Journal of Advances and Scholarly Researches in Allied Education
Vol. 20, Issue No. 2, April-2023, ISSN 2230-7540

A study of Academic Achievement of students in Mathematics in Relation to their Socio Economic Background and study Habits at Secondary School level.

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Abstract - In today's competitive world academic performance is of great importance. Academic achievement in school is the predictor of future career of any individual. Schools emphasize on improving the academic performance of the students. Parents, teachers, educators and policy makers concern about learners' academic achievement and try to find out ways to improve it. There are so many factors which influence student's academic achievement particularly in mathematics, as being one of the important school subjects. Out of these factors socio economic background and study habits are the important ones which needs to be analyzed and studied in detail. Since secondary stage of schooling is very crucial period. Academic performance is very important concern for this stage and this is the stage in which students are mature enough to be guided and form habits. Therefore, the present study focuses on investigating the academic achievement in mathematics in relation to socio economic background and study habits at secondary school level.

Keywords - socio economic background, study habits, academic achievement, performance, predictor, outcome variable.

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INTRODUCTION

The sole objective of this paper is to provide an insight to the variables involved in the study like Mathematics Education, Academic Achievement, Socio-economic background and study habits or skills. It will also refer to why Research in Mathematics Education has emerged as a subject of interest among scholars in present times. Today we live in scientific and technological era. Therefore, every country has a great need of creative talent to maintain own existence and international importance. Innovation is the soul of the country and one of the main engines of long-term economic growth of a nation. Prosperity and innovation, both are fuelled by creativity. But expertise in science and technology also requires higher level of skill in the field of Mathematics. Mathematics is a subject whose basic Knowledge and ability of solving problem is quite essential for each and every individual of the world. So, providing mathematical knowledge to the people is very much important in the modern society.

In order to find whether the objectives of mathematics have been achieved or not assessment should be done. It may be done using different tools and there may be a variety of options for the teachers as well as learners to assess the learning outcomes. One can also assess the learning outcomes of mathematics to a certain extent by knowing learners' academic achievement in that particular subject. Achievement test is one of the important tools to find out the level of learning and also to know whether the objectives have been achieved or not.

Academic achievement indicates the extent to which an individual accomplished specific goals that were the focus of teaching- learning processes in an instructional environment. The goal consists of all the domains whether cognitive, affective or psychomotor. The majority of cognitive goals in school system are either general (such as critical thinking) or entail the acquisition of information and comprehension in a particular intellectual field (such as numeracy, reading, science or history). As a

result, academic performance ought to be viewed as a complex concept that includes various learning domains.

As the field of academic achievement is quite broad and encompasses a wide range of educational outcomes, the definition of academic achievement depends on the indicators used to measure it. The are numerous indicators of academic achievement including general ones like procedural and declarative knowledge gained through education, more curricular ones like grades or performances in achievement tests and cumulative indicators of academic achievement like educational degrees and certificates. There is one thing common in all the criteria that they all refer to intellectual activities and so, more or less reflect a person's intellectual capacity.

Academic achievement is significant to everyone's life in developed societies.The mathematics achievement of students has long been a matter of concern for academician, parents, teachers, curriculum developers and policy makers. The school performance of the students does not depend on mental and physical factor alone rather depend on so many other factors too. Socio economic status, use of computer and multimedia, study habits, personal variables like gender, religion, participation in school activities, subject chosen, interest, language, various institutional factors etc are the factors which also affects the mathematics achievement of students. Among all these variables the present study considers socio - economic status and study habits as the predicting variable to academic achievement because of their significance.

Socio-economic Background

Socioeconomic status (SES) of a person and family is a combined economic and sociological measure of their work experience, access of resources on an economic level and position in society with relation to others. The family's SES is determined by looking at the household income, the earner's education and occupation as well as their combined income whereas for an individual SES, their own attributes are assessed. Recent studies have found perceived financial stress as a lesser recognised attribute of SES which is defined as the "balance between income and necessary expenses." Perceived financial stress can be determined by measuring whether a person has more than enough, just enough or insufficient fund at the end of each month. However, SES is more frequently used to represent an economic disparity in the society as a whole.

