A STUDY OF CAUSES OF FAILURE IN MATHEMATICS AT HIGH SCHOOL STAGE

Satish Kumar Kalhotra

Maulana Azad National Urdu University, Hyderabad,
INDIA.

drsatishkumarkalhotra@gmail.com

ABSTRACT

The present study was carried out to identify causes of failure in mathematics at high school stage. A sample of 125 (50 girls and 75 boys) failure students were selected randomly for the study. The results reveals that the failure students were found to be older in age and low in socio-economic status, it seems that their parents being illiterate and poor, are not able to care for the education of their children by sending them to the school of appropriate age.

Keywords: Education, Mathematics, Artistic Aspects of Mathematics and Necessities of Mathematics

INTRODUCTION

Education is something, which makes a man self-reliant and self-less. Education is a process, which does all round harmonious development of the individual to modify his behaviour, attitude and thinking. Education means training for the country and love for the nation. It plays a tremendous role in economical and social development and national integration of country. It includes all the knowledge and experiences, acquired during infancy, childhood, adolescence youth manhood and old age any agency of education.

Education is a creation of a sound mind in a sound body. It is potentially, a guiding force in the life of every citizen. While educating an individual we not only educate the future man but also the entire human society as such after freedom so many attempts have made to give free and compulsory education to all the citizen up to the age of 14 years. But the output is not so much satisfactory and it appeared that all the children are not able to complete even their primary education. In the survey of the session 1988-89 the dropout rate was 43% in class V and up to 65% in VIII class. But increase up to 70% in class X. It does not appear to stop even XII class and also in higher class.

Education is the touchstone of the civilization and culture of the country. It is an integral part and basis of human life. Education is as old as human existence and shall continue to function as long as the human race lives. It is an essential human virtue and man becomes man through education. According to Pesto Lozzi, "Education is the natural harmonious and progressive development of man's innate power. Education is a process which does all round harmonious development of the individual to modify his behaviour, attitude and thinking. Education means training for the country and love for the nation. It plays a tremendous role in economical and social development and national integration of country.

Education is the need of all people, so many attempts have made to give free and compulsory education to all children up to the age of 14 years but the output is not so much satisfactory. There are many children who drop out the school due to many reasons; one of the main reasons of dropout the school is failure in mathematics. Parents and society are responsible for this reason but for mathematic subject is an un-systematic, lengthy syllabus.

Meaning and Concept of Mathematics

Mathematics is one of the languages of human life and certainly no more marvellous languages were ever created by the mind of man. Mathematics cut short the lengthy statements through its symbols, is free from verbosity, help the expression of ideas in an exact form and enable to understand and appreciate precision, brevity, sharpness, logical beauty and mathematics.

Mathematics fulfils the educational values such as practical disciplinary cultural, intellectual, more; aesthetic, social vocational, inter-disciplinary etc. in order to realize the educational values and instructional objectives of mathematics, the subject must be practiced in class rooms by utilizing the service of traditional methods, educational innovations and technological advancements.

The views of "Roger Becon" about the concept of mathematics.

"Mathematics is the gate and key of sciences. Neglected of mathematics works injury to all knowledge, since he who is ignorant of it common now the other sciences or the things of the world and what is worse, men who are thus ignorant are unable to perceive their own ignorance and so do not seek a remedy.

Thus for a long time, mathematics was taught because of the training in discipline it was supposed to give to the learner. But now, this has grown a different attitude it.

Out famous leader Pandit Jawahar Lal Nehru has expressed his view related to mathematical aspects as: "mathematics is supposed to be a dull subject, but is increasingly recognized that it is of high importance in scientific developments today. Indeed, mathematical research has evidenced the horizon of the human mind tenuously and has helped in the understanding, to some extent, of nature and the physical world. It is a vehicle of exact scientific thought".

Hence, mathematics, which is a science by any criterion and which right fully belongs to this group has not been accepted and emphasized as a sense. We can analyze that maths is a science of digits or numbers as well as it is an art of computing.

