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## RESEARCH ARTICLE

# FACTORS CONTRIBUTING TO STUDENTS' LOW PERFORMANCE IN MATHEMATICS EDUCATION IN HIGH SCHOOLS AT CBTP AND PRACTICUM SITE ZONES OF JIMMA UNIVERSITY, ETHIOPIA

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### ABSTRACT

The main objective of this study is to identify factors contributing to students' low performance in Mathematics Education in high Schools at CBTP & Practicum site zones of Jimma University. A survey design which used qualitative and quantitative aspects of research were implemented. Questionnaires and interview schedules were used to collect data. Participants (N=361) were made up of 197 girls, 164 boys and ten mathematics teachers from high schools. The research instruments used were the questionnaire which had close ended question for the students and interview for the teachers. Descriptive statistical analysis was used to interpret the data. The study revealed that learners attributed their low performance in mathematics to both internal and external factors such as laziness, lack of practice, lack of interest, absenteeism by themselves, material resources and educational facilities, poor parents support, methods of teaching, bad characters of teachers, poor back ground in the subject at lower levels, change of medium of instruction for oromiya region students, the abstract nature of mathematics and lack of guidance and counseling. The study recommends that the Ministry of Education should give sufficient training for mathematics teachers; educational facilities should be improved and made sufficient. Teachers should also introduce different methods of teaching to assist students. Difficulties faced by oromiya students due to the change of medium of instruction should be addressed. Awareness with regard to the importance of education should be created on Parents so that they will support and create awareness in their children. Finally, students should be guided and encouraged to view mathematics like the rest of the subjects in the school curriculum.

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## INTRODUCTION

Mathematics is very important in our daily lives since it deals with real life situation in our daily activities (Ojose 2011). The importance of having a solid background in mathematics is well recognized as it serves as a gateway to future professions in a variety of fields (Tella 2008; Pandor 2006; De Klerk Wolters cited by Kurt H, Becker, Somchai, 2002). A thorough understanding of mathematics is an asset, if not essential, for applicants interested in obtaining better employment the world over. In other words, mathematical competence is an essential component in preparing numerate citizens for employment and it is needed to ensure the continued production of highly-skilled persons required by industry, science and technology (Mikulski 2001; Steen 2001; House 2006). According to Steen (2001), mathematics does not only empower people with the capacity to control their lives but also provides science a firm foundation for effective

theories; it also guarantees society a vigorous economy. The world's technological advances today involve a solid mathematical background which leads to job opportunities in the world (NCTMS teen 2001; Kahn 2001). At its most basic level, mathematics is a requirement for science, computer technology and engineering courses. This is based on the fact that from homes to the workplace, technological tools have become a part of our day-to-day life activities. Because of the importance of mathematics, already highlighted above, schools must respond with effective teaching and learning of mathematics from grade one to university level (Department of Education 2000). Despite the importance of mathematics highlighted above, learners continue to fail the subject (Feza-Piyose 2012). Mkgato and Mji (2006) cite several studies pointing to high failure rate in mathematics in South Africa in comparison with other countries. The performance of students in Senior Secondary Sciences in Nigeria has remained an issue of concern to all stake holders (Ajagun, 2000). The report by Ojerinde (1998) on the survey of the performance of candidates in science subjects in Nigeria over the years revealed a discernible decline. This perennial decline has

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remained a source of concern to science educators, mathematicians and mathematics educators (Nnaka and Anaekwe, 2004). Therefore this study is to investigate the causes for low performance of students in mathematics in high school at CBTP and Practicum site zones of Jima University.

### Statement of the problem

Despite the significant role played by mathematics both in enhancing comprehension of other school subjects and its general role in life learners continue to fail the subject at various levels in the school system, particularly at High School examinations. For example, Record of results for Mathematics in selected Mthatha secondary schools from 2004-2008 shows the very high failure rate for mathematics exam. Also Vundla (2012) indicates different factors that affects students' performance such as shortage of well-trained teachers, in adequacy of teaching facilities, lack of funds to purchase equipment and poor quality of text books are some of the factors that hamper students' performance in mathematics.

