

A Study of Common Mathematical Errors Committed by The Students of Xth Class in Geometry

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Abstract

The study looked into the types of mistakes committed by the Xth class students in mathematics made when solving word problems that were concrete and formal. 240 students from five local government and Private schools were chosen using random and purposeful sampling approaches, respectively. The study's conclusions showed that Students committed more numbers of errors under the objective "Application" when compared to other objectives. Students committed more number of errors under the content area "Angles". The study also concluded that the students confused greatly with the Terminology and students were very weak in fundamental operations especially in Angles. It is one of the fundamental subjects included in both primary and secondary education. The intellectual growth of an individual is aided by mathematics. The methods for solving issues, like as induction, deduction, and idealization, make up the syntactic framework. The person tackling the problem must have a sufficient comprehension of the two structures in order to solve the problem successfully. Therefore, it is advised that word problem solving receive sufficient attention in mathematics lectures.

Keywords: Common Mathematical Errors, Xth Class students. Geometry

1. Introduction

The inferences, results and conclusions of Mathematical problems are based on the logical thinking and reasoning abstracts. Mathematics also called as "Science of results and conclusions". The great American mathematician Plers and Boneman highlighted that necessary conclusion in the field of Science has been designed through mathematics. Means everyone should develop good mathematics abstract thinking which develop an effective foundation for effective reasoning and thinking, and to generate necessary possible and positive conclusions. That is why learning of mathematics has gained an important role at all stages of education and it is above all disciplines.

The majority of people believe that mathematics is simply used to study other fields, despite the fact that it is the foundation of science and technology. By compared to all other sciences the *Kothari Commission* rightly expressed the compulsion of teaching of mathematics during the first 10 years of schooling. Hence, majority of states in India and Control Board of Secondary Education (CBSE) have included topics of modern mathematics in the Syllabi at the secondary school level. Mathematics is also widely used in education, medical, health, economics, biology, social sciences, and in research mathematics has its own light, bliss and wisdom. In general teachers and students feel that mathematics

is a difficult subject. No doubt offers greater difficulty to expose than any other science. Mathematical research is mostly for individuals who are eager to explore vast intellectual horizons in search of treasure. Ramanujam, a famous Indian mathematician, once remarked that "the goddess of nominal inspired him within the mathematical results." While taking a bath in his dream, Archimedes had an inspiration for his well-known concept. Thankfully, another mathematician made the observation that mathematicians are similar to lovers.

The concept and structure of mathematics provides a strong base for understanding and talking the problems of a dynamic society as it is said that `mathematics is a living and never growing subject and not deed and frozen product of antiquity. Different branches of new mathematic have been developed under applied in variety of disciplines like computer mathematics game theory of linear programming, set theory etc. Hence, the importance of mathematics has tremendously increased. It can be concluded that "all mathematic arose from necessity". Mathematics, a way of describing relationships between numbers and other measurable quantities. We benefit from the results of mathematical research every day. For the most part, Mathematics remains behind the scenes. We use the end of results without really thinking about the complexity underlying the terminology in our liver changes in society and the work place require greater skill and understanding of mathematics.

Bell (1951) says that "Mathematics is the handmaid and servant of all sciences".

Gauss said that "Mathematics is the queen of all sciences". The developments in various occupations, industry and other fields own much to the developments in mathematics. Social scientists also use mathematical techniques, primarily probability and statistics.

Camte (1987) says, "It is only through Mathematics that we can thoroughly understand what true science is". Mathematics, the language of science, has two dialects, pure Mathematics and applied Mathematics. Pure Mathematics is the study of abstract relationships where as applied Mathematics applies mathematical analysis to real-world problems. Mathematics strives for simplicity and generality. Simplicity means the use of minimal number of assumptions or hypotheses in a proof or theory. Generality is the ability to apply the mathematical theory to different situations. The subject Mathematics has been gaining an important role in school curriculum. Mathematics by virtue of its extensive practical applications and the aesthetic appeal of its methods and results has long held a prominent place in Education. Stone stated that "Mathematics seeks not to find new place in new place in the curriculum but to adjust its place in education in accordance with its growing importance in contemporary life". With availability calculators and computers higher order thinking is basic skill for all students.

