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Improving Quality of Teaching Mathematics in Higher Secondary level: An Approach to Create Creative Sense in Mathematics

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The importance of Pure Mathematics is increasing day by day with the extension of Applied Mathematics in various sectors of innovation and technology. The governing equation of Applied Mathematics solely depends on the theory of Pure Mathematics. Changes and transformation of governing equation creates new effects on the application of Applied Mathematics and new modified results are found. Therefore, creative sense and its analysis of basic Mathematics play a vital role in Applied Mathematics. In this context, Mathematics should be creative and explainable for being interesting. Most of the young researchers teach basic Pure Mathematics theory in Higher Secondary level, whose application and extension can be shown in the next level, i.e. undergraduate level. For developing creative sense in Pure Mathematics among teenagers, it is necessary to explain and analyze by showing them the basic mechanism behind the theory. We see that many of the young teenagers feel interest in Mathematics in Higher Secondary level, but they lose it after that. In this research, we try to identify the limitations of teaching Mathematics in this level and propose an effective approach to improve the techniques of teaching Mathematics for developing creative sense in the young learners in Higher Secondary level. We also present the way to encourage the young learners about the basic and Pure Mathematics and present interesting facts of Mathematics to improve their sense of creative thinking as well as quality of teaching Mathematics.

Keywords: *Pure Mathematics, higher secondary level, creative sense.*

Introduction

Quality education depends on planned curriculum, qualified teachers and favorable environment. To be a qualified teacher one needs

(i) accurate subject knowledge

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(ii) knowledge and efficiency in education science
(iii) mentality of teaching .

Among main three levels of education system of Bangladesh, Higher secondary level is very much important because it can produce human resource making good researcher which turn into economic development of the country. But secondary education is the weakest link in the education chain of Bangladesh whose effect followed in Higher Secondary level especially in Mathematics subject. In order to overcome this problem more practical and use a group of well trained teachers are badly needed. There are 14 Government and 85 govt. Teachers training colleges there are many problems in Bangladesh. But they are in many these colleges. Many of them have rented buildings for their academic activities. Trained teachers, books in library, science materials, transparency and accountability, management are not sufficient. For these qualities of training in teachers training colleges has decreased. But without trained teachers we can not ensure quality education in secondary level of education in Bangladesh. Specially the subject like Mathematics it is solely needed for creating creative sense among teenagers.

Objective of the Study

- To Know the trend of science student in mathematics i.e., in pure mathematics or, applied mathematics.
- To know what the student want to know from mathematics for their future plan.
- How to increase interest in mathematics in Higher Secondary level in Bangladesh.
- To identify the weakness of creative mathematics for Higher Secondary Level in Bangladesh.
- To encourage students by presenting realistic picture of necessity of mathematics education creating creative sense.
- To give recommendations for upgrading the existing creative method.

Scope of the Study

The importance of Creative mathematics is sole important for the developing country like Bangladesh. With the extension of science technology, country requires the creative vision to introduce new technology and innovation. However, the numbers of science students in the country are decreasing day by day. One of main fact behind this, students do not realize how they would apply their science knowledge in the up growing business world because of their darkness of creative sense. Only the creative mind and creative vision can change their behavior about the science. The best time for creating this sense is the higher secondary level. It is the root time for mind setting of the young students who are going the vast knowledge of university where plenty of opportunities are waiting for this young mind setting student. Most of the student of our country has fare about mathematics so they deny taking mathematics in higher secondary level. Consequent of these, they could not able to take course like Mathematics, Physics, Chemistry or others Mathematics related subject in their graduate level. Therefore, they try to change their background from science to business or other. In this situation it is urgently needed to create creative sense to the mind of the students by making mathematics more attractive. Only the creative method can plays an important role in this case. If the student can realize pure mathematics by analyzing total fact, calculation and explanation; able to apply that knowledge in the real field then they will get interest on the subject. With this, they have to inform broadly about the importance and scope of using mathematics in the real world. In the fact, making pure mathematics more explainable and interesting and using it in field of science as applied mathematics could be effective.

