

Improving Low Achiever Students' Participation in Mathematics Classroom: The Case of Bule Hora University 1st year Mathematics Students

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Abstract

Students' active participation is unavoidable building block to promote learning. Therefore, active participation is realized and lively when every student contributes his/her role to the instructional process. The objective of this study is to identify factors responsible for low participation of low achiever 1st year mathematics students and to improve their participation. Purposive sampling technique was used to select sample participant. Secondary source, observation, interview, focus group discussions and questionnaires were employed to generate data. Descriptive survey research design was employed. The results show that most of students were participating from rarely to sometimes (80%) in mathematics class room. In addition, most of students' mathematics performance was satisfactory (50-60) on average in the preparatory school. Most of the students' family educational background is illiterate (73%) who have engaged in laborious activities that demand the help of their students after schooling rather than advising for students' academic success. Majority of students have negative attitude towards mathematics in that most of them agreed and strongly agreed to negative statements as well as disagreed and strongly disagreed for positive statements. Interviewed instructors also said that lower achiever students seem be hopeless in their academic carrier but they simply avail themselves in the classroom not for learning but for attendance. Generally, shyness, fear of friends' criticism, family educational background, fear to make a mistakes, lack of back ground on the course, negative attitude for mathematics which is a key for participation, misunderstanding on the importance of mathematics and the need of more refreshment are the main factors for low participation of lower achiever students. Create awareness, giving tutorial and employing variety of teaching methods were the action plans which were implemented properly in two consecutive months. Even though, practitioners' intervention didn't bring significant change in the first two weeks, students' participation had increased in the second two weeks of the first month. Then after, practitioners continued their intervention and observed that students' participation had improved to the greater extent for the last four consecutive weeks in the second month continuously. We believe our findings and intervention could have a profound implication on academic issues related to promoting genuine participation of students.

Keywords: low achiever Students, participation, action plan, implementation, evaluation

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1. Introduction

1.1. Background of the Study

John Elliott (1991) defines action research as Action research is the process through which teachers collaborate in evaluating their practice jointly; raise awareness of their personal theory; articulate a shared conception of values; try out new strategies to render the values expressed in their practice more consistent with educational values they espouse; record their work in a form which is readily available to and understandable by other teachers; and thus develop a shared theory of teaching by research practice.

One of the decisive factors for effective-teaching learning process is participation. Students' active participation is unavoidable building block to promote learning. Therefore, active participation is sensual and lively when every student contributes his/her role to the instructional process. So, learning must be offered through sharing ideas and experiences from the class room participants. It is through this method whereby we can create opportunities for students to think and learn. According to Maryellen (n.d) Participation is an extremely crucial element for learning. It is a proven fact that students learn better and retain more when they are active participants. Learning is an active process and should involve talking. The same author also added that motivating students to participate in classroom discussions is a subject unto itself. The words "excruciating," "agonizing," and "mentally draining" may come to mind. There are some students who seem to assume that as long as the assigned work is completed on time, test scores are good, and attendance is satisfactory, they shouldn't be forced to participate. It's not that they don't think participation improves the classroom experience, they just prefer that other students do the participating. As argued by Biggs (2003), the learning process depends on the level of student-student interaction and student-teacher interaction in a conducive learning environment. The formation of appropriate interactive groups and the effective use of materials with clear instructions are essential tools in the teaching-learning process.

Oakley et al., (2004) strongly believe that students should be involved in discussion that is strongly interactive. This enhances student cooperation for positive learning outcomes and confidence building. Instructors' input in the interaction process also influences the learning process in many important ways, particularly learners' attitudes towards the instructor, the peers and the subject matter. Johnson and Johnson (1985) said that clarity of instructions is instrumental in both the interaction process and the learning outcomes. Also issues with one another in the group and supporting each other's' ideas with reasoning enhances student learning and builds self-confidence. Kaufman and Felder (2000) found that in a cooperative setting, achievement improved and learners developed a more positive attitude towards the subject. At the same time, they found that the positive response is not universal; students who were reluctant to interact with others may be negatively affected. Therefore, caution is needed when interactive learning is being encouraged where active participation is the one.

