The actual status of general secondary school mathematics teaching and learning: The case of Ethiopia

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The actual status of general secondary school mathematics teaching and learning: The case of Ethiopia

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Abstract. This paper examines the actual status of general secondary schools mathematics teaching and learning in Ethiopia. The research was conducted on samples of 405 general secondary school students and their mathematics teachers in Ilu Ababor zone general secondary schools. A multi-stage random sampling method was applied to choose schools and students. The results indicated that due to students’ mathematics perception, student’s mathematics background and low family support they are not interested and motivated to learn mathematics. The scarcity of continuous teachers’ training opportunity and a shortage of educational resources affect teachers’ interest and motivation to teach mathematics and their job satisfaction. Because of large class size and low level of students’ participation, the actual learning and teaching mathematics was lecture method. Implications for improvement also suggested.

1. Introduction
Mathematics is a fundamental subject, which taught all over the world as an individuals’ building foundation from pre-schooling age. Secondary school educations hold a very pivotal position to produces competent young boys and girls for higher education [1]. At this level of education, students gain basic academic knowledge that gets ready them to join higher education within a short period [2]. As a consequence, the Education Sector Development Strategy of Ethiopia puts mathematics as one of the essential subjects for every person [3].

However, student performance in mathematics and science subjects did not show the expected results. The Ethiopian government launched the National Program for Strengthening Mathematics and Science Education in Ethiopia (SMASEE). But still, in Ethiopia, student’s mathematics background was weak [4].

As a result, the rationale of this paper is to investigate the current status of quality of mathematics education teaching methodology and the role of students’, teachers’, school administrators and students’ family to upgrade mathematics teaching process of general secondary school (GSS) in Ethiopia. Hence, this study narrowed the gap that noticed in the literature due to the lack of research evidence on the status of mathematics learning and teaching in Ethiopia. It will be helpful for administrator and educator to give attention to the improvement of mathematics learning - teaching methodology and guide them properly.

2. Literature review
As Suh [5] pointed out that some students’ fears to learn mathematics subject and others have no interest to learn mathematics. Hence, to improve the quality of teaching and learning, teachers have to
follow the constructivist approach, which focus on using student-centered teaching [6]. To apply this method of teaching effectiveness of teachers and their professional development are important issues related to it [7]. Emphasizing this Shibeshi [8] remarks on the improvement of educational system depends on teachers. In line with this Siti Fatinah Zuhairah Haji Ismail et al [9] illustrated, as teachers are at the center of effective mathematics teaching and learning.

Although, teacher quality is difficult to measure: as determined by Darling-Hammond and Sykes [10] oral skill, academic knowledge, and usage of appropriate methods of teaching and learning based on students’ background are the main observable components of teachers’ quality.

In developing countries physical, human resources and learning materials including community participation in school administration are the main factors associated with educational quality [11]. Parental support is another important matter for their children’s academic performance. They are the most significant person outside the school in determining student motivational attitudes [12].

3. Methodology
The research design of this study was mixed method approaches in which both qualitative and quantitative methods of research designs combined. Using a multi-stage random sampling method initially, schools in urban and rural areas of Ilu Ababor zone identified. Hence, three schools from each area of the zone selected randomly using cluster sampling. Then, based on the proportion of students 405 students were randomly selected from the six schools. The sample also consists, all 32 sampled GSS mathematics teachers purposively.

3.1. A Data Gathering Instruments
Focus group discussion (FGD) with mathematics teachers, classroom observations, and questionnaires for students and mathematics teachers were employed to gather information. The instruments were reviewed based on the comments of professionals and the result of the pilot study for the face and content validity.

3.2. Data Analysis
In this study, both qualitative and quantitative analyses employed. The close-ended items in questionnaires were rated on 5-point Likert scale having five degrees of agreements varying from 1= strongly disagree, to 5 = strongly agree in which 3.0 is the average scales. Note that, Mean (M) and standard deviation (SD). Accordingly, the quantitative data were analyzed using descriptive statistics and presented in tables and quantitatively analyzed, interpreted and reported using mean to describe the students, teachers and other stockholders’ related characteristics.

The data gathered through open-ended questionnaires, FGDs and classroom observations were analyzed qualitatively. Qualitative data presented in this paper was collected to get further information on the current status of mathematics teaching and learning. Finally, the findings and conclusions made and some recommendations given.