The Kothari Commission Report (1964-66) rightly points out that the study of Mathematics plays a prominent part in modern education. It plays an important role in the development of physical sciences and biological sciences. One of the most exciting features of intellectual life in the 20th century is the penetration of Mathematics into an over widening circle of scientific disciplines not only pure and applied sciences, but also devoted to the study of human behavior. It is believed to be relatively difficult to learn. Mathematics is the Achilles heel for a great majority of the pupils. It cannot be learnt without proper grounding in fundamentals. Without proper training in fundamental concepts we cannot go deep into the subject.

2. Statement of the Problem

The present study is meant to diagnose the causes of errors in mathematics committed by the students of class of X is selected schools in Ludhiana district of Punjab. The study is designed to determine the types and frequencies of errors committed by the pupils with a view to suggest remedial measures in related to different variables.

3. Title of the Problem

The title of the problem is “A Study of Common Mathematical Errors Committed by the students of X Class in Geometry”.

4. Objective of the Study

The study outlines the following objectives

1. To find out and analyze the relation between government and private schools on the errors committed.
2. To find out and analyze the relation between boys and girls in rural area on the errors committed.
3. To find out and analyze the relation between boys and girls in urban area on the errors committed.
4. To find out and analyze the relation between boys and girls in government schools on the errors committed.
5. To find out and analyze the relation between boys and girls in private schools on the errors committed.

5. Hypotheses of the study

The following null hypotheses have been set up for the investigation-

1. No significant difference exists between mean errors committed by students study in school under government and private schools.
2. No significant difference exists between mean errors committed by boys and girls in rural area.
3. No significant difference exists between mean errors committed by boys and girls in urban area.
4. No significant difference exists between mean errors committed by boys and girls in government schools.
5. No significant difference exists between mean errors committed by boys and girls in private schools.

6. Variables Studied

These are the following variables including in the study are

1. Gender
2. Different types of managements of schools i.e., government management and private management.
3. Geographical factors i.e., rural and urban areas

7. Analysis and Interpretation of Data

7.1. Comparison of Errors Committed by Students of X Standard studying in Government and Private Schools

Ho : No significant difference exists between mean errors of students of X standard studying in schools under government and private schools. Means, S.D.s and ‘t’ value of the errors committed by government and private students are given in table - 1.

Table - 1

Means, S.D. and 't' value of errors committed by government and private schools

Management	N	Mean	S.D	t-value
Government	120	28.16	6.262	9.59**
Private	120	21.12	6.983	

** t is significant at 0.01 level for 238 df.

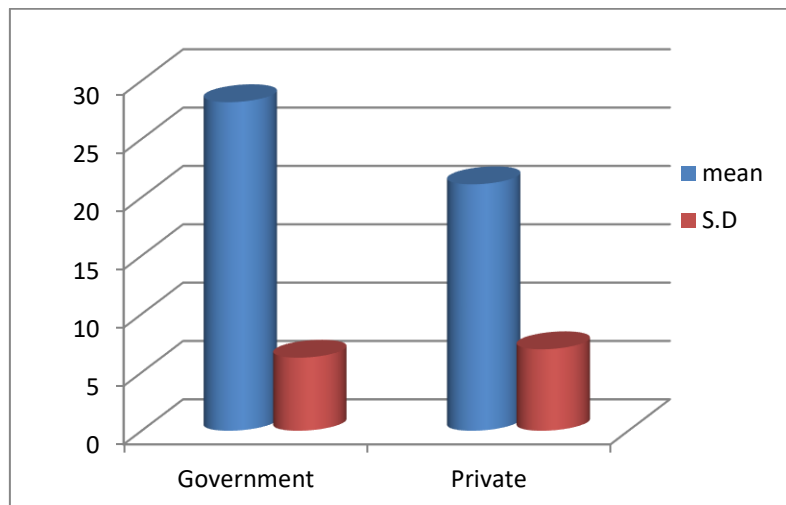


Chart -1 Comparison of Government and Private Schools Students

The difference between two means of errors of Private and Government school students was tested for significance by 't' test. The obtained 't' value is 9.59. The table value of 't' for 238 df is 1.97 at 0.05 level and at 0.01 level is 2.60. The obtained value is greater than the table value. So, 't' is significant at 0.01 level. Therefore the null hypothesis rejected.