The research addresses the following research questions

- How do teacher related factors Contribute for the low performance of students in mathematics?
- Does the students' attitude and commitment towards mathematics constitute problem in the performance of student in mathematics examinations?
- Does the lack of instructional materials, educational facilities constitute a significant factor in students' low performance in mathematics examinations.
- How do parents' related factors contribute to the low performance of students in mathematics?
- Does change of medium of instruction from mother tongue (Afaan oromo) to English language is associated with low performance in mathematics?

### Theoretical framework

The study is based on Weiner's (1980, 1992) attribution theory. The concept attribution describes the cognitive process by which a person perceives the cause of what has happened to him/her either as caused by himself/ herself or by others (Asonibare 1986). According to the attribution theory, we tend to explain the causes of success or failure to either internal or external factors. That is, we succeed or fail because of factors that we believe have their origin with us or because of factors that originate in our surroundings. There is an element of whether we control or do not control the success or failure. This is related to Rotter's (1954, 1966) locus of control concept which refers to the extent to which individuals believe that they can control events that affect them. Individuals with an internal locus of control believe that events result primarily from their own actions. Those with an external locus of control believe that other peoples (for example, teachers), fate, bad luck or chance primarily determine events (Vijayashree and Jagdishchandra, 2011). An important assumption of the attribution theory is that we will interpret our environment in such a way as to maintain a positive self-image. That is, we will attribute our successes or failures to factors that will enable us to feel as good as possible about ourselves, they are

likely to attribute the success to their own efforts or abilities and when they fail.

## MATERIALS AND METHODS

**Study design:** A cross-sectional study design was employed.

**Study area:** The study areas were High schools found in Jimma University's CBTP & Practicum sites of jimma university (Metu, Bedele, Yaberus, Bonga, jiren and Dejazmach Geresu high schools)

**Study population:** The study population for this particular research was grade 9 and grade 10 students of 2007 E.C and all mathematics teachers of grade 9 and grade 10.

**Sampling technique:** After identifying the number of Students in those regions, allocation of subjects using proportionate allocation system was employed. A total of 68 students per high school were selected. Then simple random sampling was used to select these students and sections to be included in the study.

### Instrument

A self-administered anonymous questionnaire was prepared after reviewing similar literatures and modified to the local context was used to collect data from grade 9 and grade 10 students. An interview was held with mathematics teachers i.e. two teachers per high school. The questionnaire had two parts. The first part asked about socio-demography of the students and the second part was about the factors that contribute to low performance in mathematics. Those factors that attribute to low performance were measured by strongly agree, agree, Uncertain, disagree, and strongly Disagree.

### Data processing procedure and Ethical consideration

Permission was obtained from college of Natural Science sciences, Jimma University to conduct the study in the specified area. All concerned official at all levels were communicated and informed about the purpose and importance of the study to get cooperation. All participants were informed about the purpose of the study, and assured confidentiality of the responses and informed consent was obtained from participants. Participation in the study was on a voluntary basis. The right of the respondents not to participate was respected. The collected data was entered, cleaned and analyzed using SPSS for windows version 16.

### Acknowledgments

I would like to pass my profound gratitude for jimma university Natural science college and Research & PGP coordinating office of the college for their unreserved support and constructive comment that enabled me accomplish this research work. Also I would like to express my appreciation to colleagues in Jimma University for their friendly guidance and assistance. I acknowledge all principals, teachers and students in all secondary schools of the research site, Oromiya and SNNPR region, for their cooperation when I visited them.

## RESULTS

### Characteristics of study subjects

A total of 361 students completed and returned questionnaires yielding a response rate of 85.3%. Among the respondents 164(45.4 %) were boys, 197(54.6 %) were girls .The data shows that most of the pupils in the study area were girls.

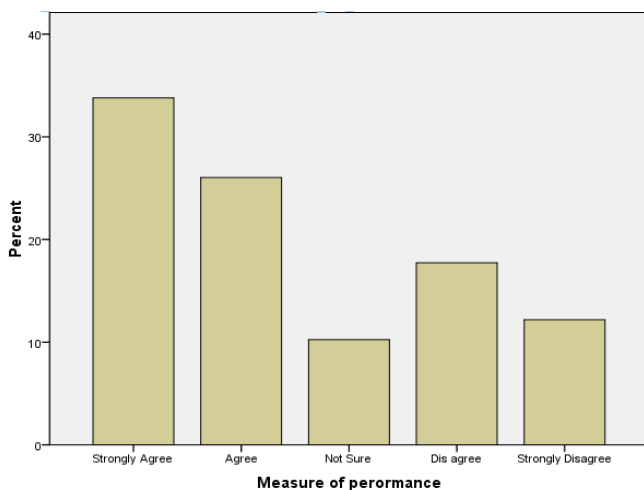
**Table 1. Composition of Sample by Gender (N=361)**