4. Results
Table 1 showed that the mean value of students mathematics background (M=2.44), level of participation on activities (M=2.66), interest towards learning mathematics (M=2.13), motivation to learn mathematics (M=1.97) and tradition to ask what they did not understand (M=2.03) were below average value.

Table 1. Descriptive statistics related to students characteristics

| Variables                                | N  | M    | SD  |
|------------------------------------------|----|------|-----|
| Students mathematics background          | 2  | 2.44 | .216|
| Students level of participation in activities | 2  | 2.66 | .937|
| Students interest in learning mathematics | 2  | 2.13 | .707|
| Students motivation towards learning mathematics | 2  | 1.97 | .74 |
| Students tradition to ask what they did not understand | 2  | 2.03 | .861|
Concerning this, on FGD teachers were also pointed out that: “students’ mathematics background and participation on activities were low even they have difficulty in basic operation. This is mainly due to there is no fail in the first cycle of primary school, and hence students join grade five without concepts of the basic operation”. On open-ended questionnaire students point out as mathematics is a difficult subject than others.

### Table 2. Descriptive statistics for school characteristics

| Variables                                                      | N  | M    | SD   |
|---------------------------------------------------------------|----|------|------|
| Frequent training opportunity to improve mathematics teaching  | 32 | 2.50 | 1.459|
| Your access to upgrade your educational level                 | 32 | 2.28 | 1.224|
| Access to read mathematics education reform documents (e.g., those published by MOE, NCTM, …) | 32 | 2.12 | 1.185|
| Opportunity to attend seminars and workshops to improve your teaching | 32 | 1.75 | 1.016|
| Follow up and support from the concerned body after participation | 32 | 2.56 | 1.19 |

Table 2 shows that teachers frequent training opportunity to improve the quality of teaching mathematics specifically, access to upgrade educational level, access to read mathematics education reform documents, opportunity to attend seminars and workshops and follow up and support from concerned body after participation were below mean value (M=2.50, 2.28, 2.12, 1.75 and, 2.56 respectively).

Regarding this, the classroom teachers responded that except supervising classroom lessons and sometimes preparing a short training, there were no special support services arranged by a school administrator and supervisors for teachers to improve mathematics teaching.

### Table 3. Descriptive Statistics for collaboration of school administrators with teachers

| Variables                                                      | N  | M    | SD   |
|---------------------------------------------------------------|----|------|------|
| You have a chance to develop school curriculum based on students characteristics, school resource, and school environment | 32 | 2.19 | 1.091|
| You and administrators plan, investigate and assess the curriculum together | 32 | 2.44 | 1.435|
| You and administrators regularly observe each other at work and put direction on how to improve mathematics teaching and learning | 32 | 3.25 | 1.344|

As it seen from table 3, teachers and school administrators regularly observe one another at work and put direction on how to improve mathematics teaching and learning (M=3.25). But teachers’ power to develop school curriculum based on students characteristics, school resource and school environment, teachers and administrators cooperation to plan, research and evaluate curriculum together to improve mathematics teaching and learning is below mean value(M=2.19 and M=2.44 respectively).

### Table 4. Descriptive Statistics for stakeholders support and teachers job satisfaction

| Variables                                                      | N  | M    | SD   |
|---------------------------------------------------------------|----|------|------|
| Family support their children on their mathematics achievement | 32 | 2.56 | 0.914|
| School administrator support teachers to improve mathematics teaching | 32 | 3.16 | 1.167|
| Teachers are recognized and valued by the community            | 32 | 2.75 | 1.295|
| Students appreciate their teachers                            | 32 | 2.97 | 1.425|
| You are satisfied with your job                                | 32 | 2.53 | 1.414|
| You will not change to another profession if you get the opportunity | 32 | 2.84 | 1.439|
As shown in the above Table 4, the mean values of family support their children mathematics achievement (M=2.56), recognition and value of teachers in the community (M=2.75), appreciation of teachers by their students (M=2.97) and teachers job satisfaction were slightly below average. While teachers would change their profession if they get the opportunity (M=3.16) and school administrator support teachers to improve mathematics teaching and learning (M=3.16) were slightly above mean value.

In line with this, teachers pointed out that their students did not respect them and society considers mathematics as a difficult subject. School administrators could not provide support to improve mathematics teaching and learning except supervising a class while teaching and preparing short-term training. Students also mentioned that the majority of their teachers were not interested, motivated to teach them from their heart and largely teach them to fulfill administrative requirements. They also added as teachers come late and leave before the end of the class time, respect only high achiever students and constantly teach without considering our understanding of the main ideas of the topic. From school observation, one can see that the classroom teachers come late and leave before the end of the class time and wasting students learning time.

| Variables                                              | N   | M    | SD    |
|--------------------------------------------------------|-----|------|-------|
| Average number of students in a class                  | 32  | 60.8 | 6.738 |
| Teaching load per week                                 | 32  | 18.9 | 2.763 |
| Availability of text books for each student            | 32  | 3.47 | 0.803 |
| Availability of appropriate references books           | 32  | 2.38 | 1.362 |
| Availability of appropriate teaching Aids (e.g., Geometric figures) | 32  | 2.38 | 1.476 |
| The extent to which classrooms provide clean, safe and comfortable environments for learning | 32  | 2.22 | 1.431 |

From Table 5, one can see that the average class size was about 61 and teachers teaching load without other extra activities is 19 credit hours per week. Mathematics text books were relatively available for each student (M=3.47). But, the availability of appropriate references books, teaching aids, Geometry laboratory and the degree to which teaching rooms provide clean, safe and comfortable environments for learning were below expected resources and facilities for mathematics teaching (M = 2.38, 2.38 and 2.22 respectively).

In line with this, most of the teachers and the students responded that due to large class size, low students participation and lack of place and time to provide tutorial class the actual teaching and learning method of mathematics is teacher-center. As a result, teachers mentioned as it was difficult for them to apply appropriate methods of teaching as stated on the curriculum and to teach students with different background and strength.

5. Discussion

Students’ interest, which is an important issue for high-quality education [13], and motivation, which affects positively their achievement [14], toward learning mathematics are low. Students’ participation in activities and tradition to ask what they did not understand were also low. This result is not satisfied one of the key components of teachers quality and which determine the quality of education [10].

The present study, also point out that teachers training opportunity, access to upgrade their educational level, opportunity to attend seminars and workshops to improve their teaching and follow up and support from the concerned body after participation to improve the quality of teaching mathematics are less.

School administrator support for mathematics teachers is not adequate to improve mathematics teaching and learning. Family supports of their children on their mathematics achievement were also low, and it affected their children’s mathematics achievement [18]. Students and community were also considering mathematics as a difficult subject. Lack of teachers recognition and value in the community and not appreciated and respected by their students were also affecting the quality of
teaching and learning [19]. Also the majority of teachers were not satisfied with their job and they will shift to another profession if they get the opportunity. This missed kinds of teaching behaviors related to student achievement [20, 21].

There is a shortage of availability of mathematics teaching resources, lack of facilities and geometry laboratory for teaching which has an impact on students learning and teacher’s encouragement to teach. This result has consistency with research studies in developing countries [11].

6. Conclusion and recommendation

The teaching and learning of mathematics in Ethiopia specifically Ilu Ababor zone is going on with low students’ mathematics background and participation on activities. Because of the name given to the subject, mathematics is difficult subject, by the society students were not motivated to learn mathematics. Hence, the respective government office should create awareness for the society as a whole.

Due to low interest and motivation of students toward learning mathematics, large class size and teachers teaching load the teaching and learning process was lecture method. These also affected students learning and teacher’s encouragement to teaching [15] and also not fulfilled the important school characteristics [16]. In this case, we recommend the school administrative and responsible body of the government to minimize the number of students to appropriate class size.

Children’s family should support, encourage and give time to study for their children on their mathematics performance. Community and students should also give value and respect teachers on his/her work to enhance teacher’s motivation to teach and job satisfaction. The school administrators should also support and provide through continuous teachers’ professional development to advance teachers teaching profession. Furthermore, after each intervention, the school should follow up and support them on its implementation.

To upgrade the status of mathematics education, teachers and school administrators should work in collaboration to develop school curriculum based on students characteristics, school resource, and school environment, which motivates teachers to bring changes [17]. Teachers also should use their class time appropriately, do not pass topics before students understand, interested and motivated to teach them from his/her heart. Further research should be done to maintain mathematics teachers on their profession and to increase their job satisfaction. For these facts, it is possible to say that mathematics teaching and learning takes place with fewer resources and facilities.

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