Performance of Geometry among the Secondary School Students of Bhurbandha CD Block of Morigaon District, Assam, India

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Abstract:
The aim of the paper is to examine the geometrical performance, gender wise variation in learning geometry of the students of secondary level and their learning environment. The data is collected from some selected schools of Bhurbanhda CD Block of Morigaon district of Assam. To know the performance in geometry and the problems faced by the students to understand the geometry, a test was taken and a question paper of 25 marks and scheduled questionnaire was prepared. Also a discussion was conducted with the teachers to find out the problems of the students in learning mathematics when it is connected to geometry. To analyze the data, simple statistical method is used. After the study it is found that the fundamental knowledge in geometry is very poor among most of students in secondary level. As it is observed in most of the cases students have great difficulty in geometry part of their mathematics curriculum. So it is very important to improve performance in geometry to improve mathematics as a whole. To improve the knowledge of geometry among the students, government should think of it as a matter of urgency, send mathematics teachers for training and seminars for effective teaching and learning.

Keywords: Gender, Geometry, Learning environment and Performance

1. Introduction

Every step of our life based on science and technology. Though science and technology have both effects--good and bad. Nobody can deny that developments in science and technology have made our life effortless. We can do our daily activities without difficulty with the help of different machines which are the gifts of technology. But the development of science and technology is mainly based primarily on mathematical theories and its applications. Therefore mathematics has a great demand in our society. Mathematics occupies very important and unique position in the school curriculum from the very elementary level itself and has been made a compulsory subject of study from the primary level up to the tenth standard of study in our country, (Choudhury & Khatun,) [1]. Despite the relative importance of mathematics, it is very disappointing to note that the student's performance in the subject in both internal and external examinations has remained consistently poor (Salao, Amazigbo) [2, 3]. The responsible factors for the dismal performance of the subject has identified poor primary school background in mathematics, lack of incentives for teachers, unqualified teachers in the system, perception of mathematics is difficult, large classes and psychological fear of the subject(Amazigbo) [3]. Majority of teachers have weak background in the subject matter of mathematics (Thewane) [4], due to that student do not receive adequate and age appropriate, high quality/proficient teaching from teachers at the primary phase. Teaching geometry therefore remains problematic because it requires knowledgeable and competent teachers. Due to teachers' poor mathematical background, many abstract concepts and formulas are introduced without paying much attention to aspects such as logic, reasoning, and understanding (Karnasih &Soeparno, 1999) [5]. This causes many of the students to think that geometry is very difficult to learn (Soedjadi, 1991; Kerans) [6,7]. Learning geometry may not be easy, and a large number of the students fail to develop an adequate understanding of geometry concepts, geometry reasoning and geometry problem solving skills (Elchuck) [8]. Many scholars identified several strong difficulties related to the use of figures in solving geometry problems in secondary schools concerning both construction of figures and proof properties of geometric figures (Mammama & Villani, Lobarde & Capponi, Berthelot & Salin) [9, 10, 11, 12]. The fundamental concepts have to formulate clear for better understanding of geometry and its application. Geometry is a unifying theme to the entire mathematics curriculum and as such is a rich source of visualization for arithmetical algebraic and statistical concepts. Educators are aware of the importance of exposing students to concepts that will allow them to develop critical thinking and reasoning skills. Often, geometry is the avenue to which these skills are reached. The students still struggle with

geometric concepts. The reason for fear of mathematics is mainly due to poor geometrical conception. Geometry is regarded as a problematic learning area in mathematics around the globe (Snyders,) [13]. Learning of geometry highly depends on proper teaching learning methods. So proper learning of mathematics depends on proper teaching (Zaskis Rina, Zaskis Dov) [14]. Thus proper teaching- learning in secondary school in mathematics especially in geometry has been a serious issue to investigate.

Keeping view of all the above discussion, the present investigation is undertaken to analyze the student's performance of secondary level at the Bhurbanhda CD block in the Morigaon district of Assam.