The formation of groups is also an important task in the process of enhancing interaction. The instructors should be instrumental in the formation of groups based on appropriate strategy to enhance the interaction. For example, weaker students should be coupled with the stronger ones, to facilitate the learning and interaction. Failing to do this could result in adverse outcomes for the weaker groups, which could have long term adverse outcomes. Normally, the stronger students tend to seek other stronger ones leaving the weaker students to group with each other Oakley et al (2004). The same author mentioned, if stronger and weaker students are combined in the groups, the weaker ones are able to gain from the stronger students in tackling the assigned tasks. In this way, but indirectly, the weaker students are receiving peer tutoring. On the other hand, the stronger students gain confidence in the subject matter and are encouraged to interact, reinforcing the teaching and learning process. Another author also mentioned that Signs of problems with classroom participation can include low grades, coming to the class with incomplete homework, and low grades on classroom papers. If your child often does not know how to do homework, this could be a sign that he or she is not participating well in class. Teachers typically assign homework as a repetition of skills already taught in class. Teachers are the best judge of your child's level of class participation (www.parenting-ed.org).

Large-scale comparative international and national surveys continue to show poor performance of students in Mathematics. Given such consistently poor productivity, much research has sought to identify students in school and out-of-school experiences that influence achievement and related outcomes especially those that are alterable or partly alterable by educators and could be manipulated by policy makers (Silesh, 2001).). Observations and reports from examining bodies revealed that a high percentage of secondary school students continue to perform poorly in mathematics examinations. This poor performance continues to generate much concern among parents, teachers, students and other stakeholder in the education business (Ajayi kassim O. et al., 2011).

Today student centered method of teaching is getting more attention than other methods of teaching on the side of Students as well as educators. For the successful practice of active learning, participation is one of the key instruments besides with other encouragements and teaching styles. We know that a lot of researches with almost similar titles were done in different areas and schools over the world but the condition of learning environment and the causes of low students' participation are different in different areas. This shows that investigation of location specific nature of the problem and corresponding solutions is highly needed. Low students' participation in mathematics classroom in Bule Hora University is very common especially those who have low academic status. Therefore, the main focus of this action research is to investigate factors for low participation of lower achiever students in mathematics and to improve it through appropriate intervention.

1.2. Objective of the research

General objective:

The general objective of this action research is to make low achiever 1st year mathematics students active participant.

Specific objectives:

- To identify the factors affecting participation of low achiever students.
- To increase students' participation.

1.3. Significance of Research

This research may help:

- To know underlying factors for the persistence of students' low participation.
- To provide an input that can assist educational managers, instructors and students' family to play their part for the improvement of education quality.
- It would maximize efficiency of work performance among target students.

2. Methodology

2.1. Study area description and Population

The total numbers of students in mathematics department are 184 including from first year to third year. From

these students 138 are on learning (50 students in 1st year, 35 in 2nd year and 53 in 3rd year) and the other students are drop out and dismissed. From those there are 101 male students and 73 female students from all students including drop out and dismissed students.

Table 1. Mathematics students' academic status

	1 st year			2 nd year			3 rd year		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Distinction	14	1	15	4	6	10	15	2	17
Pass	19	14	33	10	14	24	23	12	35
Warning	0	2	2	0	1	1	1	0	1
Dismissal	0	2	2	0	2	2	0	0	0
Drop Out	4	0	4	0	17	17	11	10	21
Total	37	19	56	14	40	54	50	24	74

Source: Registrar record office of Bule Hora University, 2015

Also from the total number of 1st year students 35 have got average grade above 2.30 and 15 have got average grade below 2.30. For this research, the target population comprises 1st year mathematics students who have got average grade below 2.30 in Bule Hora University.