Research Method

In this section, we describe the framework for analysis, including the specific features of data collection and question posed. We gathered the primary data from group and individual questionnaire with the 2000 students of Notre Dame College, Dhaka who are coming from different districts of Bangladesh. These collections of students have trends of studying in science background in their graduate level. Also the fact these students has different family background from poor to rich. Many of them have strong commitment for becoming a good researcher in their future plan. We also try to gathers some science teacher's opinion in our research. In our research the present trends of science students on mathematics, their opinion and what they wants from our new creative method . Finally, our recommendation and teachers opinion about the mathematics syllabus in Higher Secondary level also include on the paper.

Limitations of the Study

Due to scope, reputed organizational limitation, we were not able to make the study much informative, resourceful, elaborate and analytical; In future the research will more informative, resourceful, elaborate and analytic. We are trying to gather more students and institutions from the whole Bangladesh including urban and villages. Besides these, the research presents the result that is very similar to the available research in this field. The main limitations:

1. The research only includes Higher Secondary Students.
2. Very few students and teachers are taken to account.
3. Guardian and social views are ignored in some cases.
4. Research should include more teachers and curriculum specialist.

Education in Bangladesh

Bangladesh is a populous low-income county with a relatively young population and low literacy rates. Recent estimates for the population ages over 11 years put female literacy rates st 35.6 percent as opposed to 47.6 percent for males (Amaed et al, 2005) . The education system is vast comprising some 150,00 institutin,760,000 teachers and million students attending all levels up to university (Ahmaed et al, 2007) A high level of administrative centralization of women as teacher further characterize education in Bangladesh. Inequality related to socio -economic status and rural- urban divide persists, despite system- wide enhancements since 1990. At the primary level, 18 million students are engaged in four broad categories of school.

Two government programmers were instrumental in advancing EFA objectives the Food for education programmer (FFE) launched in 1993 and its successor, the primary Education stipend programmers, which came into effect in 2002. Both programmers were found to increase enrolment, attendance and grade progression of primary school aged children from poor landless families. They did succeed in brining children into school (Ahmed et al, 2005). The net primary enrolment rate3 increased from 82.0 percent in 1996 to 89.7 percent in 2004 (Ahmaed et al, 2009) (Over these years the rate for boys increased from 83.0 to 84.0 percent, while that for girls increased from 81.0 to 96.0 percent).

Despite these games in number students, serious deficiencies in terms of school quality learning outcomes and completion remain. Nearly half (48percent) of those who enter primary school dropout and fail to complete the full five year cycle (Ahmaed et al, 2006). The highest allocations for development budget have always been for education sector. But one of the challenges that faces

Bangladesh education system is persistently low enrollment and school attainment among girls .interrelated economic, social and cultural factors constrain schooling opportunities for girls, particularly at the secondary level. Secondary Education system in Bangladesh consists of 4 level, Primary Education class(I-V), Secondary Education Class(VI-X), Higher Secondary Education (class XI-XII), and Higher Education. After Finishing Grade X, students have to sit for a public examination and earn Secondary School Certificate (SSC) degree and after finishing grade XII, they earn Higher Secondary certificate (HSC) degree.