Sex	Frequency	Percentage
Male	164	45.4
Female	197	54.6
Total	361	100

**Table 2. Response rate of question: “Teachers discourage learners from learning Mathematics” (N=361)**

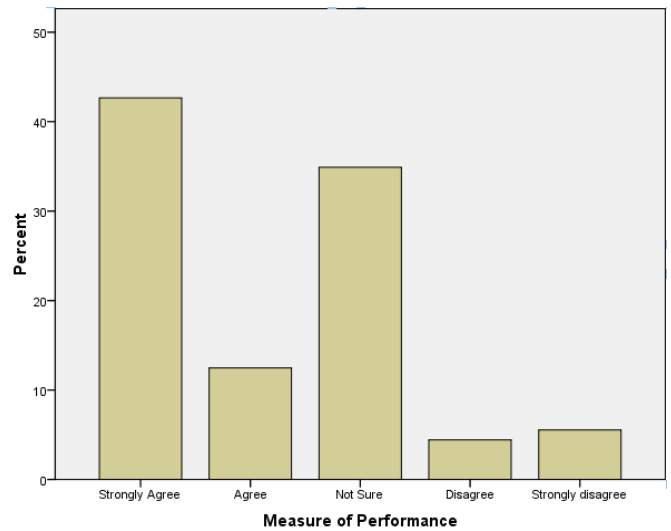
Categories of response	Frequency	Percentage
Strongly Agree	128	35.5
Agree	69	19.1
Not Sure	43	11.9
Disagree	49	13.6
Strongly Disagree	72	19.9
Total	361	100

Table 2 above shows that 54.6% of the respondents believe that teachers discourage them from learning mathematics. While 33.5% disagreed the fact that teachers discourage them in learning mathematics. Only 11.9 % of the samples were not sure about the question. Figure 1 shows response to the question “Learners perform low in Mathematics because the classroom environment is not stimulating (over crowdedness of students).” 216(60%) of the students supported the assertion. Those who disagreed were 108(29.9) % of the sample. Only 37 (10.2%) of the samples were not sure about the question.



**Figure 1. Class room environment is not stimulating**

Figure 2 shows response rate to the question “student perform low in mathematics because parents do not encourage and help them in their study” 284 (51%) of the respondents agreed with the assertion .Those who disagreed were 140(39.8%).Only 37(10.2%) was unsure about the statement.



**Figure 2. Parents do not encourage and help their children in the study**

**Table 3. Response rate to the question: “Non-involvement of students in practical activities Contributes to low performance in mathematics.”**

Categories of response	frequency	Percentage
Strongly Agree	145	40.2
Agree	90	24.9
Disagree	50	13.9
Strongly Disagree	53	14.7
Not sure	23	6.4

Table 3 above shows that 235(65.1%) of the respondents agreed with the assertion that Non-involvement of students in practical activities contributes to low performance in mathematics. Those who disagreed was 103(28.6%).Only 23(6.4%) of the respondents were not sure.

**Table 4: Response rate of the question:” Students perform low in mathematics because of the change of medium of communication from mother tongue to English” (case of the high schools selected in oromiya region)**

Categories of response	Frequency	Percentage
Strongly Agree	143	65.6
Agree	31	14.2
Disagree	13	6
Strongly Disagree	18	8.2
Not sure	13	6

Table 4 above shows that over whelming majority of respondents 174(80%) in oromiya region agreed with the assertion that change of medium of instruction from Afan Oromo to English contributes to low performance in mathematics .Those who disagreed was 21(14.2%) and13 (6%) were not sure about what to say regarding the question. Figure 3 shows the response rate to the question:”Students perform low in mathematics because of lack of instructional materials, educational facilities” 188(52.1%) agreed with the assertion. Those who disagreed was 140(38.8%) and only 33(9.1%) were not sure whether or not lack of instructional materials and educational facilities contributes to low performance of students in mathematics.