Aims of Mathematics

The aims of mathematics is to develop practical value, disciplinary value and cultural values in the student addition, subtractions, multiplication, division, weighing, measuring, selling, buyi8ng and many more simple and fundamental processes of mathematics which have got an immense practical value in life. The knowledge and skill in these processes can be provided in an effective and systematic manner with the help of mathematics, education therefore needs inclusions of subjects that have practical value. The greater stress should be laid down on the teaching of the subject that can be helpful in practical life.

The aim of the study of mathematics is to teach modern mathematical theories, law and rules by understanding and observations of the daily and life current practices and problems. Students should be trained to apply law, theories and rules to day to day. Mathematics is a subject, which has a practical as well as value. Mathematics is very much helpful in solving the problems and practical problems of management of life, as life is full of complex problems.

Necessities of Mathematics

Mathematics is one of the most important subject which act as a bridge for all knowledge. In the changing world of competition there is a growing demand of the subject mathematics. There is a definite need of mathematics in any body's lifelong planning and day-to-day

planning. A mathematical approach is essential for any progress. Any approach devoid of mathematical considerations is likely to lead to failure. If any wants to make a success of his life, he must have resource of mathematics.

Mathematics is a tool of many other subjects and we can find another extension of the utilitarian aspect of the subject. The vital of all utilitarian mathematics lies in the using of mathematics. Mathematics develops the ability in counting, reading of members in a child. Mathematics develops the skills of reasonable speed, accuracy and neatness in oral and written computational work.

Mathematics is intimately involved in every movement of every life. Right from human existence on this earth, it has been a faithful companion. In maths Algebra was devised to simplify arithmetical computations. For measurement geometry was invented and developed and so on in the case of numerous other branches of mathematics.

Artistic Aspects of Mathematics

Beauty of a piece of art depends on the manner in which it express truth mathematics in knowledge of truth and realities. It is in itself a piece of fine art. It is a thing of beauty and for many it is a joy forever especially when they do not study it for examination purposes.

In the artistic view by Helmholtz – "The manipulations of artistic' genius are but the unconscious expression of a mysteriously acting rationally".

According to Bertland Russell – "mathematics, rightly viewed, possesses not only truth, but supreme beauty – a beauty, cold and austere, like that of sculpture, without appeal to any part of our weaker nature, without the gorgeous trappings of painting or music, yet sublimate pure and capable of a stren perfection such as a only the greatest art can show."

Hence mathematics provides a basis and background for aesthetic appreciation. Appreciation of rhythm, proportion, balance and symmetry postulates a mathematical mind. But the systematic study of these designs and orders of rhythms is fully the knowledge aspects of mathematics. We cannot separate mathematics from our daily life for every person. All the effects of nature are the mathematical results of unmovable or unchangeable laws of a small numbers. So we can say that even metaphysics numbers also required full knowledge of mathematics.

Review Related Studies

On the problem of cause of failure in maths +2 stage a very little work has been done in the field. Therefore, this is a new study for the analysis of research work. Newspaper, magazines, educational survey and journals in education are not provided much about the causes of this problem in maths +2 stage. The field of study was restricted to classes such as 8th or 10th class. A few opinions about the problem narrate the different conditions of socio-economical problem and some infrastructural facilities problem. Some other blame for the system of education regarding the problem. A number of related studies have been conducted to study the relationship of the cognitive and non-cognitive variables along with the environmental factors with academic success or failure of the students in examination.

1. Sharma (1978) in his critical review of research study in a school of Assam gave expiation of failure and under and low achievement in mathematics. He explained that the causes of under and low achievement of failure in mathematics at +2 stage vary from defective textbooks to same personality needs. Imparting of limited knowledge, blind use of rules, defective text-books, in sufficient drill work, absence

of methodical approach were some of the causes of failure in mathematics of +2 stage.

2. Bhargava and Marwaha (1982) while evaluating the performance in mathematics found that deprivation in its social cultural and economical parameters causes retardation in solving or performance of the students in mathematics.