Study Habits

Study habits are defined as the routine behaviour one engages in to support their learning and studying. Students who have good study habits are more likely to get and /or maintain good grades. Many students develop the practice of keeping and archiving all graded assignments. These assignments can be utilised in the same way that study notes are used, but they can also be reviewed to identify areas of strength and weakness. In addition, asking lots of questions also comes under good study habits. Good students frequently request clarification, additional credit and assistance after school or at lunchtime. Study skills are a diverse set of abilities that deal with the organisation, assimilation and retention of new information and handling assessments. They are discrete techniques that can be used to all or the majority of academic disciplines and can typically be learnt in a short time.

RATIONALE OF STUDY

NEP 2020 states that the primary purpose of assessment will be for learning. The quality and quantity of learning attained by an individual in a subject of study after a period of instruction is gauged through academic achievement. Assessing and forecasting academic achievement of students is always a matter of great importance in education. Educationists, researchers and guidance workers always search for an instrument which is useful in predicting academic achievement. Such an instrument is useful for identifying the students, who if provided with required help and guidance can be developed to the maximum extent. Many attempts have been made in this direction using achievement test scores as outcome variable and other intellective factors as predictors of academic success but were found to be of limited use. There is a growing need that the factors like sociological, environmental, cognitive and non-cognitive must be assessed in detail in order to reduce the error in the prediction of academic achievement of the learners. Therefore, the present study makes a humble attempt to find out the effects of socio-economic background and study habits on academic achievement of students in mathematics at secondary school level. As this stage of schooling is crucial for the learners in terms of the development as well as emotional, physical and social transitions. They become mature enough to form certain habits and understand the pros and cons associated with it. The investigator chose mathematics as the subject to analyse the academic performance due to its importance in school curriculum. Being mathematics as an important school subject, the investigator tried to view the effects of important predictors socio economic background and study habits on its academic achievement among secondary school students. Socio economic status is a home related factor whereas study habits are also somehow associated with the home environment. NEP 2020 also recognises home environment and parent's contribution important for achieving the desired learning outcome for the learners as well as for achieving their holistic development.

After reviewing the studies and literature, it has been found that there is a dearth of researches conducted to find the effect of socio-economic background and study habits on academic achievement in

mathematics and at the same time to find out the correlation between these two predictors at secondary school level. The knowledge of these factors and their impact on academic achievement will help teachers, educators and the entire school system to plan educational programmes as per the need. The present study will also help parents to develop a basic understanding of the impact of these factors on academic achievement. This will help them deal with their children in an effective manner so as to develop good study habits by proving a conducive environment for study at home. This understanding will also assist teachers to create a more affectionate, acceptable., inclusive, warm and democratic emotional atmosphere for inculcating good study habits at school. They may give proper guidance and training to the learners accordingly. Policy makers, curriculum planners, educational administrators, counsellors and guidance workers may also get benefitted by the result of this study. The information yielded by this study may also be of great practical use for training programmes of teachers, instructors and guidance personnels. Researchers may also find new avenues for future exploration in it, here lies the rationale of the study.

TITLE OF THE STUDY

The study has been titled as, "A study of Academic achievement of students in Mathematics in relation to their socio-economic background and study habits at secondary school level."

VARIABLES OF THE STUDY

- Dependent variable: Academic Achievement
- Independent variables: Socio-economic Background and Study Habits
- Background variables: a) Gender, b) Age, c) Medium, d) Locality, e) Management, f) Category g) Parental Qualification h) Parental Employment Status and i) parental income.

RESEARCH QUESTIONS

The present study has been an attempt to answer the following research questions.

1. What kind of study habits have been adopted by secondary level mathematics students while making an attempt for studying mathematics?
2. What is the socio-economic background of secondary level mathematics students and in what manner, it is associated with their certain background variables?
3. In what manner, Academic achievement of Secondary level students in mathematics is associated with their study habits and socio-economic background?

OBJECTIVES OF THE STUDY

The present study has been conducted in order to fulfil the following objectives as under

1. To study and describe the Socio-economic background of Secondary level students in Mathematics with respect to their background variables Gender and Management.
2. To study and describe the study habits of Secondary level students in Mathematics with respect to their background variable Gender and Management.
3. To study and describe the degree of association between the levels of Academic Achievement, Study Habits and Socio-economic background of Secondary level students in terms of their background variables.