Table 5. Some other learners view which contribute to low performance in mathematics

Item	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)	Not sure (%)
Mathematics is naturally a difficult subject	29.6	23.8	18.0	17.7	10.8
Mathematics is too abstract and do not relate to them.	44.3	22.4	12.2	12	8.9
Lack of enough Mathematics teachers at primary school level to build a solid Mathematical foundation in the students.	41.8	21.9	15.2	12.7	8.3
Students' engagement in other work (personal, family) after the school.	47.6	16.1	9.7	19.9	6.6
Lack of effort (practice), interest and laziness	44.3	26.9	11.9	8.9	8
Lack of guidance and counseling sessions	53.7	12.2	8	16.9	9.1
Learners do not come to school Regularly	31.6	27.4	12.7	16.9	11.4
Absenteeism by teachers from school	29.9	23.8	18	17.7	10.8
Negative attitudes towards mathematics	28.8	30.7	15.5	15	10
Teachers do not use active learning methods	31	21.9	18.6	22.7	5.8

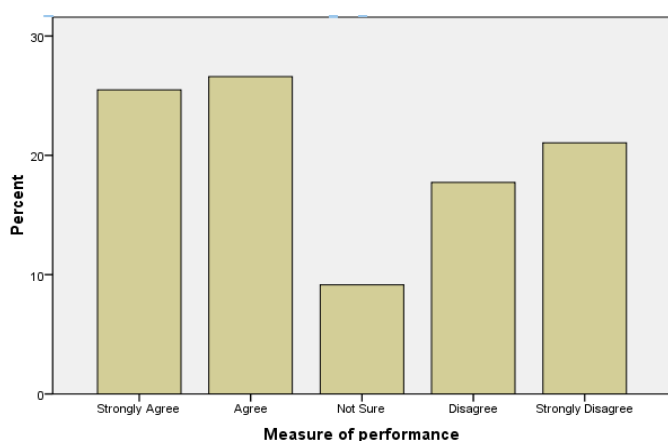


Figure 3. Lack of instructional material and educational facilities

Table 5 shows the various factors attributing to learners' poor performance in mathematics. Mathematics is naturally a difficult subject (53.4%), Mathematics is too abstract and do not relate to them (66.7%), Lack of enough Mathematics teachers at primary school level to build a solid Mathematics foundation in the students (63.7%), Students' engagement in other work (personal, family) after the school (63.7%), Students perform low in mathematics because of lack of effort (practice), lack of interest and laziness, (71.2%), Lack of guidance and counseling sessions whereby the importance of doing mathematics is shared with students (65.9%), Learners do not come to school regularly and therefore do not understand what is taught in their absence (59%), Absenteeism by teachers from school adversely affects the acquisition of concepts in mathematics (53.7%), Learners perform poorly in exams because their attitudes towards mathematics is negative (59.5%), and Teachers do not use active learning methods (52.9%).

### Teachers Response

Teachers in the entire study site confirmed that they implement mostly lecture method due to large class size. They claim that they carry excessive work load and hence feel tired and unable to address the class properly particularly at the last period. Teachers in the oromiya region of the study said that grade nine students ask for translation of English in to afaan oromo. And also they said that we were not given training which boosts our capacity in teaching.

### DISCUSSIONS

The study established that learners attributed factors which contribute to their low performance in mathematic to the internal factor that they could control. It was interesting to note that learners attributed their poor performance to internal factors that is students blamed themselves for their low performance. The internal factor includes lack of effort (practice), lack of interest and laziness, negative attitudes towards mathematics and Absenteeism by the learners. One cannot perform well in a subject he or she hates. The interest for the subject will clearly be low. Students with a positive attitude towards mathematics have been found to perform better in the subject than those who have no interest (Ma 1997; Lewis 1995). Students who worked hard may claim that they scored good result because they avoid hatred towards subject, and have put more effort in the practice and hence acquire good result in the subject. One of the most important factors for improving performance is students' involvement (Polya 2011). By involvement, it means how much time, energy and effort students devote to the learning process (Mthethwa, 2011). Acknowledging failure due to lack of interest and absenteeism helps the learner believe that they can succeed if they develop interest, attend the class regularly. This sense of control is a key variable for the learners' success in the school (Boruchovitch 2004). Obodo (2012) explains further if a student has a positive attribute towards mathematics, he / she will definitely be interested in its teaching and learning. For Salmon (2010), most mathematics teachers do not make the teaching of mathematics practical and exciting and this leads to negative attitudes to mathematics by students.