2. About the Study Domain

The district Morigaon is located in the central part of Assam. In the south bank of the Brahmaputra between 26^0 15′N and $26^0$50′N Latitude and $91^0$59′E and $92^0$35′E Longitude

With a geographical area of 1431.5 sq km according 1.99% of the total area of the state. The literacy rate of the district is 69.37% lower than the state rate 73.18% (Census, 2011). The study area of the district covers the CD (Community Development) block Bhurbandha. The block is located central part of the district. The block is situated 26º 15´ N to 26º 19´ N latitude and 92º 15´ E to 92º 20´ E longitude.

3. Statement of the Problem

Amongst the all subjects taught in schools, mathematics is considered one of the toughest subjects with poor performances of students. Poor performance in the subject has been a matter of serious concern. The major cause of failing in the examination is due to poor performance in mathematics (Bhagawati) [15]. Poor performances of mathematics from the view point of teacher's are poor study habits and non-punctuality in doing home work (Grewal) [16]. Besides with this a large number of socio-economic and academic environmental factors influence the student's performance in school. Poor performance is not only results in child having a low confidence, but also causes significant anxiety to the parents (Karande and Kulkarni) [17].

The poor performance of students in mathematics and geometry in particular has been a thing of concern to mathematics educators, parents and government. Mathematics educators have put in effort aimed at identifying the major problems associated with secondary school mathematics. In spite of all these noble efforts, the problem of poor achievement in mathematics has continued to rear its head. Geometry is the core difficult area where student's performance always been low and where the problems of teaching-learning occurs most in mathematics (Adolphus,) [18]. According to De Villiers [19] reports pupil's performance in secondary level geometry is far worse than in algebra.

Failure of the mathematics to relate to the child's environment and thus the child cannot see the importance and immediate application of mathematics, in particular geometry in his day to day living (Osafemnti) [20]. Most of the students prefer to solve an algebraic problem rather than a geometrical problem. They can memorize a geometrical theorem or problem but do not know about its application. Many teachers, students and their parents are seen carrying a wrong conception that geometry is more difficult part than any other branch of mathematics. But now a day it is seen that many students of secondary school level have deplorable geometrical concept. It may be due to anxiety, stems from unpleasant experiences in mathematics specially geometry. Though there are lots of studies about mathematics education in various levels but very few studies have been done so far about the geometrical education. To improve the knowledge and ability of students about geometrical education in secondary school level it is felt imperative to study the performance of geometry among the secondary school students.

4. Aim and Objectives

The main objectives of this study will be:
- Performance of the secondary school students
- To examine the gender wise variation of geometry performance of the block.
- To study the learning environment of geometry in the secondary school students of the block.

5. Methodology and Database

The study is carried out on secondary schools in the Bhurbandha CD block of Morigaon District. The primary data is collected randomly through scheduled questionnaire from 6 schools of the block and from each school 20 students were selected out of which 60 male and 60 female. To know the performance and problems faced by the students about geometry a test of 25 marks is taken and a questionnaire is prepared. A discussion with the teachers is also conducted to find out the problems of their students to learn mathematics when it is connected to geometry.

The data is tabulated and analysis with the help of different Quantitative Techniques.

5.1. Analysis and Discussion

In this study most of the students were seen poor performance in geometry. Lake of basic knowledge affects the performance of students. Table-1 shows that the performance of students in percentage of marks.

