

**A STUDY ON ACADEMIC ACHIEVEMENT IN MATHEMATICS AMONG HIGHER  
SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR SCHOOL  
ENVIRONMENT**

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**ABSTRACT**

The purpose of the study was to ascertain the role of School Environment on the Academic Achievement of Mathematics among higher secondary students. Research shows that a positive school climate increases attendance rates and Academic Achievement, promotes student mental and physical wellbeing and teacher retention, and reduces violence. It also helps reduce stress in teachers and students and boosts a more positive mindset in everyone involved. Some studies even suggest that School Environment is a key factor in student Achievement and teacher retention. School environment describes the qualitative and quantitative cognitive, creative, physical and social support offered to the students in the school during the teaching learning process. School environment has a substantial impact on the development of children. Different aspects of School Environment in an organized manner interact to create an inclusive good environment and therefore influence the performance i.e. achievement of students. School Environment and Academic Achievement have a significant correlation. School Environment has a significant influence on Academic Achievement directly as well as indirectly. School Environment is the conditions, process and psychological stimuli which affect the educational achievement of the child. School environment determines academic success of students. For this purpose, the present research paper is an attempt to compare the school environment as perceived by the boys and girls. School Environment Inventory developed and standardized by Dr. Kurana Shankar Mishra was administered on 300 boys and 300 girls studying at higher secondary level. The result of the study showed significant difference between boys and girls about School Environment and Academic Achievement.

**Keywords : School Environment, Significant, Cognitive, Retention, Academic Achievement.**

## INTRODUCTION

School environment, in simple terms, means the overall surrounding of a school that comprises all the components of the school right from the infrastructure to the community service activities. School environment attempts to provide an environment that is as rich and active and joyous as possible with opportunities of play, social co-operation, mutual work, creative and constructive activities and safe and secure environment to the child. A healthy school environment is the only way for the healthy development of the child. However, the school environment remains an important area that should be studied and well managed to enhance students' academic performance. The issue of poor academic performance of students has been of much concern to the government, parents, teachers and even student themselves. The school with adequate learning environment contributes to stir up expected outcomes of learning that will facilitate good academic performance, by encouraging effective teaching and learning.

The government and especially parents are very much concerned with the quality and volume of learning acquired by their children. When a school fails to provide the necessary learning facilities and a conducive atmosphere for teaching and learning to take place, it will be difficult for optimal achievement of both teachers and students. The learning environment determines to a large extent how a student behaves and interacts, that is to say that the environment in which we find ourselves tend to mould our behaviour so as to meet the demands of life whether negatively or positively. School environment consist of both material and non-material resources in the school. It includes the teachers, peers, cohesiveness, the subjects and method of teaching.

Academic performance is generally referred to how well a student is accomplishing his or her tasks in studies. School Environment factors also determine the level and quality of students Academic performance . As a student spends most of his life at school, the school environment is highly responsible for the inculcating o f great values on them. The Kothari Commission (1964-66) has beautifully said, "The destiny of India is now being shaped in her classrooms. As students are the backbones of the nation it is important to maintain a healthy school environment.

## REVIEW OF RELATED LITERATURE

### STUDIES RELATED TO SCHOOL ENVIRONMENT

**Tapia-Fonllem et al. (2020)** explained the relationship between school environment and the well-being of primary education students. For this study a total of 405 students from four public elementary schools in Northwestern Mexico were selected to participate. The instrument used to measure the variables and the relationship of school environment and well-being is based on the three dimensions of school environment proposed by Kutsyuruba et al. (2015): Physical, social, and academic. Statistical analyses were carried out to determine the reliability and validity of the

measurement scales using SPSS V20 and EQS software. Confirmatory factor analysis models were tested to determine the construct validity of each scale; then, an analysis via structural equation modeling was made to form an explanatory model obtaining acceptable practical and statistical indicators. Among the relationships in this study, it was found that school environments as an outcome determined by physical, academic, and social factors. School environment and student well-being variables were also found to be correlated.

**Lawrence and Vimala (2012)** studied the School Environment and Academic Achievement of standard IX students and was probed to find the relationship between School Environment and Academic Achievement of standard IX students. Data for the study were collected using self-made School Environment Scale (SES). The investigator used stratified random sampling technique for selecting the sample. The sample consisted of 400 standard IX students. For analyzing data 't' test and Pearson's product moment co-efficient were the statistical techniques used. Finding revealed that there was no significant relationship between School Environment and Academic Achievement of standard IX students.

**Harinarayanan and Pazhanivelu (2018)** conducted a study to find out the impact of school environment factors on achievement. The survey method was employed and selected the Vellore educational district for this study. The investigator has used a stratified random sampling technique for selecting a sample from the population. The sample consists of 300 students found that secondary students have a high level of the school environment. It was found out that there was a positive relationship between the school environment and academic achievement.

**Baafi (2020)** examined and compared the effect of the school physical environment on academic achievement of senior high school students in Ghana. The study sought to investigate the contribution of a number of school physical environment on the performance of students in schools. Participant for the study was selected using the multi-stage sampling technique using simple random sampling. A regression model was used to determine the relationship between the dependent and independent variables. The findings of the study confirmed that the students in senior high schools with a pleasant physical environment perform better than those where the learning environment is not conducive.

**Anbalagan (2017)** investigated the impact of school environment on academic achievement of secondary school students in Madurai district. The sample of present study consists of 160 students taken from higher secondary student in Madurai district. The findings from the present study, revealed that male students have better perception on school environment than the female students. The result also revealed that self-finance schools have better school environment than the aided and government school students. The result also indicated that boys school students have better school environment than the boys and coeducation students.

## STUDIES RELATED TO ACADEMIC ACHIEVEMENT IN MATHEMATICS

**Ryan et al. (2021)** investigated student performance in mathematics after the transition from primary to secondary education in Ireland. Academic achievement in mathematics was measured using a standardised test at the end of the final year of primary school and the end of first year of secondary education. Progress in mathematics was measured over the transition by comparing these two test results for 249 students. On average, students' raw scores decreased by 7% from sixth class (final year of primary school) to the end of first year of secondary education despite an additional year of instruction and extensive overlap of both syllabi. The results showed statistically significant losses in each strand area and in each process skill.

**Villa and Sebestian (2021)** examined achievement motivation, locus of control and study habits as predictors of mathematics achievement of freshman students taking non-board examination programs at a certain state university in Southern Luzon, Philippines. In this descriptive-correlational research design, purposive sampling technique was used to select 258 participants enrolled in the subject mathematics in the Modern World. Four sets of research instruments were used for the data collection: namely, mathematics Achievement Motivation Scale, Locus of Control Scale, mathematics Study Habits Inventory and the teacher-made mathematics Achievement Test. The results showed that most students have average achievement motivation, internal locus of control, desirable study habits and average mathematics achievement. The results also revealed that there was a significant relationship between achievement motivation and mathematics achievement and achievement motivation was found to be the only predictor of mathematics achievement.

**Brezavšek et al. (2020)** investigated the main factors influencing the mathematics achievement of social sciences university students in Slovenia. A conceptual model was derived where three categories of variables were taken into account: attitude towards mathematics and math anxiety, engagement in learning activities, and attitude towards involving technology in learning mathematics. Data were collected for seven consecutive academic years and analysed using Structural Equation Modelling (SEM). The results showed a very high coefficient of determination for mathematics achievement, indicating that variables "Perceived Level of Math Anxiety", "Self-Engagement in Mathematics Course at University", and "Perceived Usefulness of Technology in Learning Mathematics", together, explain 80.1% of the total variance.

## NEED AND IMPORTANT OF THE STUDY

Mathematics enables a child to think and communicate quantitatively, solve problems, recognize situations where their aptitude can be applied and use appropriate technology to support their cause. It gives the child an instrument through which it may measure, analyze and explain a wide range of phenomena, make trend projections, or solve problems of personal interest in general. Despite the importance of Mathematics Education, it has increasingly been observed in recent times that the Achievement of students in Mathematics in all tiers of

education is far from satisfactory. Learning outcomes have become a phenomenon of interest to all and this accounts for the reason why scholars have been working hard to unravel factors that militate against good academic performance (Aremu & Sokan, 2003). Hence it is necessary to study all the possible factors that influence Achievement in Mathematics.

Mathematics, as a language, is a way of communicating. The Mathematics Educators teach the symbolism they use which is globally recognized. In this way, Mathematics can be thought of as a universal language. The National Council of Teachers of Mathematics (2000), in its principles and standards for school Mathematics, includes “Mathematics as communication” as one of its major principles for Mathematics Education.

The medium through which the attainment of individuals and the nations’ educational goals can be achieved is through learning. Learning outcomes have become a phenomenon of interest to all and this accounts for the reason why scholars have been working hard to unravel factors that militate against good academic performance (Aremu & Sokan, 2003).

Academic Achievement of students especially at the higher secondary school level is a major determinant of the future of youth in particular and the nation in general. Even when they go for higher education like Engineering, Medicine, etc., their marks in Mathematics is considered not only for getting admission into these courses, but also to obtain better job opportunities during campus interviews and to enter into prospective companies. Hence, Academic Achievement in Mathematics has been taken as a criterion variable for the present study by the investigator along with certain relevant educational factors that is responsible for the Mathematics achievement at the higher secondary level. As India is a developing country, and most of the students are still studying in Government schools and Government-aided schools, the investigator sensed the importance to analyze the standards of students’ Mathematics Achievement and to investigate the influencing factors such as Approaches to Learning of the students on Mathematics performance. This is an honest attempt to study the research inquiry on educational factors of Mathematics Achievement among higher secondary students studying in Chennai district.

### **STATEMENT OF THE PROBLEM**

Academic achievement is important because it is strongly linked to the positive outcomes. Adults who are academically successful and with high levels of education are more likely to be employed, have stable employment, have more employment opportunities than those with less education and earn higher salaries. Academic success is important because working people will need higher levels of education to tackle the technologically demanding occupations of the future. Individuals, who are better organized, better prepared and have an organizational plan and planner did better in school and will continue to be like that in their career. A nation’s development depends on the educated citizens and hence academic performance plays a significant role in deciding the students’ future.

A positive school environment is defined as a school having appropriate facilities, well managed classrooms, available school-based health supports, and a clear, fair disciplinary policy. There are many hallmarks of the academic, disciplinary, and physical environments of schools with a positive climate. The teacher should try to provide healthy environment in the school because children spent most of their time over there. Researchers found that learning environments play a crucial role in student success. Students who study in a positive learning environment have been shown to be more motivated, engaged, and have a higher overall academic performance

The main focus of this study is to examine the higher secondary students' spatial ability, approaches to learning, school environment and academic performance in Mathematics. Therefore, this study is an honest attempt to investigate the spatial ability, school environment, approaches to learning and academic achievement in Mathematics among higher secondary students. Hence, the statement of the problem can be stated as "A STUDY ON ACADEMIC ACHIEVEMENT IN MATHEMATICS AMONG HIGHER SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR SCHOOL ENVIRONMENT".

## **OPERATIONAL DEFINITION OF THE VARIABLES**

**School Environment:** The term "School environment" refers to the set of relationships that occur among members of a school community that are determined by structural, personal, and functional factors of an educational institution, which provide conducive atmosphere to study effectively

. **Academic Achievement:** Achievement means knowledge attained or skill developed by pupil usually in the school subjects measured by test scores or marks assigned by teacher or by both in Mathematics. In this investigation, mark secured by the students in their half yearly examination has been taken as academic achievement.

**Higher Secondary students:** Operationally the term higher secondary level students refer to those who have chosen Mathematics as one of the subjects studying in class eleven and twelve of the selected schools situated in Chennai district.

## **HYPOTHESIS**

### **MAJOR OBJECTIVES OF THE STUDY**

The following objectives were framed to guide this study.

1. To assess the level of School Environment and Academic Achievement in Mathematics of higher secondary students.
2. To ascertain the relationship among the variables namely School Environment and Academic Achievement in Mathematics among higher secondary students.
3. To investigate the relative contribution of School Environment and Academic Achievement in Mathematics among higher secondary students.

4. To investigate whether there is any significant difference in School Environment and Academic Achievement in Mathematics with respect to gender, type of institution, medium of instruction,

#### **HYPOTHESES WITH REGARD TO RELATIONSHIP**

1. There is significant relationship between School Environment and Academic Achievement in Mathematics among higher secondary students.
2. There is significant contribution of the independent variables namely School Environment and Demographic variables namely Gender, Medium of Instruction towards Academic Achievement in Mathematics among higher secondary students.

#### **HYPOTHESES WITH REGARD TO VARIANCE**

3. There will be no significant difference between boys and girls with respect to
  - School Environment
  - Academic Achievement in Mathematics.
4. There will be no significant difference between the students studying in English and Tamil medium with respect to
  - School Environment
  - Academic Achievement in Mathematics

#### **VARIABLES OF THE STUDY**

The variables included in the present investigation have been classified into dependent and independent variables which are presented below:

##### **Independent Variables – Sociological variables**

- School Environment

##### **Dependent variable:**

- Academic Achievement in Mathematics

##### **Demographic variables**

Demographic variables refer to the variables identified by the researcher to describe the nature of the sample chosen. The demographic variables included in the present study are:

- **Gender** – Boys and Girls
- **Medium of Instruction** – Tamil/English
- **Type of Institution** – Private and Government School students.

Thus, the independent, dependent and were identified and systematically treated in the present study.

**TOOLS USED FOR THE STUDY**

The selected tools for this research investigation along with the reliability and validity of the tools were presented below.

**Tools Used**

<b>Variables</b>	<b>Tools</b>	<b>Reliability</b>	<b>Validity</b>
School Environment	School Environment Inventory developed and validated by Karuna Shankar Mishra (2000)	0.954	0.977
Academic achievement in Mathematics	Marks scored by the students in half-yearly examination have been taken from the register.		

**METHODOLOGY**

In the present study, descriptive method is used to assess the academic achievement in Mathematics with other selected independent and demographic variables. The investigator took utmost care to establish a sound research methodology, designing the psychometric properties and executing the same to select the sample of the study. Survey method has been employed by selecting samples from large number representing a specific population collected through a highly structured and detailed questionnaire. Data have been collected, tabulated, classified, interpreted, compared, evaluated and then generalizations were made. It involves some types of comparison or contrast analysis and attempts to discover relationship between existing dependent and independent variables of the study. Thus, normative survey method has been adopted in the present research study

**SAMPLE DISTRIBUTION**

In the sample of 600 students

<b>SAMPLE DISTRIBUTION OF 600 STUDENTS</b>		
<b>GENDER</b>	<b>MEDIUM</b>	<b>TYPE OF INSTITUTION (SCHOOL)</b>



<b>Boys</b>	<b>Girls</b>	<b>English</b>	<b>Tamil</b>	<b>Private</b>	<b>Government</b>
<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>

**Description of the Inventories School Environment Inventory** The present ‘School Environment Inventory (SEI)’ was developed by Dr. Karuna Shankar Misra, is an instrument designed to measure the psycho-social climate of schools as perceived by the pupils.

- a. Creative Stimulation (CRS)
- b. Cognitive Encouragement (COE)
- c. Permissiveness (PER)
- d. Acceptance (ACC)
- e. Rejection (REJ)
- f. Control (CON)

SEI contains 70 items related to six dimensions of school environment. Twenty items belong to the (CRS) dimension while each of the remaining five dimensions has ten items belonging to it. The instrument requires pupils to tell the frequency with which a particular teacher pupil interaction behaviour is expressed in his or her school i.e. he/she is requested to tell whether a particular teacher-behaviour (as mentioned in an item) occurs – ‘Always’, ‘Often’, ‘Sometimes’, ‘Rarely’ And ‘Never’.

**Scoring:** Assign 4 Marks to ‘Always’, 3 Marks To ‘Often’, 2 Marks To ