

**WHAT ROLE SHOULD THE SCHOOL, AS A LEARNING COMMUNITY,
PLAY TO ENHANCE STUDENTS' MATHEMATICS ACHIEVEMENT AT THE
SHS LEVEL?**

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ABSTRACT: *The purpose of this study is to advance the understanding of what mathematics classrooms need to enhance students' opportunity to learn mathematics. The study looked specifically as role should the school, as a learning community, play to enhance students' opportunity to learn mathematics at the SHS level. The research was conducted in two districts (Gomoa West and Efutu) in the Central Region of Ghana. The study included an extensive literature survey in order to identify related studies in Ghana and other countries. The analysis was based on quantitative and qualitative data gathered in schools with similar learner demographics characteristics, including both high-achieving and low-achieving schools. The quantitative analysis was based on close-ended questionnaire issued to both students and teachers whereas the qualitative analysis was based on open-ended questionnaire also issued to both students and teachers. A semi-structured interview of Heads of Mathematics Department of the selected schools was also included in the study. The findings of this research indicated that School, in order to improve students' mathematics learning opportunities, should:- Provide curriculum materials, Organize in-service training for teachers, Improve assessment methods, Extend short mathematics instruction periods, Improve teaching methods, Motivate mathematics teachers and recruit competent mathematics teachers. The conclusion is that, for a country to achieve the expected success in mathematics at her SHS educational level, a critical consideration should be given to the findings of this research with all stakeholders acting to fulfill its respective role.*

KEYWORDS: Role, School, Learning Community, Mathematics, SHS

INTRODUCTION

The environment for learning mathematics today is inviting and inclusive for all students regardless of gender, ethnicity, age, physical challenges, or cultural background. Lau *et al.* (2009) emphasized that the mathematics skills required for the youth of today to function in the workplace are different from that for youth of yesterday. Development in all areas of life is based on effective knowledge of Science and Mathematics. There simply cannot be any meaningful development in any area of human life without knowledge of Science and Mathematics. It is for this reason that the educational systems of countries that are concerned about their development put great deal of emphasis on the study of science and mathematics.

Currently, mathematics is studied as core and elective subjects in Ghana. It is a compulsory subject to be studied by pupils at the basic level (Primary and Junior High Schools). The rationale behind this policy is to help the pupils to develop interest in the use of mathematics and the ability to conduct investigations using mathematical ideas. It is the acquisition of some of these qualities that mathematics education in Ghana aims to emphasize in the school system (CRDD, 2007). The subject is also studied as a core subject in all Senior High Schools and it is intended to build on the knowledge and competencies developed at the Junior High School level.

In spite of the importance attributed to the subject in Ghana, there is still hue and cry over the type of education delivery at the SHS level of Ghana's education. Some of the examination results that have been produced in this subject over the years have been disheartening. Evidenced by the Anamuah-Mensah Committee (2002) depicts that though there has been some improvements in the results of the SSSCE (presently WASSCE) in Mathematics, about 45% of the students fail to pass the subject. This has invited various investigations from mathematics educators on what learning opportunities have been provided to students to learn mathematics in their various schools. Mathematics educators are making such an assessment because Linn and Baker (1993) emphasized that it was prudent to provide adequate and timely instructions of specific content and skills prior to an examination. Therefore educational assessment and its achievement must depend on the learning opportunities that have been created for students to learn.

Ysseldyke, Thurlow, and Shin (1995) have defined opportunity to learn as the criteria for, and the basis of assessing the sufficiency or quality of the resources, practices, and conditions necessary at each level of the education system to provide all students with the needed material in national curriculum. It also includes the provision of curricula, learning materials, facilities and instructional experiences that enable students to achieve high standards (Schwartz, 1995). If what has been described above are necessary constituents that facilitate students' achievement, then what should be the schools' roles in ensuring its success in the teaching and learning of mathematics? In this research, the researcher is looking at the basic factors that need to exist to enhance students' mathematics learning and its impact on students' achievement at the SHS level.

As a result, two research questions were posed:

- What do teachers think should be done by schools to enhance teaching and learning of mathematics?
- What do students think should be done by schools to support them in learning of mathematics?

International researches on school effectiveness have demonstrated that factors such as location of school, in-service training, the provision of teaching and learning materials, and students' assessment increase students' learning outcomes, particularly in developing countries where schools are deprived of the most basic resources (Hanushek, 1995; Pennycuik, 1998).