HYPOTHESES TESTED DURING THE STUDY

The following hypotheses have been formulated and tested using suitable statistical techniques:

Ho1: There is no significant difference in the Socio-economic background of secondary school students with respect to their gender.

Ho2: There is no significant difference in the Socio-economic background of secondary school students with respect to Management.

Ho3: There is no significant difference in the study habits of secondary school students with respect to their gender.

Ho4: There is no significant difference in the study habits of secondary school students with respect to management.

Ho5: There is no significant association between study habits and socio-economic background of secondary level students.

Ho6: There is no significant association between study habits and academic achievement of secondary level students in mathematics.

Ho7: There is no significant association between socio economic background and academic achievement of secondary level students in mathematics.

DELIMITATION OF THE STUDY

The study has been confined to Govt., Private and Govt. Aided schools being run in NCT of Delhi under Directorate of Education, Delhi.

RESEARCH METHODOLOGY USED

The researcher adopted the descriptive survey design. This research design permits the researcher to describe the relationship between socio economic background and study habits with academic achievement of student in mathematics. Descriptive survey design enables the researcher to investigate

the events or things that existed at the time the research is conducted.

Population

The population for the present study includes all the secondary level students of IX and X class, studying in secondary schools of Delhi under the jurisdiction of Directorate of Education, Delhi Govt. It includes Government, Govt.- aided and private schools of Delhi.

Sample

For the systematic collection of information, Stratified Random sampling Technique was used. The sample was stratified on the basis of districts, locale and sex. The sample for the present study consisted of 1200 (600 boys and 600 girls) students studying in Ninth and Tenth class. The stratified random sampling technique was adopted in two stages.

Table 1: Describing the Sample Selected for Data Collection

S. No.	Variables		No. of Students	Total
1.	Gender	Boys	600	1200
		Girls	600	
2.	Class	IX	600	1200
		X	600	
3.	Age	< or = 14 Years	537	1200
		>14 Years	663	
4.	Medium	Hindi	559	1200
		English	641	
5.	Locality	Urban	600	1200
		Rural	600	
6.	Management	Private	600	1200
		Govt.	600	
7.	Category	Reserved	398	1200
		Un-reserved	802	
8.	Parental Qualification	Graduates	381	1200
		Non-graduates	819	
9.	Parental Employment Status	Employed	826	1200
		Unemployed	374	
10.	Parental Income	>2 Lacs	509	1200
		<or = 2 Lacs	691	

Description of the Tools Used: The following tools have been used for collection of desirable information regarding variables involved in the study.

Study Habits Inventory: The Study Habits Inventory (SHI) developed by Mukhopadhyay and Sansanwal was used in the present investigation. The study habits inventory has been considered to be constituted of nine different kinds of study behaviours. These are: i) comprehension, ii) concentration, iii) task orientation, iv). Study sets, v) interaction, vi) drilling, vii) supports, viii) recording and ix) language.

Socio economic Background Scale: The Socio-Economic Background Scale developed By Dr. Meenakshi.

Academic Achievement: For finding the details about the academic achievement of secondary level students in mathematics, the final scores obtained by them in final examination of the respective class i.e., IX and X have been used as the indicators of academic achievement in mathematics.

Analysis of data and interpretation of result

For analyzing the data, the statistical tools used are mean, Standard Deviation, Range, t-test and Chi-Square

Exploration into Socio-economic background of Secondary School Students

Objective-I: To study and describe the Socio-economic background of Secondary level students in Mathematics with respect to their background variables Gender and Management.

For the fulfilment of the above objectives the basic descriptive techniques like Mean, Standard, Deviation and Range have been used as these techniques are useful enough to use other inferential statistics like t-test, z-test, ANOVA and other statistics.

Differential Analysis of Socio-economic background of Secondary School Students w.r.t. their Background Variables

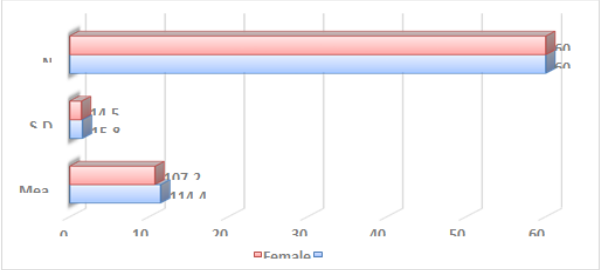
Ho1: There is no significant difference in the socio-economic background of secondary school students with respect to their gender.