Table 2. 1st year mathematics students' status those who got average grade below 2.30

Sex	I.D number	Grade point	Academic status
M	Math/R/0002/14	2.14	Pass
M	Math/R/0003/14	1.83	Pass
M	Math/R/0004/14	1.98	Pass
M	Math/R/0005/14	2.17	Pass
F	Math/R/0006/14	1.78	Pass
F	Math/R/0011/14	2.22	Pass
F	Math/R/0013/14	2.07	Pass
F	math/R/0051/14	1.64	Warning
M	Math/R/0019/14	0.00	Dropout
F	Math/R/0026/14	1.98	Pass
M	Math/R/0030/14	1.94	Pass
M	Math/R/0032/14	0.00	Dropout
F	Math/R/0035/14	1.93	Pass
F	Math/R/0038/14	1.49	Dismissal
F	Math/R/0039/14	2.13	Pass
F	Math/R/0040/14	1.74	Warning
F	math/R/0052/14	2.05	Pass
M	Math/R/0041/14	0.00	Dropout
M	Math/R/0042/14	2.25	Pass
F	Math/R/0223/13	0.25	Dismissal
M	Math /R/ 0218/13	0.00	Dropout

Source: Registrar record office of Bule Hora University, 2015

2.2, Sample and sampling techniques

Sample of the population were selected by purposive sampling technique. Accordingly, 15 students were selected by considering average grade (who got less than 2.30). In addition, 6 mathematics teachers were selected purposively to get additional information about the sample students.

2.3. Design of the Study

The main objective of the study is to improve low achiever students' participation in mathematics class room. To achieve this objective, a descriptive survey (percentage, charts and tables) research design was employed. A combination of qualitative and quantitative methods was employed. Because of that mixed approach helps to crosscheck the findings obtained by each of them (Dawson, 2007).

2.4. Data source and Gathering Tools

Data for this study was collected from both primary and secondary sources. Secondary source of information was collected from both published and unpublished materials. Primary data was collected using the following techniques.

- i. **Observation:**-This method was employed to observe class room environment such as class size, sitting arrangement, teaching materials and teaching practices.
- ii. **Interview:**-Interview was conducted with teachers and Students. The results of interview were employed to substantiate the results gathered through questionnaire and document analysis.
- iii. **Focus group discussions (FGD):**-To cross check the idea forwarded by different participants, FGD was carried out that comprises 7 students.
- iv. **Questionnaires:**-The most important tool of data gathering in this research is structured questionnaires having both closed and open ended items. There are also likert type scale questionnaires in which the scale ranges from strongly agree to strongly disagree.

2.5. Method of data Analysis

The data which was collected from the survey was analyzed using both quantitative and qualitative methods. The completed questionnaires were entered into SPSS software (version 20) and summarized. Then, brief analysis and interpretations was made.

2.6. Ethical consideration.

Before the distribution of the questionnaire, the participants were assured that the data have been used for research purpose, and that participation was voluntary. Respondents were encouraged by interviewer for some explanation when their responses do not match with the questionnaires.

3. Data Analysis and interpretation

This chapter presents the analysis and interpretation of the study.

3.1 Low Achiever Students' Response on their Classroom Participation

Participation is an extremely crucial element for learning. It is a proven fact that students learn better and retain more when they are active participants. Opposed to this fact, Most of respondents were participating from rarely to sometimes (80%) in mathematics class room which implies that there is low participation in mathematics class room (see fig1 below). Even those replied to participate always (7%) and often (13%) was in contrary to the data obtained from classroom observation and interviewed instructors

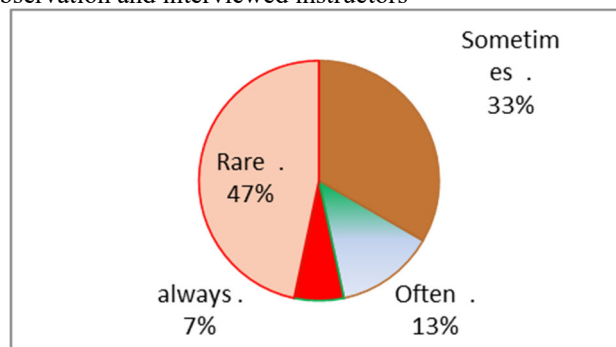


Figure1. Percentage of students' participation

3.2. Students' living place during preparatory education

As it is indicated in table 3 below, from the respondents most of the students learnt their preparatory education by living in urban rented house. Also, some of the respondents lived in Urban with their family. Therefore, the students could need guidance and counseling as well as material incentives to improve their participation.

Table 3. Students' living place during preparatory education

No	Students living place during preparatory education	Number of respondents
1	Urban rented house	9
2	Urban with my family	6
3	Rural with my family	0

3.3. Students' preparatory mathematics performance.

We can understand that most of respondents' mathematics performance was satisfactory (50-60) on average in the preparatory school (see fig.2). This implies that they have not good mathematics back ground which should be

built through appropriate intervention that allows active involvement of students in their learning.

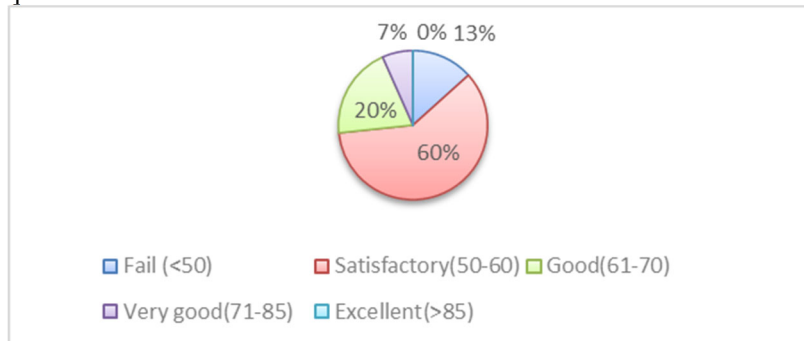


Figure 2 Students' preparatory mathematics performance.

3.4. Family educational backgrounds

As depicted from Figure 3 at the right, most of the students' family educational background is illiterate (73%). It is clear that most of illiterate people in Ethiopia are farmers who have engaged in laborious activities that demand the help of their students after schooling rather than providing valuable advice for students' academic success.

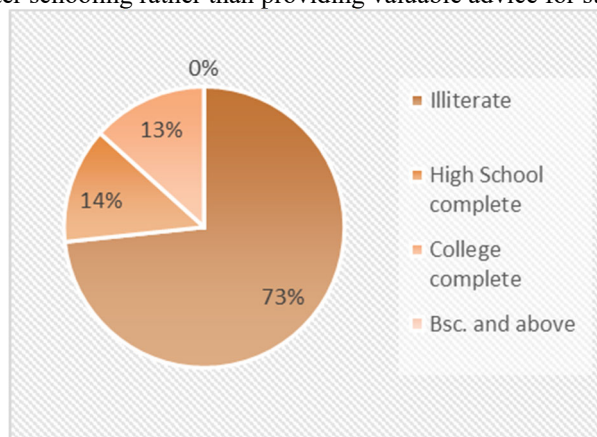


Figure.3. Family educational backgrounds

3.5. Students' Attitude about Mathematics

Students' attitude towards mathematics subject can dictate how well they do in the classroom, as well as how motivated the students are when they enters the classroom. According to the figure below, most of respondents have negative attitude towards mathematics in that most of them agreed and strongly agreed to negative statements as well as disagreed and strongly disagreed for positive statements. For example, majority of the students agreed to the negative statement that says "I feel unconfident in doing mathematics". Similarly, majority of the respondents strongly disagreed to positive statement which says "I'm interested with working in the field of mathematics in the future". In addition, students' idea during focus group discussion clearly assured that they have negative attitude toward mathematics.