3. Mohammad Miyan (1982) advocated that method of teaching equally effect the achievement of the students in mathematics. He found that

   a. The guided discovery method was most effective in developing originality in subject mathematics.

   b. He also observed that the pure discovery method is not so effective in the achievement in the field of mathematics.

   c. Low achievement in mathematics varies from defective textbooks to some personality need from defective textbook to some personality needs.

   d. Imparting of limited knowledge and blind use of the articles causes the problems of failure in mathematics up to some text.

4. Narotra (1980) while observing to the achievement in mathematics found that the failure in subject mathematics has a strong correlation with socio-economic status, security insecurity and problem of students, found significantly positive correlation between socio-economic status and achievement which got reduced to negligible when effect of security in security and problems of study mere partially out. Problems with regards to academic mathematics, mathematics and teachers were found to be significantly contributing to achievements in mathematics negative while problems with regard the miscellaneous conditions of school and self are negatively but not significantly contributing to scoring in mathematics at +2 stage.

5. Kelli Ruth Thomas (2001) in this study 'Standard base mathematics curriculum versus tradition mathematics curriculum found that standard based textbooks appear to have positive impact on the students achievement scores for a standard based assessments. Students achievement in the standard based group was significantly higher for karmas mathematics assessment total scores, knowledge scores and application scores than in the upper X quality tradition group, while not significantly higher, the standard based group based were higher than the quantity traditional group.

6. Pritam (2002) in his study of survey of cause of failure in mathematics at +2 stage concluded that "All the students felt that their failure in mathematics is due to though examinations of article or formulae in the text book, tough examples are not explained in one or two different way, not able to use the library facilities, lack of books in the library. The number of questions for practice is less. Heavy syllabus, theoretical and less practical, they are facing the problems of getting suitable good books.

7. Shilpa (2005) in her study of a comparative study of govt. and public school about teaching of mathematics in X class concluded that mathematics teachers in Govt. schools were more experienced than those of public school. Govt. schools have larger size of X class compared to the public school. Public schools were more regular in comparison to govt. school. In Govt. schools the screening is more vigorous for appointment of teachers as compared to public school. Majority of the

teachers both in Govt. and Public schools were satisfied with pattern of question paper.

8. Veena Chauhan (2002) in her study of teaching of Mathematics in Govt. and Private Schools. A comparative study concluded that in Govt. schools teachers were professionally qualified in comparison to public schools. Time allotted for teaching of mathematics is more as comparison to that of the Govt. school. Public school teachers get helping material in time whereas in Govt. school majority of teacher do not get helping material in time. Public school students are more regular than in the classes are compared to Govt. school. All the govt. and public school teachers feel that the question paper for class X is always very tough and lengthy.

SIGNIFICANCE OF THE STUDY

A research proposal should worth and urgency of the study. It should indicate clearly how the result of the research could influence educational theory. Mathematics is one of the most important subjects, which acts as a bridge for all knowledge. In the changing world of competition there is a growing demand of the subject mathematics. The present study is to know the cause to failure in mathematics at +2 stage and to check up the failure. The present investigation which seeks to identify the causes of failure in mathematics among +2 stage students seems to be significant. It is expected that the study will reveal significant factors contributing towards the failure among +2 stage students and also helps in devising corrective measure with the help of present study. The causes of failure in the mathematics can be identifying. Today the need is to great not a white collared people but a real engineer or technicians. The real engineers or technicians can be produced by stopping the failure in mathematics. The present study is significant to know the causes of failure in mathematics and help in devising corrective measures.

There are so many reasons for the failure of students in special subjects like mathematics. Parents and society in responsible for this reason but our educational system and unsystematic and lengthy syllabi is fully responsible for this problem. In most of the cases, it is noticed that the choices of academic session is not according to the interest of child but role of compulsion from parents and society which causes failure in mathematics. The lack of academic environment in family also causes failure in mathematics. Parents are not able to develop a healthy educational environment due to lack of education. They cannot realize the importance of education. Mostly the low level mental level students in responsible for this reason. Due to this problem student lacked behind day to day and causes of failure in examination.