Table 2: Analysis of Socio-economic background of Secondary School Students with respect to their Gender

Gender	Mean	S.D.	N	t-value	df	Sig.
Male	114.45	15.81	600	9.10	1199	Significant at 0.01 Level
Female	107.29	14.52	600			

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart representing the Socio-economic background of Secondary School Students with respect to their Gender



The Socio -economic background of Secondary School Students was analysed with respect to their Gender. The **Table 2 and its associated chart gives** a brief description of the statistics related to the comparison of Socio-economic background of Male and Female Secondary School Students. The significance of difference between mean Socio-economic background of Male and Female Secondary School Students was tested using **t-test** which was found highly significant at 0.01 level. Which leads to the rejection of our Null Hypothesis i.e., **Ho1: There is no significant difference in the Socio-economic background of secondary school students with respect to their gender.**

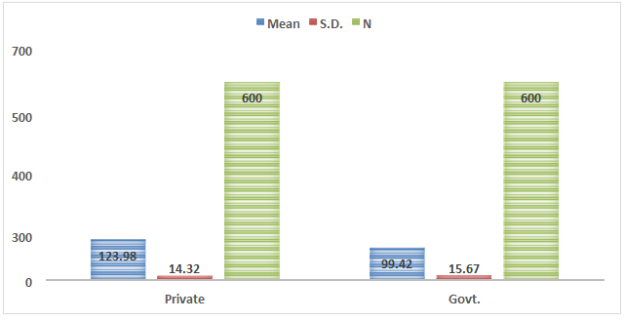
Ho2: There is no significant difference in the Socio -economic background of secondary school students with respect to their Management.

Table 3: Analysis of Socio- economic background of secondary school students with respect to their Management.

Management	Mean	S.D.	N	t-value	df	Sig.
Private	123.98	14.32	600	30.08	1199	Significant at 0.01 Level
Govt.	99.42	15.67	600			

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart Analysis of Socio-economic background of Secondary School Students with respect to their Management



The Socio-economic background of Secondary School Students was analysed with respect to their management. The **Table 3 and its associated chart** gives a brief description of the statistics related to the comparison of Socio-economic background of Secondary school Students with respect to their school management **i.e., Private and Govt.** The significance of difference between mean Socio-economic backgrounds of Secondary School Students with respect to their management, was tested using **t-test** and found highly significant at **0.01 level.** Which leads to the rejection of our Null Hypothesis i.e., **Ho2: There is no significant difference between the Socio-economic background of Secondary School Students with respect to their management.**

Differential Analysis of Study Habits of Secondary School Students w.r.t. their Background Variables

Objective- II: To study and describe the Study habits of Secondary level students in Mathematics with respect to their background variables Gender and Management

For the fulfillment of the above objectives the basic descriptive techniques like Mean, Standard, Deviation and Range have been used as these techniques are useful enough to use other inferential statistics like t-test, z-test, ANOVA and other statistics.

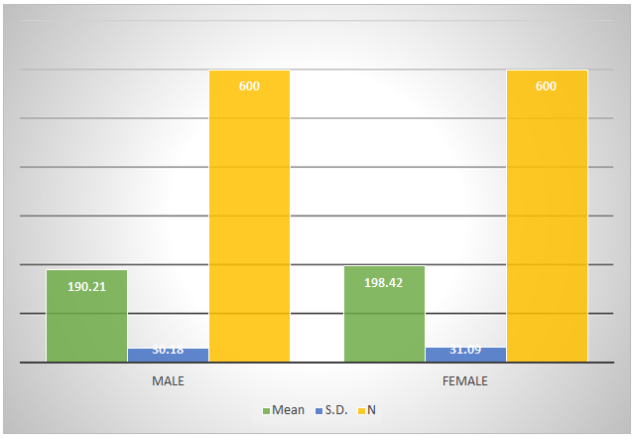
Ho3: There is no significant difference in the study habits of secondary school students with respect to their gender.