7.2 Comparison of Errors Made by X Standard Boys and Girls in Rural Area

Ho: No significant difference exists between mean errors of boys and girls in rural area. Means, S.D.s and 't' value of errors made by boys and girls in rural area are given in the table - 2.

TABLE-2

Means, S.D. and 't' value of the errors committed by Boys and Girls in Rural Area

Gender	N	Mean	S.D	t-value
Rural Boys	60	22.25	7.171	2.205*
Rural girls	60	25.25	7.767	

* t is significant at 0.05 level for 118 df.

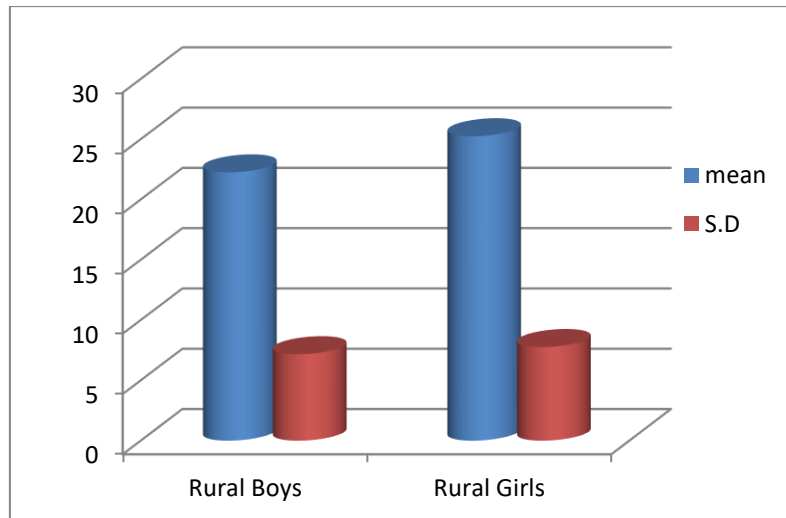


Chart -2 Comparison of Rural Boys and Rural Girls

The obtained 't' value is 2.205 and the table value of 't' for 118 df. Is 1.98 at 0.05 level. The calculated is greater than the table value. Hence the null hypothesis is rejected at 0.05 levels. So, there is significant difference between the mean errors committed by boys and girls in Rural Area.

7.3. Comparison of errors made by X standard Boys and Girls in Urban Area

Ho: No significant difference exists between mean errors of boys and girls in urban area. Means, S.D.s and 't' value of errors made by boys and girls in Urban areas are given in the table – 3

TABLE – 3

Means S.D. and 't' value of the errors committed by X standard Boys and Girls in Urban Areas

Gender	N	Mean	S.D	t-value
Urban boys	60	26.25	6.995	1.075*
Urban girls	60	24.83	7.473	

* t is significant at 0.05 level for 118 df.

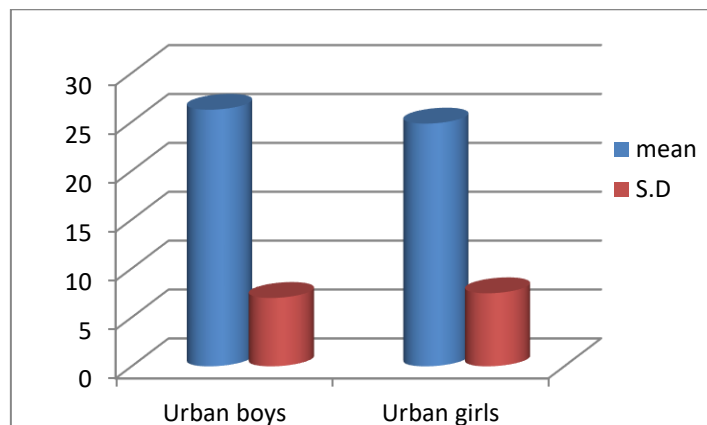


Chart -3 Comparison of Urban Boys and Urban Girls

The obtained 't' value is 1.075 and the table value of 't' for 118 df is 1.98. The calculated is less than the table value. Hence the null hypothesis accepted.