The desire to place schools in developing countries on attractive levels to meet high mathematics standard has been an issue of concern to many international agencies and donors. In 2004, for instance, the United States Agency for International Development (USAID) funded Educational Quality Improvement Program (EQUIP2) which investigated community-based schools as a mechanism for providing underserved populations with an opportunity to learn mathematics (Destefano, Gillies & Moore 2007). Destefano, Gillies and Moore (2007) cited again that international donor communities are beginning to recognize that without changing how educational opportunities are delivered in many developing countries, the goals of Education for ALL will not be achieved. It is some of these concerns that have warranted this research.

Curriculum and Evaluation Standards and Strategies

Many educational researchers believe that setting standards will help schools, particularly those in deprived schools. National Council on Education Standards and Testing (NCEST, 1992), commissioned by American Congress to determine the feasibility of national standards and assessments, asserted that standards are necessary to help close the mathematics achievement gap between advantaged and disadvantaged students. The following were highlighted as standards and strategies:

Curriculum and Instruction

Curriculum should:

- meet the content standards for the subject,
- be logically integrated with other coursework,
- reflect the challenges of real life problems,
- present material in a context relevant to students, and
- be as free as possible from hidden bias (NCEST, 1992; SSPEI, 1991; Darling-Hammond, 1994).

--Time

- Teachers should spend adequate time covering the content in class.
- Students should have time to learn content on their own.
- Schools should emphasize more important curricula by assigning more class time for it.
- Schools should provide students with time to do general academic work on the campus (Oakes, 1989).

--Teacher Competence

Pre- and in-service teacher training should:

- lead to mastery of course content and techniques to teach it meaningfully, with particular attention to the material in the content standards, and
- include strategies for reaching diverse student populations and students with different learning styles (SSPEI, 1991; NCEST, 1992).

School Organization

--Resources

- Schools should have enough physical space to accommodate all their students safely.
- Schools should have an adequate number of teachers and classrooms to ensure optimum class size.
- Students should have access to textbooks and educational facilities.
- Teachers should have the materials, time, private space, and support staff they need for lesson preparation and professional development.
- Schools should establish curricular priorities, ensure appropriate teacher assignments, and provide students with needed supports (Oakes, 1989; SSPEI, 1991).

--Environment and Culture

- The school building should be clean, safe from hazards, and in good condition.
- The school culture should foster learning and demonstrate concern for students' well-being.
- Schools should promote respect for diversity and protect student populations from discrimination.
- Staff and students should be expected to behave respectfully toward each other, and feel protected from potential violence (SSPEI, 1991).

These highlighted points above are what various scholars have proposed to enhance students learning. Yet, the assessment of many students in the mathematics classroom is still one that is based on an approach where grading and ranking is the primary goals (Niss, 1993). In these classrooms, students just passively listen to a teacher presenting procedures, then, with follow-up examples. Current theories of learning mathematics suggest that students are not passive receivers' of knowledge but actively construct knowledge consensual with social and cultural settings (von Glasersfeld, 1991).

The need to change mathematics assessment practices must be seen in the wider context of changes to society, changes to the way we view mathematics, teaching mathematics and learning mathematics. Today's society has moved from an industrial to an information-based society that relies on a greater use and application of technological understanding and has goals that promote equal opportunity for mathematics learning for all its citizens (NCTM, 1989). Rather than relying on approaches that provide assessment solely for the purposes of grading and ranking, assessment practices are needed to integrate learning activities that support students' construction of knowledge and that which reflect the diversity found in the curriculum. For the purpose of achieving high performances in mathematics, the National Council of Teachers of Mathematics (NCTM 1995) highlighted six point issues that any mathematics assessment should focus on:

- Assessment should enhance mathematics learning and support good instructional practice.
- Tests and other assessment instruments should reflect broad curricular goals including the full range of the mathematics that students need to know.
- Assessment should support every student's opportunity to learn mathematics.
- Systematic assessments should reflect broad expectations of student learning, including the ability to solve problems, to communicate ideas, to use technology appropriately, to work in teams, and to read technical material.
- Students should be offered varied opportunities to demonstrate their mathematical knowledge.
- Instruments used for assessment should be consistent with the opportunities that students have had to learn mathematics.

In assessing what learning opportunities improve mathematics achievement in Senior High Schools, the library as one of schools resource cannot be left out. Evidence has shown that library correlates to student achievement and in fact, a functional variable of student success. A research was conducted in 200 Colorado schools and the findings were that the performance of students with quality school library programs was 15% higher than the performance of students without high functioning School libraries (Lance, 2001). Many studies have investigated the positive impact school libraries can have on student achievement. The studies identified several aspects of school library service as direct and/or indirect predictors of academic achievement. There is certainly no shortage of research that investigates the link between school libraries and student achievement. According to Lance (2001A), over the past sixty or so years there have

been about seventy-five studies on the impact of school library media programmes on academic achievement. From this large body of research, Lance identifies some of the key trends as being:

- A strong library programme that is adequately staffed, resourced and funded can lead to higher student achievement regardless of the socio-economic or educational levels of the adults in the community;
- A strong computer network connecting the library's resources to the classroom and laboratories has an impact on student achievement;
- The quality of the collection has an impact on student learning;
- Test scores are higher when there is higher usage of the school library;
- Collaborative relationships between classroom teachers and school librarians have a significant impact on learning, particularly in relation to the planning of instructional units, resource collection development, and the provision of professional development for teachers;
- Libraries can make a positive difference to students' self-esteem, confidence, independence and sense of responsibility

Although a substantial body of research since 1990 shows a positive relationship between school libraries and student achievement, many of these studies are based on overseas data and the extent to which this body of evidence is transferable to a Ghanaian setting is not obvious. Library service in Ghana has not received the needed attention to enable it play its role in the educational process. This is due mainly to the inadequate funding of the Ghana Library Board which is responsible for the management and supervision of the existing libraries, both public libraries and school libraries in Ghana (Anamuah-Mensah 2002). Evidence from other researches also buttresses the fact that qualified teacher librarians who are needed to manage school libraries to enhance student achievement keep diminishing in number. Reynolds and Carroll (2001) found that since 1983 the number of school libraries being staffed by qualified teacher librarians has dropped dramatically. Other problems found by Anamuah-Mensah Committee (2002: p212) as militating factors against the provision of effective Library in Ghana include the following:

- lack of libraries in some schools;
- poor/non-existent accommodation;
- inadequate and obsolete materials and equipment;
- outdated reading materials;

To address the problems and improve library and information services, the Committee which was led by Anamuah-Mensah (2002 : p212) recommended the following:

1. District Assemblies with the support of the GETFund (Ghana Educational Trust Fund) should establish and fund basic school and community libraries and in addition provide ICT facilities to, among others, facilitate distance learning and non-formal education;
2. First and second cycle schools should have library periods on their timetables;

3. The Department of Information Studies of the University of Ghana should be supported by Government to expand its training facilities to train librarians for public, community, academic and school and college libraries;
4. A Directorate for school and college libraries should be created at the Ministry of Education (MOE) to be responsible for school and college libraries.

RESEARCH DESIGN

This research employed both quantitative and qualitative method of research design. One striking feature of this blend is that it's enhance triangulation (Neuman, 2000; Tashakkori and Teddlie, 2003; Saunders, Lewis and Thornhill, 2007). The descriptive survey is the research strategy that was adopted for this study. Baumgartner et al (2002), affirmed that descriptive survey involves determining the views or practices of a group through interviews or by administering a questionnaire. The descriptive strategy was used to sample views of 192 persons. 32 of which were mathematics teachers and 160 students from four Senior High Schools in the Central Region. The primary aim was to explore the factors that should be instituted in schools to promote SHS students' opportunity to learn mathematics in the Central Region. Four SHSs operating both as boarding and day schools were selected from two districts in the Central Region. Two schools were selected from each of the districts. The two districts were Gomoa West and Effutu which are now a municipal. These two municipal were selected using convenience sampling. Convenience sampling as the name suggest, is selecting the research participants on the basis of being accessible and convenient to the researcher.

Purposive sampling was used to select the targeted number of mathematics teachers needed for the research from all the selected schools in the two sampled districts. This sampling method was adopted in accordance with Neuman's (2000) submission which emphasized that purposive sampling occurs when one selects cases with a specific purpose in mind. Purposive sampling was appropriate because the researcher selected mathematics teachers based on teachers' willingness to support this research in terms of responses. There were 32 (SHS) mathematics teachers in the selected districts. Twenty four (24) of them were professionals and eight (8) non professionals. Four schools were selected out of the five schools in the selected districts based on convenience and accessibility. The four (4) schools were Apam Senior High School, Dawuramong Secondary Technical School, Winneba Senior High School, and Senya Senior High School.