In addition students attributed their failure to the subjects due to mainly external factors that they could not control. One of the external factors that attributed is the belief that mathematics is naturally a difficult subject. It implies that the students believed that mathematics was difficult by nature there was nothing they could about it. Similar findings were found by Cao and Bishop (2001) who established that Australian learners attributed their failure in mathematics to task difficulty. Learners are most likely not to put any effort because of the belief that the subject is difficult. Further more study conducted by vundla (2012) indicates that Mathematics has been viewed as the most difficult subject in the secondary school particularly by children in the rural area. It also

emerged from this study that learners attribute their poor performance to the abstract nature of the subject. This let them think that mathematics a mere calculations that has no application. There is strong evidence that many students' difficulties in learning mathematics can be traced to the fact that, when they learned about an abstract apart from mathematical object they made no link to the corresponding abstract general concept (Mitchelmore & White, 1995). Learners attributed their failure to Lack of enough and qualified Mathematics teachers at primary school level to build a solid Mathematical foundation. They believe that their poor performance is due to lack of enough and qualified teachers. Attributing learners' poor performance to the lack of enough and qualified teacher has been alluded to by different researches. Samuelson (2011) in a study of students' perceptions of mathematics in rural secondary schools in South Africa found that students thought that teachers who did not have competence in teaching mathematics were unlikely to be aware of the way to assist learners in solving problems in mathematics. Student also mentioned that some of the teachers did not understand all the chapters in mathematics textbooks, and so it was difficult for them to assist students on those topics they did not understand (Avital, 2012). Du Preez (2004) who posited that learners could not do well in mathematics when their teachers who were supposed to guide did not know the subject themselves. Agyeman (1993) cited in Tella (2008) also state that teachers who are professionally under qualified in mathematics would have negative influence on the teaching and learning of the subject. Attributing learners low performance to teachers' use of poor teaching methods in mathematics teaching confirmed by Nyaumwe et al. (2004) who reported that some of the methods teachers use do not help students develop conceptual understanding of mathematics hence high failure in the subject in Zimbabwe. The National Mathematical Centre, Abuja (NMC, 2009), in an attempt to revamp Mathematics teaching and learning at Secondary Schools, has successfully researched into the causes and remedies for the abysmal failure in WAEC and SSCE Mathematics examinations. It has discovered that poor performance in the promotion/public examinations in Mathematics has more to do with the teachers' method of teaching than the content of curricular of the school Mathematics (NMC, 2009).

Students regard their low performance as being caused by was lack of instructional material and educational facilities. Similar findings were established by Vundla (2012) states that shortage of well-trained teachers, inadequacy of teaching facilities, lack of funds to purchase necessary equipment, poor quality textbooks, large classes, poorly motivated teachers, lack of laboratories and libraries all hamper the smooth acquisition of mathematics knowledge. Class room environment was also seen by students as a factor which make them perform low in mathematics. Portugal students' poor performance in science examination was attributed to poor class room decorations and lack of resources (Zacharia and Barton 2004). The study conducted in Zimbabwe by Theminkosoi Tshabalala and Alfred champion Ncube (2013) revealed that the school environment was one of the factors contributing to students' poor performance.