Another cause is unbalanced economical conditions. Due to unbalanced economical conditions of parents, they are not able to avail their children good books and other facilities related with present education. The lack of such facilities, some time deprive the children at the healthy environment in the classes, which also creates the failure in exam nature.

OBJECTIVES

To identify the cause of failure in mathematics among students at 10th class in term of education level of parents - parental income - help of parents in domestic work – school climate – problems faced by the students in learning mathematics – tuition – method of teaching – test – class strength – availability of time for study at home.

Sample

Only 125 failure students were selected randomly for the study. Only 50 girls' students and 75 boys student were selected for the study.

Tool

For identifying the causes of failure in mathematics at 10th class, a question was naire used by the investigator, in order to develop a question naire due attention was given to its contents, language and structure, efforts were made that the objective of the study may be achieved by specific question. The specially designed questionnaire was administered personally by the researcher and all the pertinent details were recorded on the questionnaire seeking information on various aspects included in the study.

ANALYSIS AND INTERPRETATION OF DATA

Age and Sexual Distribution

The information with regard to the age and sex wise distribution of student is given in table 1.

Table1. Age and Sexual Distribution

S. No.	Age (Group) Yrs.	Boys (%)	Girls (%)	Total (%)
1	15-16	24	18	21.06
2	16-17	26.66	26	26.06
3	17-18	36	34	35.2
4	18-19	10.6	22	15.2
5	19-20	2.67	-	1.6

It is inferred that majority of the boys and girls students in the 10th class in Jammu region are in the age of 17-18 years followed by the age 16-17 years followed by 15-16 years followed by 18-19 years and a very few students are in the age group of 19-20 years. From the observations it may be concluded that majority of the students are in the age group of 17-18 years.

Educational Level of Parents (Fathers)

The information regarding the educational level of parents (Father's is shown in the Table 2.

Table 2. Educational level of parents (Fathers)

S. No.	Level	Total %
1	Illiterate	14.2
2	Primary	26.4
3	Middle	22.4
4	Matric	20
5	10+2	12
6	Graduate	4.8
7	P. Graduate	-

The table 2 shows that father of 14.2% students are illiterate, whereas 26.4, 22.4, 20, 12 and 4.8% are literate up to primary level, middle standard, metric level, 10+2 level and graduate level.

From these observations, it may be concluded that majority of students father are literate up to primary middle or metric level only.

Educational level of Parents (Mother)

The distribution of educational level of mother of the 10th class student is shown in table 3.

Table 3. Educational level of Parents (Mother)

S. No.	Level	Total %
1	Illiterate	29.6
2	Primary	29.6
3	Middle	20.08
4	Matric	10.08
5	10+2	6.4
6	Graduate	0.8
7	P. Graduate	-

On over all basis, it is observed that 26.9% mother's of the students are illiterate whereas 26.6, 29.6, 20.08, 10.08, 6.4, 8% mother are literate up to primary, middle, metric, literate, 10+2 level and up to graduate level respectively. From these observations, it may be concluded that majority of mothers are Illiterate up to primary middle or metric level.

Help the Parents in Their Work

Table 4 shows that help rendered by the students to their parents in their domestic work.

Table 4. Help the parents in their work

S. No.	Responses	Yes (%)	No (%)
1	Help the parents in domestic work	112 (89.6)	13 (10.4)

It is observed that 89% students help their parents where as 10.4% students do not help their parents in their domestic work.

Majority of students helped their parents at home.

School climate

The information regarding school climate is given in table 5.

Table 5. School Climate

S. No.	Response	Good (%)	Non Good (%)
1	School climate	83 (66.4)	32 (25.6)

Table 5 shows that 66.4% students say that climate of the school is good and 25.6% say that climate of the school is not good. From this table it is concluded that majority of the students like climate of their school.

Parental Income

The information regarding the Annual income of parents is given in the table 6.

