

Comparison between the Mathematics Syllabuses of 1975 and 1995 in Bangladesh

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Abstract

Education plays a vital role for sustainable economic development in Bangladesh. Primary education lays the foundation for it. Development of primary education poses a daunting challenge because of inaccessibility and resource constraint. Despite such challenges Bangladesh has achieved remarkable progress in Primary Education. Bangladesh runs one of the biggest primary education administrations in the world. Acknowledging primary education as a national responsibility of the Government and recognizing the fundamental rights of the people to education ushered a new era in Bangladesh. In 1972, the Kudrat-e-Khuda Education Commission was formed to recommend objectives, strategies and action plans to create a modern educational system. The characteristics of 1975 and 1995 syllabus are consisted of: i) presenting mathematics as a co-related and complete subject, ii) subjecting and meeting the social demands, iii) preparing for higher studies, iv) recognizing progressiveness of mathematics curriculum and v) new techniques in teaching mathematics. In 1975, the modern idea of number set, binary numbers, statistics and geometry were introduced. In syllabus of 1995 the idea was expanded and improved including learning outcome. Both theoretical and practical ideas have been combined side by side. The aim of formulating an appropriate syllabus was not only to include the up-to-date and modern concepts in modern and contemporary mathematics, but also for the reflection of national and international values and implementation of those. Considering the above facts and in order to bring our mathematics teaching to the level of international standard, the syllabus for class IX and class X, class XI and class XII were chosen as the objective and selection of subject matters. The educational value of mathematics is known to all not only because of meeting the demand of day to day professional life or to excel in different branches of science but also to develop the human qualities. The irrefutable logic, the firm expressions, the ingenuity of problem solving are some of the characteristics of mathematics help a learner to aspire for these qualities and ultimately helps learner to achieve these qualities .

Introduction

The modernization process for mathematics curriculum of stagnant British period was started during the Pakistani period in 1959 by forming a national Education programme. Although the mathematicians of bygone times did try to modernize the mathematics curriculum, yet no change was observed in the syllabus and produced of mathematics education due to their limited knowledge and inadequate aptitude.

After liberation of Bangladesh from the Pakistanis, Bangladesh education commission was formed headed

by scientist and educationist Dr. Kutrat-e-Khuda in 1971. The commission submitted its report on 30th May, 1974. The implementation of this was started in 1975 through forming the National curriculum and syllabus. This committee had presented for the first time to the nation a modernized curriculum and syllabus. The reason for defining this report as modern is in the sense that a considerable new subject matter curriculum and teaching method was introduced for the first time. But when this was revised in 1995 it is found that it was unchanged from that of the 1975 one. If both the curriculum are placed side by side then this fact can easily be established.

In this paper, the mathematics objectives and aims of 1975 syllabus of class IX and X, and of the 1995 syllabus for the same class will be discussed.

1. 1975 curriculum for class IX and class X

There is an increased and continuous pressure on the limited land resources of the earth. Man is endeavoring to overcome that pressure by his own endless labor and enhancing the fruit of science and technology. As a result, new horizons of science are being unfolded continuously and mathematics is being utilized in every aspect of life due to its inherent merit. Mathematics is the language of science. So the development and application of mathematics is essential.

The way mathematics syllabus was prepared and the procedure it was followed until now could not and can not quench the thirst of modern mathematics and to any extent result in inadequate contribution to the development of science and technologies. Keeping this in mind, efforts have been taken to coordinate the old and new syllabus as such as possible for the proposed curriculum syllabus.

The guidelines which were to be followed during writing the textbooks of these levels are given below:

- To develop the ideas of theory of number and arithmetic and algebra on the basis of variables.
- To formulate the idea of determining the difference between two variable and function.
- To realize the beauty of mathematical proves through mathematics logic.
- To co-relate geometry with other mathematical subject and study accordingly.
- To get an idea of statistics to meet the demands of modern times.