Further, random sampling was used to select the targeted students needed for the research in all the SHS. There were three (3) different forms in each school. These were form one (F1), form two (F2) and form three (F3). The researcher employed the balloting system to select one of the forms which happened to be F3. Within F3, we have students in different classes who were offering different programmes. Therefore, for each school, the researcher selected four (4) classes. In schools like Winneba Senior High School and Apam Senior High School where the classes were more than four (4), class prefects were asked to pick ballot papers of which four

were Yes and the rest No. This balloting helped the researcher to have the number of classes for the study.

The systematic sampling method was then used to select students who were needed to complete the questionnaire. A sample frame which represented names of students of the selected classes from the selected schools was requested from the schools' administration. Using the class list as the frame, one (1) of every five (5) persons was selected from each class. A total number of 10 students were selected from each class in each of the schools. In all, 160 students were selected for the research exercise.

Data collection instrument: Questionnaire

The data collection instrument used for the research was questionnaire and interview. Open ended questionnaire and semi structured interviews were used under this design to collect the needed data in order to answer the research question. Two different sets of questionnaire with each going to the teacher and the student were administered and an interview guide which was also used for the interviewing. Each questionnaire was made up of two main parts.

The first part contains items that elicited information on the demographic background of each group of the respondents and their views on teaching and learning of Mathematics. The demographic component of the questionnaire essentially elicited information on variables like gender, academic/professional qualification, number of years of teaching Mathematics and the average number of students in a class. This was in tune with the research since these variables helped the researcher to make deductions from views of respondents. The second section involves open ended questions that allow the respondents to express their personal views regarding teaching and learning of Mathematics at the SHS level. A semi-structured interview guide with open-ended questions was used. The researcher interviewed a total of three (3) heads of departments (out of four proposed) from each school used in the study.

Data Analysis Procedures

The content analysis method and descriptive statistics were used for the data analysis. The data were coded, themes were found, and the data were organized and defined according to the codes and themes. Each interview was listened to and written down verbatim with hesitations and laughs indicated. The researcher then thematically analyzed the ideas that emerged from the interview.

DATA ANALYSIS

The findings of the study are discussed under two sections:

- (i) findings related to the research questions;
- (ii) discussion of results

Responses of Teachers

Teachers were asked to give their responses on **what they think schools should do to support teaching and learning of mathematics**. A total of 56 responses were received from 26 respondents. This was possible because the question was an open-ended type and respondents had the right to give more than one response. These responses were grouped under three main themes after careful considerations. Table 4.5 below shows the group response analysis of teachers.

Table 3.1: Group Response Analysis of Teachers

| what should the school do to support T/L | | Responses | |
|--|----------------------|-----------|---------|
| | | N | Percent |
| a | curriculum materials | 24 | 42.9% |
| | teachers motivation | 14 | 25.0% |
| | in-service training | 18 | 32.1% |
| Total | | 56 | 100.0% |

From Table 3.1, 24 out of the 56 collated responses suggested that schools should make provision for curriculum materials for use. This represents 42.9% of total responses. Curriculum materials are a sum representation for those respondents who suggested textbooks, set of construction materials, graph board and the likes. 25.0% (n=14) of respondents also believe that mathematics teachers must be well motivated to enable them teach well. The remaining 32.1% (n=18) of respondents requested schools to organize in-service training for mathematics teachers. Each of these findings is pertinent in the teaching and learning process. Textbooks, for instance, are of paramount importance in any consideration of educational reform because more often than not textbooks are the sole reading materials that the students will have access to and which the teachers will use as instructional resources.

Also, teacher motivation could be looked at in two ways. These are extrinsic or intrinsic motivation. Both have significant influence on teachers' performance. Extrinsic motivation refers to motivation that comes from outside rewards, such as money or grades. This motivation comes from the pleasure one gets from the reward or from the sense of satisfaction that is gained from an incentive to complete a task. Therefore, extrinsic motivation is an answer to help mathematics teachers to feel more confident and committed in teaching the subject. On the other hand, an intrinsically motivated teacher will work, for example, because he/she finds mathematics teaching enjoyable or because the success in finding a solution to a mathematical problem provides a sense of pleasure.

Some of the teachers' responses argued that intrinsic motivation does not mean that a person will not seek rewards. They stated, *intrinsic motivation just means that external rewards are not enough to keep a person motivated but does not rule out satisfactory remunerations*. In neither case, the person performs the task because there is some reward involved, such as a prize, a payment, or in the case of students, a grade. Times continue to change and mathematics teachers on the field need to change to meet new development. This change in teachers could be brought about by schools bringing in resource persons, organizing in-service and short-term workshop or giving study leave for further studies.

Responses of Students

Students were asked to give their responses on **what they think should be provided by the schools to support them in their learning of mathematics**. A total of 151 responses came from respondents and their responses, upon careful considerations, were grouped under six (6) main themes. The responses were group because it was realized that similar ideas had been expressed in different language forms by individual respondent. Table 3.2 below shows the summary of open-ended response from students.

Table 3.2: Summary of open-ended responses from students

| ITEMS | Frequency | Percent |
|---------------------|-----------|---------|
| Assessment Methods | 34 | 22.5 |
| Learning materials | 47 | 31.1 |
| Instruction period | 25 | 16.6 |
| Method of teaching | 20 | 12.1 |
| Motivating teachers | 13 | 7.9 |
| Competent teachers | 12 | 7.3 |
| Total | 151 | 100.0 |

From the above Table 3.2, we have 34 students representing 22.5% commenting on Assessment as a means to support them in learning mathematics. This group of respondents believes that working more problems (exercises), assignment, class test and organizing quiz competitions were just but few ways the school could use to help them learn mathematics. The plea of this group is just realistic because Kilpatrick (1992) stated that the challenge for the 21st century, as far as mathematics educators are concerned, is to produce an assessment practice that does more than measures a person's mind and then assign a mind treatment. 47 out of 151 students, representing 31.1%, are of the view that schools should provide them with learning materials. They were referring to mathematics textbooks, constructing instruments, calculators', graph books and the likes as items that could support them to learn mathematics. This was the second

time textbook has been mentioned as a contributing factor in this study and this brings to minds the immense nature of textbooks to the teaching and learning of Mathematics.

Other respondents were asking for the instructional period for mathematics to be increased. About 16.6% of the students believe that the time allotted for mathematics on the schools timetable was short and were appealing if the school can adjust it to make room for the slow learners. Instructional period for mathematics lessons is a delicate issue and it has been proven by many researches to be important ingredient of student's mathematics learning. McKnight *et al.* (1987) for example, in a review of research on instructional time, found strong support for the link between allocated instructional time and student performance. Method of teaching has been used to describe respondents' request for teachers to practice more past questions and teachers classroom presentation. 12.1% (n=20) of the total respondents complained about teachers pace in lessons delivery and inadequate practicing of past questions. Even though, efforts are being made by educational stakeholders to phase out traditional way of teaching Mathematics where students just passively listen to a teacher presenting procedures, and then following them with examples, some few mathematics teachers still hold on to such teaching methods.

Extant literature has shown that method of instruction affects students learning. Hitz and Scanlon (2001) stated that students who attended traditional teacher-centered classes shown better results immediately after their programme. However, students who were taught using project-based methods (constructivist teaching approach) had better results and had a greater level of retention and ability to use received knowledge and skills over time. A handful of the respondents representing 7.9% and 7.3% of students were respectively calling on the schools to motivate mathematics teachers and to provide them with competent teachers.

Response of Interviews (Heads of Department)

The following were the summarized responses of the Heads of Department who were interviewed concerning what the school should provide to enhance the teaching and learning of mathematics at SHS level. The written responses were:

- The school should make sure that all the necessary teaching and learning materials are provided to facilitate the developing of concept in mathematics.
- The school should motivate teachers of mathematics so as to give their maximum best.
- The school should try to device measures to motivate students who excel in this field of study. One of the interviewees went on to say "*awarding students will encourage other students to study the subject well and develop interest in the subject since each and every student would feel proud to be once called or honoured the best student in mathematics*".
- The school should encourage mathematics teachers to teach with the recommended textbooks, syllabus and other related referencing material.

- The schools should organise in-service training to enrich teachers' methodology in teaching the subject.
- The schools should provide standard school libraries and equip them with standard and self tuition mathematics textbooks.
- The schools should put in place mechanisms that would enforce mathematics teachers to assess students regularly so that teachers will become informed of their students' performances.

DISCUSSION OF RESULTS

A cross examination of the findings from the three sets of respondents exhibited some similarities in ideas. For instance, all the three sets of respondent groups hinted on teaching and learning materials (curriculum materials) with textbooks being marked as essential ingredients that promote the teaching and learning of mathematics. This result is obvious because Ghana Mathematics Series, which is a product of Mathematics Association of Ghana (MAG), is the only Government recommended textbook for both teachers and students. This is not adequate for a country that wants to move mathematics performance to a highest level. Additional textbooks are needed for teachers to read and prepare adequately for mathematics lessons in order to vary their ideas and presentations. This might be the reason why Anamuah-Mensah Committee (2002) recommended that teachers should be encouraged and supported to write textbooks, which should be assessed and recommended by CRDD for use in schools.

Other educational researchers have found curriculum materials to be an indispensable factor that is influential to students' mathematics learning. Thompson and Senk (2006) found, both curriculum materials and teachers' implementation of the materials to be influential to students' opportunity to learn Mathematics. Teaching and learning materials represented a greater part of the contributions that came from students and teachers. One of the interviewees sharing his sentiment on lack of construction instruments further said "*it has once happened in a school when a teacher of mathematics had to use a common thread as a compass when teaching construction*". It is therefore obvious for educational stakeholders and policy makers to ensure that schools are resourced with all the needed curricular materials if they really want to achieve higher mathematics outcomes in SHS.

Furthermore, motivation of mathematics teachers was jointly mentioned as a factor which needs consideration from schools. In Ghana, teachers are always agitating for increment in salaries which means that teachers are not extrinsically motivated to teach. This has affected the teaching of mathematics in schools because teachers show very little commitment. Among several lacking factors that were found and reported by Anamuah-Mensah Committee (2002) as factors that have accounted for the low performance was non-availability of qualified and well-motivated teachers. 32.1% of teachers' responses indicated that school authorities need to organize in-service training to update teachers on new developments in the teaching and learning of mathematics. 65.4% of teachers who participated in this research had already indicated they had never participated in any in-service training in mathematics. This is not good news because

mathematics is now moving with the pace of technology and if mathematics teacher should keep to this pace then they need regular professional development.

Assessment was another factor that was addressed by both students and teachers. 20.6% (n=34) of students respondents believed that the school has to do more for them in terms of assessment so as to build their confidence and to identify their shortfalls. This is consistent with one of the interview responses which say *the schools should put in place mechanisms that would enforce mathematics teachers to assess students regularly so that teachers will become informed of their students' performances. This will help teachers to take necessary remedial measures where need be*. Therefore, school authorities have to institute various assessment strategies; be it summative or formative assessment to improve students' mathematics assessment in schools.

Generally, international research on school effectiveness has demonstrated that inputs such as location of school, in-service training, the provision of teaching and learning materials, and students' assessment increase students' learning outcomes, particularly in developing countries where schools are deprived of the most rudimentary resources (Hanushek, 1995; Pennycuick, 1998).

CONCLUSION

Mathematics is an important element that is needed for the development of any nation. Honestly, it would not be enough for a country to just believe that Mathematics is important until a substantial amount of the subject contents have been successfully imparted into a country's schooling citizens. This has made students' mathematics achievement an issue of concern to many countries today. These concerns have necessitated numerous educational researchers to investigate what should be done by educational institutions to enhance the teaching and learning of Mathematics. On the strengths of the findings made by the study, it is evident that the School as a learning community should provide the following factors below to enhance the teaching and learning of mathematics at the SHS level.

- Provide curriculum materials for the teaching and learning of mathematics
- Organize in-service training to develop the mathematics teacher with requisite teaching skills
- Improve assessment methods in the teaching and learning of mathematics
- Extend instruction periods for the teaching and learning of mathematics
- Improve teaching methods in mathematics classes
- Motivate mathematics teachers to give off their best
- Provide competent mathematics teachers to teach the subject

RECOMMENDATION

It is not only important to assess what factors facilitate students' mathematics achievement but also imperative for all and sundry to appreciate that there are more things do be done as a nation to help develop mathematics. Based on the findings of this study, the researcher would like to make the following recommendations as essential issues for consideration:

- Assessment procedures should be improved to support them in the learning of mathematics, the researcher wishes to recommend that a variety of mathematics assessment procedures, including paper and pen test, multiple choices, inter class mathematics quizzes competition, systematic observation of students performance and information gathering should be employed in SHS.
- Teaching and learning of mathematics at the SHS level should be strengthened with the provision of qualified and committed mathematics teachers so that students receive the best out of them.
- A mechanism for organizing regular in-service training, workshops and seminar for all mathematics teachers in the system should be put in place. In addition, mathematics teachers must be encouraged to join subject's Associations such as Mathematics Association of Ghana (MAG).

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