7.4 Comparison of errors Made by X Standard Boys and Girls in Government Schools

Ho : No significant difference exists between mean errors of boys and girls in Government Schools. Means, S.D.s and 't' value of errors made by X standard boys and girls under Government management are given in the table - 4.

TABLE - 4

Means, S.D. and 't' value of the errors committed by X standard Boys and Girls in Government Schools

Gender	N	Mean	S.D	t-value
Government boys	60	27.08	6.677	1.93*
Government girls	60	29.25	5.59	

* t is not significant at 0.05 level for 118 df.

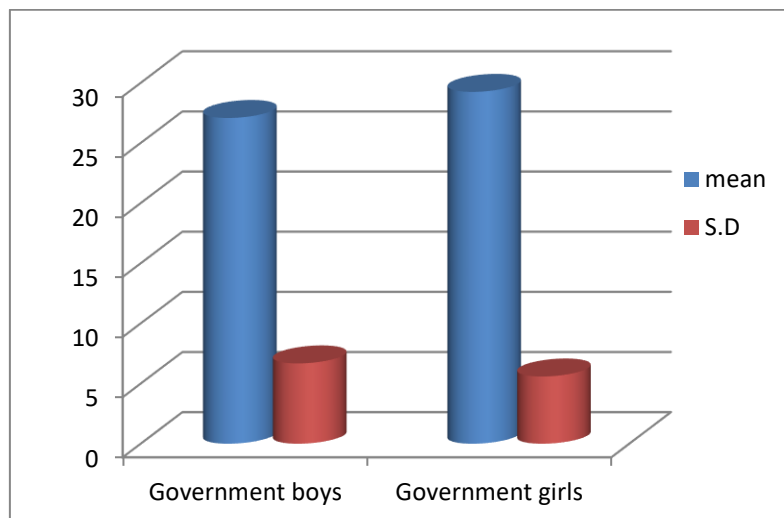


Chart -4 Comparison of Government Boys and Government Girls

The obtained 't' value is 1.93 and the table value of 't' for 118 dt. is 1.98 at 0.05 level and 2.62 at 0.01 level. The calculated is less than the table value. Hence the null hypothesis accepted at 0.05 level.

7.5 Comparison of errors made by X Standard Boys and Girls in Private Schools

Ho: No significant difference exists between mean errors of boys and girls in Private schools. Means, S.D.s and 't' value of errors made by boys and girls under Private management are given in the table - 5.

TABLE - 5

Means, S.D. and 't' value of errors made by X standard Boys and Girls in Private Schools

Gender	N	Mean	S.D	t-value
Private boys	60	21.42	6.95	0.46*
Private girls	60	20.83	7.03	

* t is not significant at 0.05 level for 118 df.

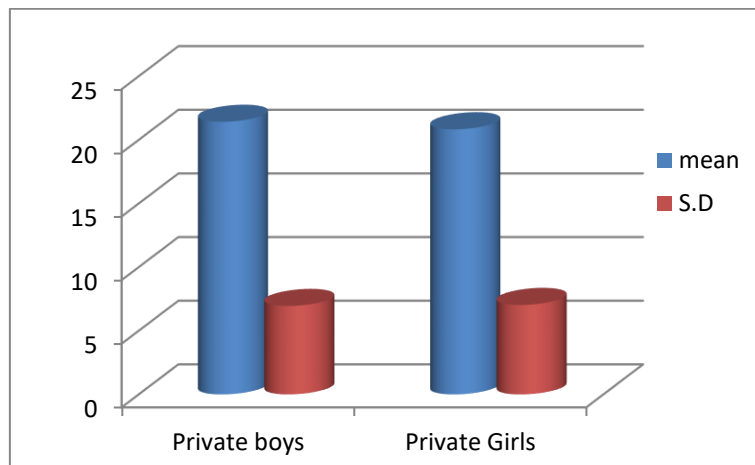


Chart -5 Comparison of Private Boys and private Girls

The obtained 't' value is 0.46 and the table value of 't' for 118 df. is 1.98 at 0.05 level and 2.62 at 0.01 level. The calculated is less than the table value. Hence the null hypothesis accepted.

8. Major Findings

From the results discussed in the earlier chapter the findings may be summarized as follows.

1. The mean value of errors committed by students in Govt. schools is 28.16 and by students in private schools is 21.125.
2. The standard deviating of errors committed by students in Govt. schools is 6.262 and by students in private schools is 6.983.
3. The mean value of errors committed by Urban boys is 26.25 and by Urban girls is 24.83.
4. The standard deviation of errors committed by Urban boys is 6.995 and Urban girls is 7.473.
5. The mean value of errors for Rural boys is 22.25 and Rural girls is 25.25.
6. The SD of errors for Rural boys is 7.171 and for Rural girls is 7.767.
7. The mean value of errors made by boys in Govt. schools is 27.08 and Girls in Govt. schools is 29.25.
8. The SD of errors made by boys in Govt. schools is 6.772 and for girls is 5.599.
9. The mean value of errors made by boys in private schools is 21.42 and girls is 20.83.
10. The SD of errors made by boys in private schools is 6.910 and girls is 7.003.

9. Conclusions:

Based on the above findings there are the following conclusions

1. On the whole the mean value of errors was higher than that of correct responses.

2. Gender has no significant influence on the frequency of errors committed by pupils of X class of Geometrical concepts.
3. Locality has no significant influence.
4. Management of the School has significant influence.
5. There is significance difference between Boys and Girls in Rural area.
6. There is significant difference between Private and Govt. School Students in Urban area.
7. There is significant difference between Private and Govt. School Students in Rural area.
8. Students committed more numbers of errors under the objective “Application” when compared to other objectives.
9. Students committed more number of errors under the content area “Angles”.
10. The students confused greatly with the terminology.
11. Students are very weak in fundamental operations especially in angles.

10. Educational implications of the study

1. A considerable time must to allot in the class-room for developing certain skills, followed by drill work with the careful supervision of the teacher.
2. Adequate practice should be given in measuring on angle in drawing parallel lines. The teacher has to guide the pupils when they are drawing diagrams in the class room. How assignments serve a lot in learning any branch of mathematics. But they do not cause the absence of the students to the class.
4. Place of drill work in teaching geometrical concepts and skills. In order to secure complete mastery in fundamental skills in Geometry, the following principles should be adhered to in planning and conducting drill lessons.
 - a) Drill to be most effective must be motivated
 - b) Drill work should be allotted to the student to work according to his own ability and speed.
 - c) Drill should be specific on skills.
5. Motivating the study of Geometry
The use of different mathematical instruments must inculcate interest in the students. The teacher must tell the pupils to prepare different models in Geometry with papers, wood etc.
 - a) Arousing interest by means of daily use of Geometry
 - b) Mathematical recreations
 - c) Mathematical games
 - d) Mathematical work shops
 - e) Role mathematical clubs
 - f) Use of Multi-Sensory Aids
 - g) Mathematical Libraries

11. Suggestions for further Research

1. The present investigation is only confined to a few selected schools situated in Ludhiana district. It is suggested that a study covering a large sample of schools may be undertaken and the tests be standardized.
2. A similar investigation can be conducted covering more topics from the curriculum.
3. A similar investigation can be carried out for subjects in the school curriculum.

4. This type of studies may be conducted at elementary level and college level in all the curricular subjects.
5. Similar diagnostic students may be conducted for the other secondary school class in all the subjects.

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