Although different subject matters of the syllabus are written in separate section for the benefit of better presentation, one can cross over to another section with ease. For example, ratio, proportion in arithmetic can be set as examples and problems from algebra and geometry. The discussion of fraction in algebra can be coordinated with the idea of fraction in arithmetic and there will be no problem regarding this. The syllabus has been formulated with the four principles of teaching mathematics. These are i) generalization, ii) functionality, iii) problem solving and iv) the use of mathematical logic. It is to be expected that these will be reflected in the syllables.

- To get an overall idea of numbers and to acquire satisfactory aptitudes by using number.
- To get insight of the complex problems in arithmetic and to enable generalizations of the arithmetical idea through the algebra.
- To able to measure the statistical central tendency and variability and to use them appropriately.
- The four main subjects of algebra in secondary levels, i) generalization by formula, ii) to solve problems with the help of equation, iii) to get a clear idea about the differences of two variables through graph and iv) also them to solve everyday problem through mathematical calculation.

- To able to solve geometrical theorem by applying the mathematical logic and to learn about the immense potentiality of mathematical solution of a problem.
- To solve the problem of construction with the help for proposition.
- To realize about the integrated nature of mathematics.

On the basis of these objectives the subject are mentioned below:

Arithmetic

The students will be independently discussing the arithmetic by use of algebra and geometry in the light of students' previous knowledge.

Review of the idea of numbers

Number set, integral number, positive and negative integral number, rational number, irrational number, the extent of decimal of rational and irrational number and their characteristics, real numbers and binary number activities, problems associated with G.C.D. and L.C.M. determination of divisibility by prime number up to 11 number twin prime, composite number and simplification of the other number by using primary four rules.

Introduction of Higher mathematics

It does not need to emphasize the importance of higher mathematics learning in this age of science. Mathematics is established with its own importance and characteristics. Although the syllabus for higher mathematics as optional subject was chosen for those who want to familiarize with modern mathematics and for those students who are exceptionally brilliant and get immense pleasure, yet it could be chosen even by the general students. As such some new subject matters have been incorporated in current syllabus. For example, function, logarithm etc can be mentioned which are the stepping stone for learning higher mathematics. Needless to say, this will make the learning of mathematics easier and pleasant. The success of the syllabus will depend simultaneously on both teacher and students' curiosity and efforts. It is hoped that they will undergo a little more labour for the sake of themselves and the nation as well.

Objectives

- To get the idea of set this is a widely used and strong weapon of modern mathematics.
- To get more idea of the rules of indices and acquire the aptitude for exercising logarithm by applying them for any practical problems.
- To acquire aptitudes for multiple uses of polynomials.
- To set a primary conception of function as a coordinated factor.
- To solve the problems related to progression and surd.
- To grasp the idea of proposition and construction of traditional geometry so as to solve those in simplified manner.
- To create awareness to solve the everyday life problems by using trigonometry.
- To determine the value of trigonometrical ratio in simplified manner.
- To orient about the use of trigonometry in different aspects of science

2. The syllabus of 1995 for class IX and class X

Class IX and class X are the primary stage of secondary level education. After completing this stage, the students are either engaged in different profession/vocation or continue learning for higher secondary education. Although higher secondary is the stepping stone to higher education, yet some of the students enter professional life after completing this. The role of mathematics is to prepare the students for both the avenues. Every branch of science and part of the modern trade and business are dependent on mathematics. This dependence is increasing day by day because of the fast expanding computer technology. Naturally, the teaching of mathematics at this level needs to be subject to new ideas and application. They has already been done in many developed and under developed countries The progress, which was achieved in the last few decades by mathematics teaching, has made it easier to bring about this radical change.

The educational value of mathematics is known to all not only because of meeting the demand of day-to-day professional life or to excel in different branches of science but also to develop the human qualities. Characteristics of mathematics help a learner to aspire for such qualities as the irrefutable logic, the firm expressions, and the ingenuity of problem solving.

Considering the above facts and in order to bring our mathematics teaching to the level of international standard, the syllabus for class IX and class X were chosen here.

