolis

Demographic variables		**Responses**				χ^2	**p-value**
Sex	N	Strongly agree	Agree	Disagree	Strongly disagree		
Male	155	25(16.1)	102(65.8)	24(15.5)	04(2.6)	2.133	0.545
Female	33	09 (27.3)	17(51.5)	07(21.2)	-		
Experience							
< 10 years	158	34(21.5)	105(66.5)	18(11.4)	01(0.6)	37.302	0.000
≥ 10 years	27	07(25.9)	19(70.4)	01(3.7)	-		
Qualification							
NCE	09	04(44.4)	05(55.6)	-	-	3.462	0.326
Bachelor & higher degree	179	37(20.7)	121(67.6)	19(10.6)	02(1.1)		
Location							
Rural	69	19(27.5)	41(69.4)	09(13.1)	-	3.939	0.268
Urban	117	22(18.8)	84(71.8)	10(8.5)	01(0.9)		

16.1% and 65.8% of the male respondents strongly agreed and agreed that they were knowledgeable in the art of formative assessment in Mathematics as against the females where 27.3% and 51.5% strongly agreed and agreed. 21.5% and 66.5% of the Mathematics teachers with less than 10 years teaching experience strongly agreed and agreed that they were knowledgeable in formative assessment while 07(25.9%) and 19(70.4%) of the teacher with 10 years' experience strongly agreed and agreed. With respect to qualification, only 55.6% and 67.6% of the teachers with NCE and Bachelor degree and other higher degrees agreed that they were knowledgeable of formative assessment. 69.4% of the rural Mathematics teachers and 71.8% of the urban teachers agreed that they were used to formative assessment in the teaching of Mathematics.

The association between sex, qualification of teachers, location of school and Mathematics teachers' knowledge of formative assessment were not significant ($p > 0.05$). However, the association between years of experience and Mathematics teacher's knowledge of formative assessment was significant ($p < 0.05$).

Discussion of Findings

The study took a cursory look at public secondary school teachers' knowledge and application of formative assessment in the teaching and learning of Mathematics. The study revealed that the teachers were knowledgeable in the art of formative assessment in the teaching of Mathematics. It was in tandem with OECD (2013) which averred that educators carried out formative assessment more often and even saw it as a practice of a final summative assessment instead of a process used to assess student understanding and teaching. Also, it corroborated the study by Amoaka et al (2019) which revealed that a strong positive correlation existed between Senior

High School Mathematics teachers' knowledge and formative assessment practices. But the study was not in agreement with the study of Akyina and Oduro-Okymeh (2019), which showed that teachers lacked the concept of formative assessment and its sub-concepts, and were involved in certain practices which, unknown to them, were formative assessment practices, and with Tazewell (2018) which stated that teachers' knowledge about formative assessment was not encouraging. Above all, Clemons (2018) found that teachers only use questioning and activities to generate feedback to guide their instructions.

With respect to the extent of application of tools and strategies of formative assessment in the teaching of Mathematics in public secondary schools in Benin Metropolis, the study revealed that the extent of application was to a low degree. This was attributed to the fact that majority of the teachers sampled were still not able to differentiate between using summative and formative assessment. This corroborated with OECD (2013) which reported that educators thought formative assessment was summative assessment. In the same vein, it agreed with Clark (2015) who stated that there was confusion between formative and summative assessments. According to him, teachers believed they use formative assessment when they used summative assessment. Yan & Cheng (2015) observed that so much focus on summative assessment had affected teachers' implementation of formative assessment. They further averred that teachers could not use formative assessment in their teaching, even when they understood the advantages of practices because they felt the pressure to meet the institutional and instructional demands of high stakes testing. And above all, Vingsle (2014) revealed that formative assessment was very complex, demanding and a difficult task for the teachers in several ways, hence its application was a nightmare to secondary school teachers

Another revelation from the study was that demographic variables of sex, location of school as well as qualification of teacher did not influence public secondary school teachers' knowledge and application of formative assessment in the teaching of Mathematics. However, only years of experience contributed to the teachers' knowledge and application of formative assessment in a Mathematics classroom.

Conclusion

This study showed that the teachers had heard of formative assessment, but they did not know the difference between formative and summative assessments with respect to their application. The study also revealed that test construction was rarely done, neither was standardization of test carried out. Therefore, for an effective and efficient application of formative assessment, teachers needed to differentiate between the usage of formative and summative assessments in Mathematics as it would reawaken the interest of students and thereby, reduce Mathematics anxiety.

Recommendations

Based on the findings, it was recommended that:

- Public secondary school teachers should be trained on the use of formative assessment in Mathematics as well as how to use the various tools and strategies.
- The government should provide and train teachers on the art of using modern assessment techniques in the teaching and learning of Mathematics.
- The choice of the head of Mathematics teachers in secondary schools should be done based on years of experience and not on the basis of additional or higher qualifications. Those with 10 years and above experience should be appointed in the supervision of the teaching of Mathematics.

- The teachers should be trained on the use of Information Communication Technology (ICT) in the assessment of students.

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