Learners involved in this particular study also attributed their failure to their parents who didn't help and encourage them in their education. This claim was supported by Salman, mohammed, ogunlade and ayinla (2012) on their study which indicates that lack of frequent Practice, non-involvement of students in practical activities and parent's failure to provide their wards with adequate materials for learning mathematics lead to poor academic performance in the subject accounted for mass failure in NECO/WAEC Mathematics examinations. In addition they attribute their poor performance to their engagement in other work (personal, family) after the school. These activities might take most of their time so that they will not have enough time for study. There is a good deals of research evidence to suggest that the more time and efforts students invest in the learning process and the more intensely they engage in their own education, the greater will be their growth and achievement, their satisfaction with their educational experiences and their persistence in school, and the more likely they are to continue their learning (Unameh, 2011). It also observed in this study that students attributed their poor performance to teacher's behavior such as insulting and not motivating learners. Some teachers de-motivate' learners in class even if they gave the right answers during class discussions. The finding attributing learner failure to teacher behavior confirms that of Kolenski (2009) who argued that a student may develop a strong dislike for a certain subject whose teacher habitually ridicules him or her in front of his/her peers. The other external factors that the students attributed for their failure were their engagement in different jobs after the school and lack of guidance and counseling. According to (Kalenkoski & Pabilonia, 2009) time spent working reduces the time available for educational activity and therefore could lead to lower educational achievements, possibly resulting in school withdrawals. Research on some schools within the Port Harcourt metropolis shows that most students fail and repeat classes as a result of lack of guidance and counseling services, especially in Government Secondary schools. If such services are provided in schools, most of the students that fail and repeat classes could have been helped in the right choice of subjects, thereby avoiding unnecessary failure and class repetitions (The Tide News Online, 2013).

Majority of learners in oromiya region of the study attributed Change of medium of instruction from afaan oromo to English as a factor contributing for their low performance in mathematics. According to Noraini (2006), "concepts are learned by learners through experience with language used in discussion and teaching aid which facilitates conceptual development". Clearly, one of the major issues that students faced in learning mathematics are related to an inadequate grasp of the language of instruction that plays such an important role in the students' development of conceptual understanding (Hofstetter et al., 2003). To demonstrate understanding of mathematics, students must be able to explain the mathematical concepts using the correct mathematical terms (e.g. parable, denominator) and vocabulary (e.g. translation, obtuse). Hence, students who are learning mathematics with a language background other than the language of instruction such as English will face tremendous difficulty in comprehending the textbooks, teaching aids and discussions in an unfamiliar language. Also in Nordin (2005)'s

study on lower secondary student's perception regarding the teaching of mathematics in English, most students find that learning mathematics in English is difficult because they are not used to the English language to understand mathematical concepts. Besides that, many students' especially rural students have not yet mastered the basic and essential skill that is reading in English (Foo, 2007). Hence, during their learning of the mathematics concepts using real life problems, many of them experience a great difficulty in the comprehension of mathematical ideas and problems that are presented by the teacher as well as the text book in English.

### Conclusions

From the above study, the researcher makes the following conclusions:

- Learners mostly attribute their low performance in mathematics to their negative attitude to the subject, laziness, lack of effort and interest
- Learners believe that mathematics is abstract and naturally difficult subject
- Absenteeism by both learners and teachers from school adversely affects the acquisition of concepts in mathematics.
- Lack of instructional material and educational facilities affects their performance
- Lack of support from parents contribute to the students poor performance
- Engagement of students in different activities after school contributes to their low performance
- The study explains that lack of enough mathematics teachers at primary school level to build a solid Mathematical foundation in the students attributes to students low performance
- Evidence from the study also reveals that teachers used learning methods that could not participate the students
- Students in the study sites of oromiya region point out that the change of medium instruction affects their performance and hence contributes to low performance
- Students also attribute their low performance to lack of guidance and counseling
- Classroom environment were not always stimulating for learners to enjoy learning mathematics.
- Most of the teachers teaching mathematics were not competent to teach the subject effectively.

### Recommendations

Based on the findings of this study, the following recommendations are made:

- There is the need to improve the quality of mathematics teachers by giving short term and continues training to equip them with skills of teaching mathematics in schools as most of the teacher do not use active learning method.
- Teachers should include different methods of teaching such as of learner centered teaching in order to make mathematics teaching/learning more attractive for learners.

- Teachers should motivate the students
- Counseling and guidance should be given for the students so that students will be aware of the importance of education particularly mathematics, work hard in the subject and view mathematics like the rest of the subjects in the school curriculum.
- Parents should encourage and help their children by supplying them with appropriate teaching material further more parents should give time for discussion about the education of their children.
- More teachers should be hired and extra classes should be built to reduce the burden on the teachers.
- School environment should be convenient for the teaching learning process.
- Educational facilities should be improved; production of instructional materials should be increased.
- Students should be encouraged to attend the school
- Concerned body should pay attention for the students' difficulties with regard to the change of medium of instruction from Afan oromo to English and address the problem.

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