Table 4: Analysis of Study Habits of Secondary School Students with respect to their Gender

Gender	Mean	S.D.	N	t-value	df	Sig.
Male	190.21	30.18	600	4.73	1199	Significant at 0.01 Level
Female	198.42	31.09	600			

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart showing the Comparison of Study Habits of Secondary School Students with respect to their Gender



The Study habits of Secondary School Students was analyzed with respect to their Gender. Table 4 **and its associated chart gives a brief description of the statistics related to the comparison of Study habits of Male and Female Secondary School Students. The significance of difference between mean Study habits of Male and Female Secondary School Students was tested using** t-test **which was found highly significant at 0.01 level. Which leads to the rejection of our Null Hypothesis i.e.,** Ho3: There is no significant difference between the study habits of Secondary School Students with respect to their gender i.e., Boys and Girls.

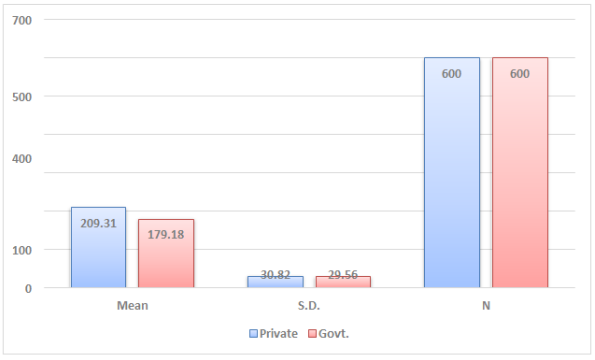
Ho4: There is no significant difference in the study habits of secondary school students with respect to their Management.

Table 5: Analysis of Study Habits of Secondary School Students with respect to their Management

Type of Management	Mean	S.D.	N	t-value	df	Sig.
Private	209.31	30.82	600	17.48	1199	Significant at 0.01 Level
Govt.	179.18	29.56	600			

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart Showing the Comparison of Study Habits of Secondary School Students with respect to their Management



The Study habits of Secondary School Students was analysed with respect to their management. **Table 5 and its' associated chart briefly** describe the statistics related to the comparison of Study habits of Secondary School Students with respect to their school management **i.e., Private and Govt.** The significance of difference between mean Study habits of Secondary School Students with respect to their management, was tested using **t-test** and found highly significant at **0.01 level.** Which leads to the rejection of our Null Hypothesis i.e., **Ho4: There is no significant difference between the study habits of Secondary School Students with respect to their management.**

Degree of Association among Academic Achievement, Socio- economic background and Study Habits of Secondary School Students

Objective-III: To study and describe the degree of Association between the Levels of Academic Achievement, Study Habits and Socio-economic background of Secondary level students in terms of their background variables.

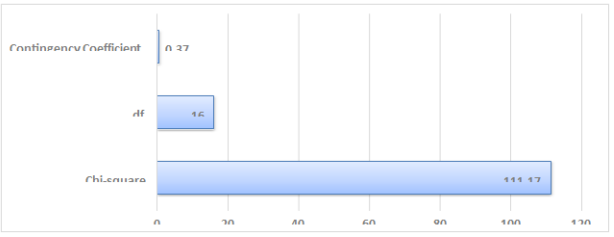
Ho5: There is no significant association between Study habits and Socio- economic background of secondary level students.

Table 6: Analysis of association between Study habits and Socio-economic background of secondary level students.

Levels of	N	Chi-square	df	Contingency Coefficient	Significance
Study Habits	1200	111.17**	16	0.37**	0.00**
Socio-economic Backgrounc	1200				

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart Showing degree of association between Study habits and Socio-economic background of secondary level students.



The **table 6 and its associated chart** describes the association among the Levels of Study Habits and Socio-economic background of students at secondary level. It was found that the Chi-square value for the same was found to have **111.17** with a degree of freedom 16. Which is found to be significant enough leading to the rejection of our null hypothesis; **Ho5: There is no significant association between Study habits and Socio-economic background of secondary level students.** Further the value of Contingency

Coefficient was found to be 0.37 which is also significant enough at 0.01 level of significance.