Objectives

- To acquire the mathematical knowledge with satisfaction confidence and pleasure and to acquire the skill.
- To realize the essences and inherent beauty of mathematics.
- To know about mathematical logic and to acquire the skill to apply them.
- To get an idea about almost objectives of modern mathematics.
- To acquire the skill for practical application of mathematics.
- To acquire the skill of using the correct producer for problem solving new subject.
- To enhance the skill of applying the correct procedure for problem solving.
- To understand the relationship between mathematics and other subjects and when necessary, facilitating the process of practical application of mathematics.
- To acquire the ability to turn the particular truth into generalization.
- To reach to an objective conclusion by applying mathematical logic.

3. The characteristic of 1975 and 1995 syllabus are given below

By comparing these two curriculums, the following points are known.

a) Mathematics as a co-related and complete subject

If we give it a little thought, it can be understood that mathematics is abstract and generalized in nature. For example, the terms such as number, point, line, and plane can only be termed as an idea. These can be used also in our daily life and basically all aspects of life. Although we classify the subject matter of mathematics into arithmetic, algebra, geometry, and trigonometry, yet mathematics is an interrelated subject. For example, algebra is the generalized form of arithmetic and trigonometry is that of geometry. Some arithmetic numbers like 1, 2 and 3 can be termed as generalized numbers like X, Y and Z. As a result, our limited horizon of thinking can be extended and we can solve any problems of more complex quality to the most complex ones.

b) Subject and imparting of social demand

The syllabus during the pre-1975 era was in fact the repetition of the syllabus during the British period. Between these periods, radical change has been made of the mathematics curriculum throughout the world. School Mathematics Project (SMP) was formed in Britain, and School Mathematics Study Group (SMSG) in the USA respectively, and textbooks were written in a new perspective. This wave of awareness was initiated in the neighboring region by National Council of Education and Research Center (N.C.E.R.T), India. In Bangladesh, it was started in 1975 at a much later time and this trend of change in curriculum was brought about fully in 1995. The new subject matters, which were incorporated in 1975, were the number system including binary number, different based number, set, function, statistics, inequality, mathematical logic, geometrical vector, and transformation and its uses. As a result, the pleasure of learning mathematics has been increased in one hand and also given a sound foundation for mathematics learning on the other. For example, the concept of set become more meaningful when we see different sets in our daily life such as tea sets, sofa sets, dinner sets, the class VII book sets etc. At the same time, the area of mathematics learning has been extended. For example, they are countable number set N , integral whole number set W , rational number set Q , real number set R etc. In Geometry, they are point set, line set, plane set, angle set etc.

There is more of an inequality than equality in our life. Learning linear programming is easier when concept of inequality is applied. The inclusion of inequality has made learning of mathematics easier. We have to apply statistics while making of a decision. Statistic is widely used nowadays in every aspects of our life. Decision making and hypothesizing planning cannot be thought without the use of statistics. Because of this, statistics has been included in the syllabus.

There is a scope for solving all kinds of realistic and life-likes problems by including mathematics in every aspect of our life.

c) The preparation for higher studies

The above mentioned subjects are very important to learn mathematics. These are also called the mathematical foundation. If we do not have any idea of the subjects then it will not only put us into difficulties in our life but also make it difficult to achieve success though knowledge of higher mathematics. Mathematics is not only a subject but also should be treated as an instrument to learn other subjects. It was believed before that mathematics teaching is essential for learning science but now mathematics is being widely used for teaching other humanistic subjects. The teaching of other subjects like economics, statistic, computer, social science, and language teaching are also much dependent on sound knowledge of mathematics. In short, the role of mathematics in continuing higher studies can never be overemphasized. Mathematics turned as an international language.

d) The recognition of progressiveness of mathematics curriculum

The mathematics curriculum was inert and devoid of progressiveness before 1975. No new subject was included in the mathematics curriculum for a long time. The first step to modernize mathematics curriculum was taken only in 1975 mathematics curriculum. It is usually observed that an effort would be made on a day, but it would not be continued due to lack of proper attention and supervision. Luckily, this did not happen in case of mathematics curriculum. The effort that was taken in 1975 was given a complete and continuous touch in 1995.

e) New technique in teaching mathematics

Besides including some new subject in mathematics teaching, it has also been suggested for teacher guide and the importance of teacher training. Students were also advised for individual participation, and collective

assignment and participation in all other practical works including mathematics project.