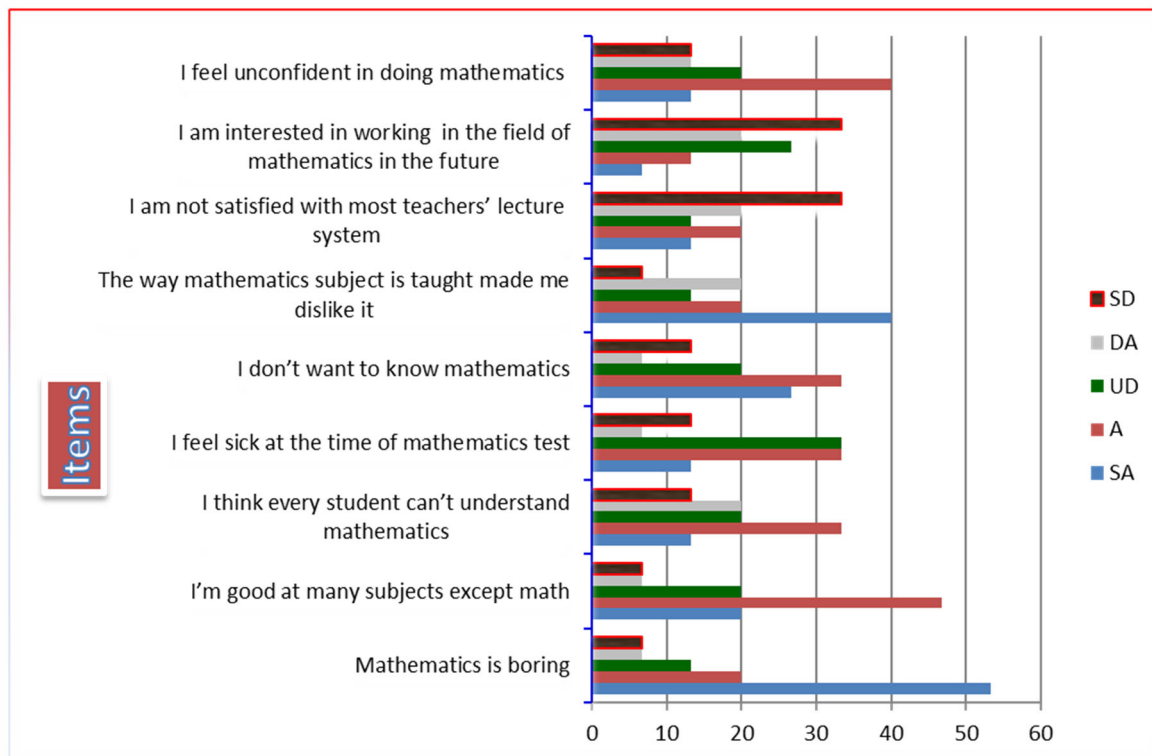


Figure 4 Percentage score of respondents' attitude about mathematics.
 Key. SD-strongly disagree, DA- disagree, UD-undecided, A-agree, and SA- strongly agree.

3.6. Teachers' Response on low achiever Students' Participation in a Classroom

Some teachers were asked about the participation of the low achiever students in the class room. Accordingly, all of them said that lower achiever students seem to be hopeless in their academic carrier but they simply avail themselves in the classroom not for learning but for attendance. Teachers also added that those lower achiever students have disliked answering and asking questions as well as they prefer to keep silent in the group work and in different activities in the class room.

Generally the data obtained from open-ended questions, interview, observation and participant of focus group discussion showed that the following are the factors responsible for low participation of low achiever students.

- ☞ Shyness
- ☞ Fear of friends' criticism
- ☞ Family educational background (less attitude to education)
- ☞ Fear to make a mistakes
- ☞ Lack of back ground on the course
- ☞ Negative attitude for mathematics which is a key for participation.
- ☞ Misunderstanding on the importance of mathematics
- ☞ The need for more refreshment.

4.Action Plan (Strategies) and Implementation

4. 1. Action plan

Based on this investigation most of the problems are psychological like fear to participate, lack of confidence, and negative attitude for mathematics which are the key for participation. Thus, to solve these problems the following strategic actions were planned;

- ✚ Giving training (create awareness) about advantages of active participation)
- ✚ Giving tutorial
- ✚ Employ variety of teaching methods

In conclusion we hope that, if these strategies are properly implemented, the lack of self-confidence, negative attitude and fear in classroom participation and related problems could be solved.

4.2. Implementation of action plan

4.2.1. Giving training (Create awareness) about advantages of active participation

First of all we discussed with the selected low achiever students about “how to improve confidence during classroom participation?” Accordingly the following advises were provided for the students.

- ✓ Students were advised that mathematics is *interesting and valuable in that it has so many applications in different fields.*
- ✓ *We informed students about different ways of participating in and outside the classroom such as ask and reply to question; give comments; state their disagreement with the teacher (if any) and doing class and homework.*
- ✓ Advice was given for students about contribution of active participation to enhance their learning as well as making mistakes are one way of learning.
- ✓ Students were informed the frequency of their daily participation could be recorded and considered at their final result.

4.2.2. Giving tutorial

We found that lack of back ground knowledge on the course is one of the contributing factor for students’ low participation. Therefore students were given tutorial once in a week for two months to improve their subject matter knowledge and thereby their participation.

4.2.3. Use variety of teaching methods

In the class room using variety of teaching methods is helpful to increase students’ participation. So, the following methods were used during the lesson.

- Started by asking students what they know to build confidence, to solve problems on the board or on paper individually and following up students.
- Started teaching of familiar title and gradually moved to a new or difficult topic by giving practical examples.
- Adequate lecture note was given for students to facilitate their preparation before and after the class.
- Media was used beyond ‘chalk and board,’ like charts, models, projectors
- Group discussion and presentation of the group work was employed. In this case, all first year low achiever students (15 students) were given the chance to present the given lesson to the whole class (including medium and high achievers).
- Micro teaching was also employed by providing presentation topics for each student.
- Feedback was given to students on their performance and how to improve their weak sides.
- Students were given exercise at the end of a class to solve and present in the next class.

4.3. Action Evaluation

The intervention was conducted in two consecutive Months. Strategies mentioned above were implemented simultaneously. Observation was the main techniques to evaluate whether students’ participation has been showing positive change or not. In addition, grading students’ participation was made. In the case of the later technique, the teacher made lists of students and then put signs as per the students were participating (giving opinions, answering questions, asking questions, contributing ideas to group discussion, reflecting the group discussion, presenting the group discussion and arguing on issues). Students’ confidence and their knowledge of the subject matter were also assessed through observation while they were presenting their own topic as part of microteaching.

In the first two weeks, practitioners’ intervention didn’t bring significant change of participation. Therefore, we continued our interventions based on the stated action plan more rigorously. In the second two weeks, however, it was observed that students’ participation had increased than the first two weeks. Then after, we gave further advice and encouragement especially for those who do not show significant change. Compared to the second two weeks, practitioners observed that students’ participation had improved to the greater extent for the last four consecutive weeks continuously. Students were also interested with participatory teaching -learning process. Even some quit students were participating to answer questions that need less detailed responses. Similarly number of appropriate answers and reasonable questions has increased than before intervention.

Generally, the problems which were identified initially such as lack of confidence, shyness, fear of friends’ criticism, fear to make a mistakes, negative attitude for mathematics and misunderstanding on the importance of mathematics were minimized greatly and target students participation was realized as it was witnessed through direct class room observation and positive change in their achievement as we saw from their grade report. In addition, students’ attention for classroom participation was improved rather than the need for more refreshment which is contrary to their behavior before our intervention.

Conclusion

Based on this investigation, most of the factors responsible for lower participation of the lower achiever students

are lack of confidence, fear of friends' criticism, family educational background (less attitude to education), fear to make a mistakes, lack of **back ground on the course**, negative attitude for mathematics, fear to participates (shyness), misunderstanding on the importance of mathematics and the need for more refreshment. To improve students' participation, we developed four intervention plans and implemented them properly for two consecutive months. Even though practitioners' intervention didn't bring remarkable change in the first half of the first month, students' participation was continuously improved interestingly starting from the second half of the first month up to the end of the second month. Therefore such kind of identification of factors which negatively affecting students' academic success and avoiding them through right intervention is strongly recommended for every academicians in any academic institutions including lower grade levels.

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