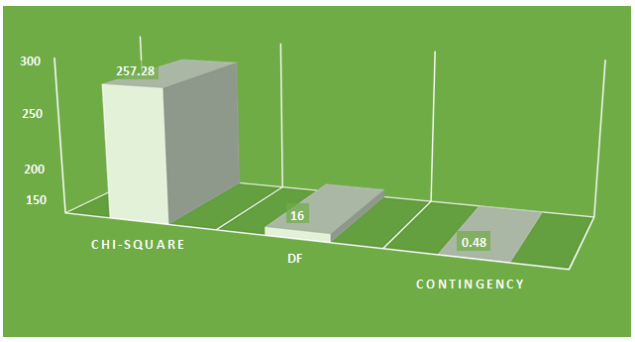
Ho6: There is no significant association between Socio-economic background and academic achievement of secondary level students in mathematics.

Table 7: Analysis of association between Socio-economic background and academic achievement of secondary level students in mathematics.

Levels of:	N	Chi-square	df	Contingency Coefficient	Significance
Socio-economic Background	1200	257.28**	16	0.48**	0.00**
Academic Achievement	1200				

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart Showing degree of association between Socio-economic background and academic achievement of secondary level students in mathematics.



The **table 7 and its associated chart** describes the association among the Levels of Socio-economic background and academic achievement of secondary level students in mathematics. It was found that the Chi-square value for the same was found to have**257.28** with a degree of freedom 16. Which is found to be significant enough leading to the rejection of our null hypothesis; **Ho6: There is no significant association between Socio-economic background and academic achievement of secondary level students in mathematics.** Further the value of Contingency Coefficient was found to be **0.48** which is also significant enough at 0.01 level of significance.

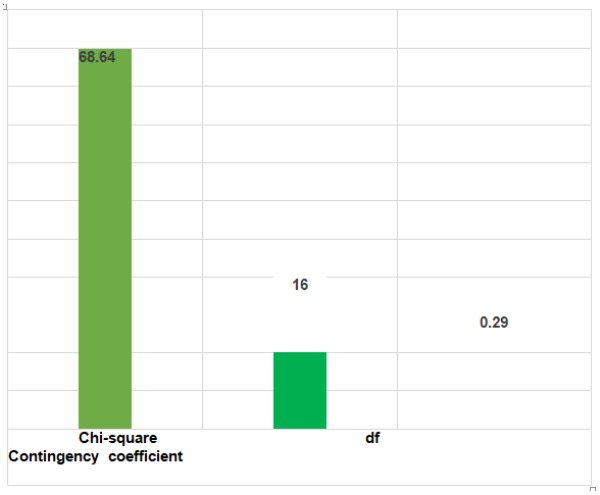
Ho7: There is no significant association between Study habits and academic achievement of secondary level students in mathematics.

Table 8: Analysis of association between Study habits and academic achievement of secondary level students in mathematics.

Levels of:	N	Chi-square	df	Contingency Coefficient	Significance
Study Habits	1200	68.64**	16	0.29**	0.00**
Academic Achievement	1200				

***Significant at 0.05 Level; **Significant at 0.01 Level; NS: Not Significant.**

Chart Showing degree of association between Study habits and academic achievement of secondary level students in mathematics.



The **table 8 and its associated chart** describes the association among the Levels of Study habits and academic achievement in mathematics of Students at secondary level. It was found that the Chi-square value for the same was found to have **68.64** with a degree of freedom 16. Which is found to be significant enough leading to the rejection of our null hypothesis; **Ho7: There is no significant association between Study habits and academic achievement of secondary level students in mathematics.** Further the value of Contingency Coefficient was found to be 0.29 which is also significant enough at 0.01 level of significance.

CONCLUSION

The present study was an exploration of the impact of Socio-economic status and Study habits of secondary level students on their academic

achievement in Mathematics in the schools of Directorate of Education, Delhi. The study was confined only two educational zones of Directorate of Education, Delhi. In the process of investigation, the researcher used two standardized tools for the realization of the objectives of the study. The analysis and interpretation of the data was done both on the basis of quantitative and qualitative methods. The results of the analysis indicated that majority of the secondary school students belonged to average or low Socio-economic Status. On the other hand, the secondary school students were found to have average study habits and they were average achievers in mathematics.

There was significant difference in Study habits and socio-economic background with respect to the background variables i.e., Gender and Management. Further, the findings of the study also revealed that there was a significant relationship between socio-economic background, study habits and academic achievement in mathematics. There was a significant association among Socio-economic Status, study habits and academic achievement of the secondary school students. There are various factors that contribute for the Academic Interest and Academic Achievement of students. The factors such as student's aspiration, ability and self-concept, interest in subjects, future course of study, language, school and classroom climate, peer influence, student's performance and accomplishment. Thus, socio-economic characteristics are not the only influential factors of Academic Achievement of students along with their study habits. But it also requires proper training of teachers, organizational planning and communication skills to conduct such studies for determining the contributing factors inside and outside school. Teachers and other stakeholders who are able to develop instructional strategies for ensuring that all children are provided with the opportunities to reach their full potential in terms of learning and performance must give this process of identifying variables their full attention and priority. Consequently, future researches are expected to investigate the issue on a huge example from additional districts of Directorate of Education including different elements that influence students' learning, family structures, school variables and social connections.

SUGGESTIONS

The results of the present study have derived implications for parents, teachers and stakeholders for the betterment of the present education system in general and mathematics education in particular. On the basis of the results and discussions, the educational implications of the findings of the present study are being presented below in the following lines.

❖ **Suggestions for Parents**: Socio-economic background has a significant impact on academic achievement in mathematics. In point of fact, it was discovered that a variety of factors, including determination, self-concept, interest in learning, and parental education and motivation, influenced the students' academic interest. As a result, parents play a crucial role in their children's education. Parents should recognize their children's interests and provide them with assistance rather than forcing them to make decisions or opinions. They should also help them study and make time for their children to study. Parents who are well-off and have a good socioeconomic background need to encourage their children to be academically driven, assist them in learning, and make every effort to provide them with all of their children's educational needs. In the same way, parents with lower socioeconomic status must still instil in their children the desire to succeed and to work harder in school so that they will not only excel academically but also avoid feeling discouraged. As a result, it is essential for parents to comprehend the significance of education.

❖ **Suggestions for Teachers:** Teachers could benefit from the findings of this study as well. The findings of the study revealed that, regardless of socioeconomic status, secondary school students show average academic achievement in mathematics at secondary level. Students in secondary education are goal-oriented and ambitious. The plausible explanation maybe female students are more sincere and solid disapproved towards scholarly exercises and this is the manner by which they get propelled in their examinations. Further this may make people physically tired and exhausted, which may make them less interested in studying or doing other educational activities. In this way, improvement in scholastic interest and scholarly accomplishment is required among the male understudies inside the area. As a result, teachers play a crucial role in encouraging students to achieve their desired outcomes. As a matter of fact, instructors can assist understudies with achieving self-administration and discipline and to manage their review propensities too. It is further fundamental for educators and managers to coordinate direction programs every once in a while, to make positive learning among understudies remembering that they shouldn't compress them concerning different scholastic exercises.

❖ **Suggestions for other Stakeholders**: The findings of this study also have implications for the state's stakeholders and policymakers. Curriculum should be more adaptable and diverse rather than limited to a few subjects. Presently a day's there are different creative regions which incorporate home science, style planning, different professional courses and PC courses which will assist with meeting the present-day need. Schools and parents should collaborate above all else; standard parent educator gatherings should be coordinated to examine different issues connecting with understudy's scholastic undertakings and school. The board ought to empower inclusion and complete obligations towards settling on different choices along with families. Education should be such that it is

equally accessible for all.

❖ **Suggestions for Government Authorities:** The government should provide more services and greater opportunities for rural parents like farmers to increase their production on agricultural works, which may increase their economic status, in order to ensure that their children do not end up assisting their parents in the field but instead continue their education. This would be especially beneficial to rural and uneducated parents. In addition, the researcher suggested that the government should assume that wealth and other resources are distributed equally to help close the gap between the various socioeconomic status groups. In addition, the government ought to make an effort to improve the socioeconomic status of those with low and poor socioeconomic status, particularly in rural areas, as the majority of students from low socioeconomic backgrounds do well in their studies but face challenges in higher education.

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