Table 6. Parental Income

S. No.	Level	Total (%)
1	Low (below) 50,000	47.2
2	Average (50,000 – 1,00, 000)	30.2
3	High (More than 1,00,000)	6.4

From the table 6 it is observed that in case of income of girls parents i.e. low, average and high, in the range of 47.2, 30.4 and 6.4% respectively, it is inferred that majority of students i.e. 47.2% students belong to low-income families.

Help from Parents in Education

Table 7. Help from parents in Education

S. No.	Response	Yes (%)	No (%)
1	Help from parents in education	18 (14.4)	107 (85.6)

Table 7 shows that parents were just 14.4% help the children in their studies where 85.5% of the students say that their parents do not help in their studies. It may be concluded that majority of students are warded off from parental help in the matter of teaching of mathematics.

Problem Faced By the Students in Learning Mathematics

The information regarding the problems faced by the students in learning mathematics in table 8.

Table 8. Problem faced by students in learning mathematics

S. No.	Reason	% (age)
1	Heavy syllabus in mathematics	76.8
2	Lack of interest in maths	78.4
3	Lack of appropriate number of questions for exercise	23.2
4	Lack of appropriate example related to exercise questions.	48.0
5	Lack of mental level of student towards mathematics.	73.6
6	Lack of appropriate related to concerned topic.	16

From the table it may be concluded that majority of students opined that the syllabus of subject mathematics is very heavy 76.8%.

Method to Solve Questions

The information regarding to methods to solve the question is shown in table 9.

Table 9. Methods to solve questions

S. No.	Types of Responses	% (age)
1	Written	27.2
2	Oral	30.4
3	Both	36.4

The table 9 shows that there are 27.2% students who solved the maths questions by written practice, 30.4% students the questions orally and 36.4% students solved questions by both the methods. From table it may be concluded that majority of students avoided written practice to solve the questions.

Use of M.B.D

The information regarding the methods to solve the questions is shown in table 10.

Table 10. Use of M.B.D

S. No.	Reason	Yes (%)	No (%)
1	Availability of solved questions	85 (64.0)	40 (32)
2	Availability of more examples	58 (44.4)	67 (53.6)
3	Easy to understand from MBD	35 (28.0)	90 (72)
4	Any other reason	-	-

Table 10 shows that 34% student use MBD because of availability of school question. 44.4% use MBD because there are more examples in the MBD. 28% say that understand easily from MBD.

It may be concluded that majority of students use MBD because of availability of questions and more examples.

Tuition

The information regarding the necessity of tuition is given in the table 11.

Table 11. Tuition

S. No.	Responses	Yes (%)	No (%)
1	Lengthy syllable	96 (76.8)	29 (23.2)
2	Teachers unable to complete syllabus	70 (56)	55 (44)
3	Unable to understand lecture	73 (58.4)	52 (41.6)
4	Any other reason		

The table 11 shows majority of students take the tuition because of lengthy syllabus.

Methods of Teaching

The information regarding the method of teaching is given in the table 12.

Table 12. Method of Teaching

S. No.	Types of responses	Yes (%)	No (%)
1	Gesturing questions during 60 (48) teaching	110 (88)	15 (12)
2	Seriousness about completing home work.	60.48	75 (52)
3	Liking the methods of teaching of teachers.	110 (88)	15 (12)
4	Attention by the teacher	79 (63.2)	36 (28.8)
5	Use of blackboard	100	

From the Table 12 it is evident that majority of students opined that teacher asking gesturing questions during the teaching. Students are non-serious in completing the homework. Students like the methods of teaching of teachers. Teacher gives proper attention to the students.

From the table it may be concluded that during teaching teacher asked the questions frequently. Students like the methods of teaching. Teacher gives the proper attention to the students and students are not serious about home work.

Test

The information's regarding the test schedules is shown in table 13.

Table 13. Test

S. No.	Types of Responses	Yes (%)
1	Monthly	70 (56)
2	Weekly	28 (22.4)
3	At the end of chapter	27 (21.6)
4	Any other	

The table 13 shows that majority of teachers take the test on monthly basis.

Class Strength

The information is regarding the class strength is given in the table 14.

Table 14. Class strength

S. No.	Types of Responses	% (age)
1	Crowded	80 (100)
2	Non crowded	20 (25)

From the table, it may be concluded that majority of classes are overcrowded.

Availability of Time for Study At Home

The information's regarding the availability of time for studies at home is given in the table 15.

Table 15. Availability of Time for Study At Home

S. No.	Response	Yes (%)	No (%)
1	Time for study at home	64	36

From the table, it may be concluded that majority of students do not have proper time for studies at home.

CONCLUSION

On the basis of analysis and of data, following conclusion may be laid down:

1. The average age of failure students was found to be more than normal.
2. Evaluation level of parents of failure students (both boys and girls) was very low i.e. mostly illiterate or educated up to primary, middle or metric level.
3. Due to illiteracy the parents of most of the students were found unable to help their children in the studies.
4. Majority of the students help their parents in their work at home.
5. In majority of schools class rooms were found to be crowded.
6. Majority of students like the climate of their school.
7. The subject mathematics was disliked by majority of the students.
8. The syllabus of the maths was found to be lengthy.
9. Majority of the students were satisfied with the adequacy of exercise questions.
10. Majority of the students avoided written practice to solve the questions.
11. Students use MBD because of availability of solved questions and more examples in it.
12. Small number of students likes the method of teaching.
13. Small number of students states that the teachers give the proper attention to all.
14. Majority of students are unable to understand the lecture delivered by the teachers.
15. Syllabus of mathematics is not according to the mental level of the students.
16. Majority of teachers take test on monthly basis.
17. Majority of students do not have any deficient about availability of formulae in it.

EDUCATIONAL IMPLICATIONS

The following educational implications for teachers, teacher educators, educational planners and administrators working in the related field may be laid down:

1. The failure students were found to be older in age and low in socio-economic status, it seems that their parents being illiterate and poor, are not able to care for the education of their children by sending them to the school of appropriate age.
2. Due to economic necessity of the family, these students are forced to attend the household duties before and after the school hours. To improve this situation, more inventive in the form of books, stipends/scholarships and dresses should be given to such children in order to reduce the some extent the financial burden on their parents. The economic problems of the parents in low-economic status contribute significantly to the general anxiety of the failure students. The point discussed in second step should be taken by govt. and other policy maker voluntary organizations to provide some concreta financial help to formalities militias to enhance their income, so that general anxiety among the failure students due to financial handicaps may be reduced to some extent.
3. Teacher can do a lot in this field. They can give special attention to each failure students. They may discuss their personal problems and can provide necessary help

or can guide them positively. It is also suggested that teachers may be given certain refresher courses for getting on understanding of the various mastery learning strategy.

REFERENCES

Bhargava, M. & Marwaha, M. (1982). Academic performance as a function of prolonged deprivation. *Indian Education Review, 17*(3), 111-122.

Chauhan, V. (2002). *Survey of causes of failure in Mathematics at 10+2 stage M.* Phil dissertation on submitted to H.P University, Shimla.

Pritam, (2002). *Survey of cause of failure in mathematics at 10+2 stage* M. Phil dissertation.

Koul, L. (1969). Personality traits of high and low achiever in mathematics. *Education and Psychology.*

Miyan, M. (1982). Research in mathematics. Fourth survey of Research in Education (1983-88) *NCERT, 1*, 690-695.

Narotra, R. S. (1980). A correlation study of academic achievement with socio-economic status. *Security, insecurity and problems of students of H.P. Himshiksha, 10*(2), 8-13.

Shilpa, (2005). *Comparative study of Govt. and Public schools about teaching of Mathematics Xth class.* M. Phil dissertation submitted to H.P University Shimla.

Sharma, K. G. (1972). *A comparative study of adjustment of over and under Achievers published Ph.D.* theses. USA: Clingonh Muslim University.