In the meantime, Bangladesh Open University was established and different mathematics books have been published with modular or self-teaching method. Emphasis has been put on self-teaching on personal basis in order to quench of thirst of learning on the part of the students. This method has been introduced in this country and recognized. The present curriculum not only inspires the individual efforts for self-teaching but also induces the teachers to invent new methods for teaching.

For example, there are about 500 schools in Bangladesh where the programs of distance teaching are conducted. The teachers in these schools are rendering tutorial service to the students besides teaching in the established method. It is needless to say that the tutorial method is different from the established method. The students have to be helped in the method on individual basis and all personal efforts of the students are encouraged and need to be monitored. The distance education is getting popular in Bangladesh day by day and this method is reaching more students gradually.

4. The review of mathematics syllabus on class basis

The question arises what is necessary for reviewing the syllabus. After reviewing them, we shall be able to learn whether the objective of mathematics curriculum has been truly reflected in each class. And also whether it is acceptable to the students or not. The elaboration of the subjects is co-related in horizontal and vertical respect. And also the difficult parts need to be reviewed. Besides this, there will be an opportunity to discuss and analyze the following things.

- Whether up to date modern knowledge, skill, culture, and awareness are included in the subject matter.
- Whether it is conducive to be a good citizen or to create social responsibility or satisfactory to oneself.
- Whether there is effective continuity between the teaching method and the previous knowledge of students and teachers.
- How far it will make the students be aware of essence of humanity and life itself and to what extent the knowledge is imparted.
- How effective the knowledge is in relation to the class.
- Whether it helps the students to engage themselves in social development.

Do they help students to be active in contemporary economic and social activities or not. In 1975 just after the liberation there was an effort to construct time-demanding syllabus and creating national and international values as well. As a result the modern idea of number set, binary number, statistics and geometry were introduced. In syllabus 1995 the idea was expanded and improved including learning outcome. Both theoretical and practical ideas have been combined side by side.

5. The salient and important features of 1975 & 1995 curriculum 1975 curriculum and syllabus

The main objective of 1975 syllabus was centralized in the spirit of independence of Bangladesh in 1971. The aim of formatting an appropriate syllabus was not only to include the up-to date and modern concepts of mathematics but also for reflection of national and international values and implementation of these values. The inclusion of modern concepts of number sets, binary number, statistics and modern concepts of geometry was the reflection of implement this syllabus and curriculum without conducting an effective survey on the previous

knowledge of both teachers and learners at the field level. As a result, this syllabus and curriculum were not able to be accepted by the teachers, learners and the guardians as a whole.

The teachers could not group the concept of new subjects and hence they could not teach these new subjects written in the textbooks on mathematics. The task of making appropriate and acceptable correction of this curriculum and syllabus was given to the mathematics association of Bangladesh. The association suggested to unite a few new subjects by keeping the original framework of 1975 curriculum and syllabus intact and followed the previous deductive method instead of inductive method. The subjects omitted were mathematics logic, vector method and transformation in geometry and linear programming in algebra.

1995 curriculum and syllabus

This curriculum and syllabus contained the main concepts of 1975 curriculum and syllabus except that it included vector geometry and liner programming. The inductive method was included as a syllabus chapter. Although this curriculum and syllabus was still the semblance of modern mathematics, unfortunately during implementation the same mistake was made as was made in 1975. It is to print the textbooks without consulting the field level teachers and not to conduct adequate and appropriate training of the teachers. The improper classroom environment was overlooked.

The gross mistake in implementing the correct and appropriate means for implementation of a new curriculum and syllabus these had an adverse effect on mathematics teaching subsequently. The students are seen to be alarmingly decreasing in higher secondary and degree level for mathematics subjects. In spite of the mistakes in 1975, this picture was charged in 1995 when calculator and computers were available in most of the shops. And due to this reason, the debate on the long standing issue of the binary number was aborted finally in 1995.

End Note

⁽¹⁾ She was a visiting professor in IDEC, between Apr. 2007 and Sep. 2007.

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