Sl. No	Performance of students	
	% of marks	No of students

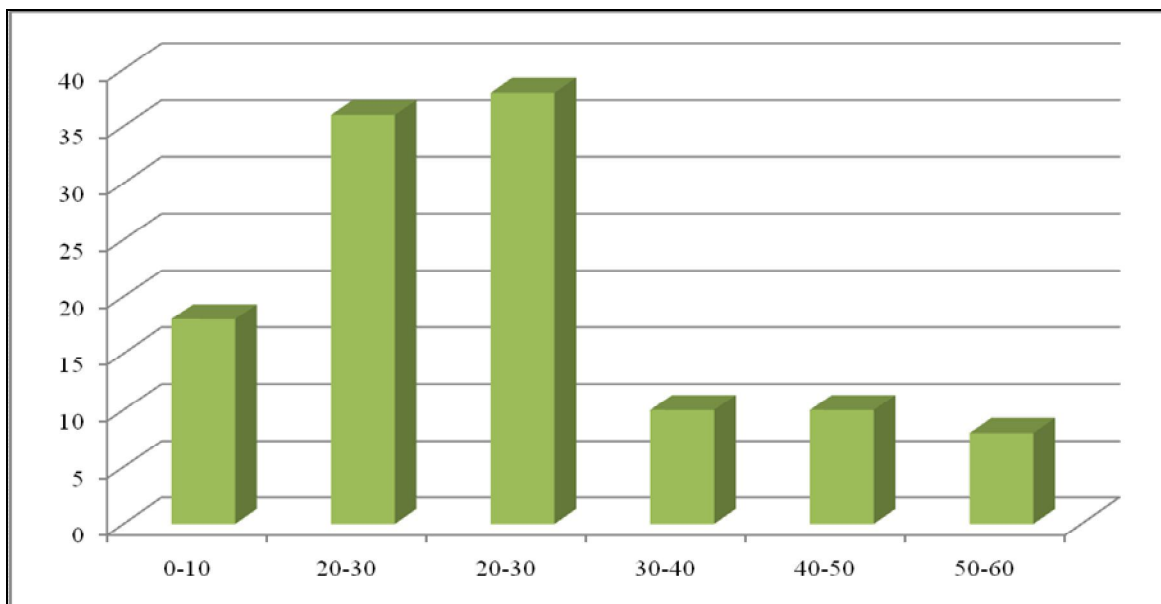| 1 | 0-10 | 18 |
2	10-20	36
3	20-30	38
4	30-40	10
5	40-50	10
6	50-60	8

Table1
Source: Primary data collection

Figure1: Performance of students

From the above table-1 and illustration it is seen that performance of geometry out of the 120 total students 92 students were obtained below 30% and only 28 students were obtained above 30%. If we consider 30% is the passing performance of the students than it is seen that the passing percentage of students is only 23.33% in the block.

In case of gender wise performance it is found that there is difference in performance. The performance of the male students is better than the performance of the females. From the following table-2 it can be understand vary easily.

Sl. No.	Gender wise performance		
	% of marks	Male	Female
1	0-10	4	14
2	10-20	18	18
3	20-30	18	20
4	30-40	6	2
5	40-50	8	2
6	50-60	6	2

Table2
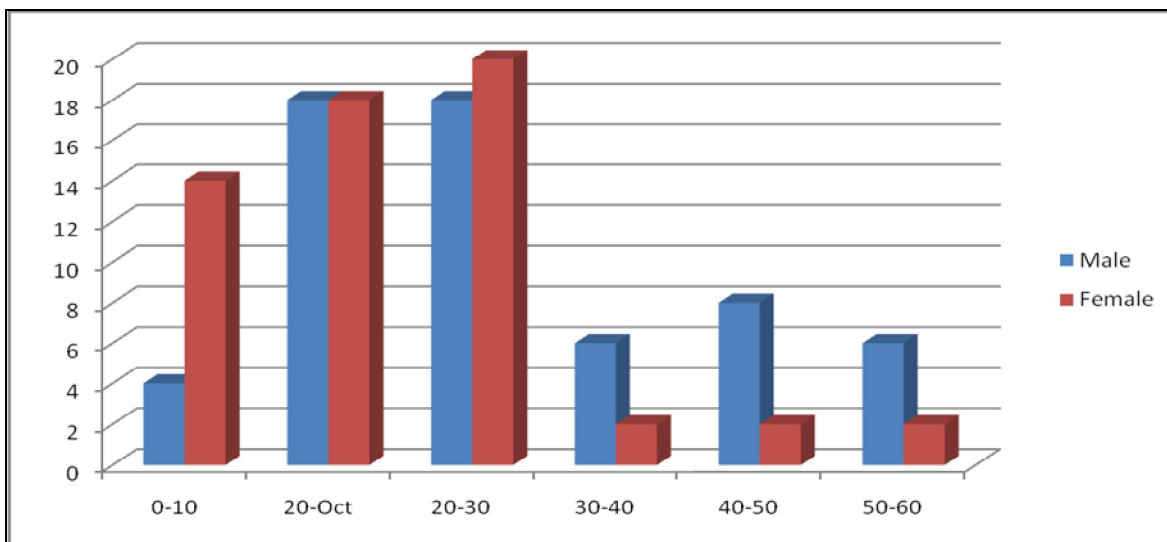*Source: Primary data collection*

Figure2: Gender wise performance

From the above table-2 and illustration it can be analyzed that out of 60 male students 40 no. of male students secured bellow 30% and only20 students secured above 30% marks in geometry. On the other hand out of the 60 female students 52 no of students secured below 30% and only 8 students were secured above 30%. If we consider 30% is the passing mark than the passing percentage of male is 33.33% and female percentage is 13.33%. There is a big difference in passing percentage (20%) between male and female. The poor performance of girls due to engagement in domestic work and due to mass illiteracy mostly in remote areas the parents are not conscious of their children, more particularly the girls. They cannot realize the importance of education and thus instead of sending their girl child to school they engage them in other household activities. The lack of women teacher is also responsible for slow progress of women education in the block.

From the study it was found that the teaching-learning environment in the area is not satisfactory one. It is a common perception that learning is effective if teaching is proper. Shortage of mathematics background (qualified) teachers, contractual basis appointment and imbalance teacher -student ratio always affects the learning of mathematics specially in geometry are the main causes. Most of the mathematics teachers expressed that majority of the students have no basic knowledge in geometry from their basic level. The role of teacher is one of the most important factors in case of teaching mathematics especially in geometry. Majority of the teachers taught traditional way but not through practical demonstration. Many mathematics teachers face difficulty in using mathematical kit box and they use it as they want to. When we interact with the teachers of selected schools, they suggest that in service training programmes should be organized specially for mathematics teacher. Some of the teacher does not use teaching- learning material while teaching mathematics. Most of the student does not know the name of the apparatus of their geometry box and they do not know how to use it while construct a geometrical figures.

6. Findings
- It is found that, performance of students in geometry is very poor. Poor performance due to poor foundation of basic knowledge from their primary stage. They cannot solve problem even similar examples are given.
- Girls' performance is seen very poor as compared to boys performance.
- They lack of the willingness and readiness to learn. Students have the tendency to copy the solution of sums from other students whenever the problems are given to them in class. Most of the students were give importance to copy the problem from the blackboard in the class room without understanding.
- The teaching learning environment is not conducive. This is in the line with lack of mathematics teachers, lack of in service training facility especially in mathematics and imbalanced teacher- student ratio.
- In most of the schools it is found that the mathematics background teachers are appointing as contractual basis.
- Shortage of lady mathematics teacher affects girls in teaching learning environment.

7. Suggestions
This study has been made on geometry performance in secondary level. From this studies, it may be suggested that-.
- There is a need to sufficient mathematics teachers in all levels from primary to secondary. So that mathematics foundation of the students builds strong from their childhood.
- Training programmes for the mathematics teachers of both government as well as private schools from primary to secondary level should be organized on subject matters and teaching method with utmost sincerity and urgency.
- Teacher should use Teaching Learning Material (TLM) in class room to visualize the physical situation of an object.
- Teacher appointment should not be on temporary basis, it interrupts the teaching-learning process more than it helps.

- Teachers should be actively participated in different teaching learning activities of the school so as to make mathematics teaching.
- Teachers should be well trained so that effective teaching learning processes can be possible especially in mathematics.
- Government should appoint lady teacher to understand the girl's problem and to accelerate the performance of girls.
- Teacher has the responsibility to create the teaching environment in classroom teaching especially in geometry.

8. Conclusion

The fundamental knowledge of geometry was very poor in most students. To improve the knowledge of geometry among the students, the State government should as a matter of urgency send mathematics teachers for training and seminars for effective teaching and learning. The goal in geometry education is for students to develop an understanding of the relevant concepts and communicate shape, size, models, graphs, and mathematical terms. Students require a strong foundation in basic geometrical skills and they need to understand the meaning of mathematical contexts to assist their ability to discuss the subject purposefully.

9. References

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