Challenges of teaching mathematics in Higher Secondary level

Teaching is a challenging profession at any level of education. Setting mind and making classroom more effective and enjoyable to student is much more complicated task. On this way of learning higher Secondary level is effective and directive time. After completing this level students enter the world of freedom and creation. So setting their mind towards science and technology teachers can play a vital rule. In this trend of study requires the study of mathematics. Most of science student take mathematics and try to secure good marks without getting deep knowledge in mathematics. As a result, student cannot get interest on it. For this reason text book should be more explainable and creative such that students have to know the content deeply by analyzing theorem and calculation. Other way, teachers will explain the theory deeply by making the class interesting. In this case proper training can be effective, also multimedia based classroom can plays important role, though most of the college of our country do not have this type facility. Survey shows 80% of the science students like to know the explanation and theory but teacher cannot do for time limitation and lack-age of good reference book. Because of page limitation, most the text writer can not do anything for the problem. Therefore, students do not feel interest in the subject. Though the creative system is now effective in higher secondary level, most of texts that are accredited by NCTB are not suitable for creative system most teachers believe. Most of the text composed is about to 300 pages including 10 chapters for page limitation. In this limited page books writers can not explain the real fact. In addition, there exists a problem of qualified teacher, most of meritorious students of our country do not want to be teacher, and finding a good mathematics teacher is very tuff. As results, mathematics teaching is becoming a challenge for the teacher.

Interview Design

The data collected by Questionnaire categorizing in three groups Urban, village students and teachers. Teachers are from different institution of Dhaka city and out side of Dhaka city.

Table-1

Questionnaire Design for Different Categories

Terms	Urban Students	Village Students	Teaches
Text books	Not Good	Not good	Not good
Should Text book more explainable and pure mathematics based ?	Yes (70%) No (20%) No Comments (10%)	Yes (55%) No (20%) No Comments (25 %)	Yes (100%)
Question type : Creative /Subjective	Creative (30%) Subjective (70%)	Creative (15%) Subjective (85%)	Creative (40%) Subjective (60%)
Which one you like most ? Pure Mathematics/	Pure Mathematics (44%) Applied Mathematics (56%)	Pure Mathematics (7%) Applied Mathematics (93 %)	Pure Mathematics (55%) Applied

Applied Mathematics			Mathematics (45%)

Data analysis

Problems of mathematics teaching in Higher Secondary level are following:-

(1) Text books and Reference book:-

a) The text books are not suitable for creative system and lack of reference books.
b) Most of the books are questioned based not theory and analysis based.
c) The book should be pure mathematics related link to the applied field.

(2) Qualified teacher and adequate training:-

a) In Higher Secondary level there is a problem of qualified mathematics teachers.
b) With the qualified teacher it requires adequate training related to creative system to making creative sense among students.
c) Proper planning and sufficient course material are also needed.

(3) Unawareness:-

a) Most of the guardian wants securing good marks at any cost and impose condition to their Children, as a result students try only for securing marks not knowledge.
b) Many students want to get a better job after completing their course so they have the tendency to give science.
c) Government can play an important role by taking step to create sense about mathematics teaching and its scope by social media.

Research Findings

a) Text books are not suitable for creative method.
b) More attention should be given to the students for increasing creative sense in mathematics.
c) Pure Mathematics based application would be better for creating creative sense among the higher secondary students.
d) Still students prefer to give examination by the subjective questions.
e) Lacking of qualified teachers in Higher Secondary level.
f) Most of the teachers are not capable to handle the question by creative method.
g) Teachers need more training and sufficient course material to handle the creative system.

Recommendations

a) Text book should be pure mathematics based explainable and suitable for creative system.
b) Qualified and trained teacher should be employed in the Higher Secondary level.
c) Govt. should take steps to train up all teachers step by step for the creative system and making creative sense among Students.
d) Guardians and the teachers of the community should motivate the students about importance of mathematics.
e) Govt. and concern authority should ensure to provide good quality text books by taking the opinion from college who are working with related field.

Conclusion

Though Creative system is introduced in the Higher Secondary level, most of the students prefer subjective questions exams due to not knowing the importance of the system. Moreover, due to having lack of proper knowledge of the Creative system, most teachers cannot afford to give detail information

about creative sense among the students. As a result, students do not get interested in the subject. To draw students' attention, a teacher should know the entire system and design course materials by explaining theory and analysis making a link between real worlds so that students feel interest in the subject.

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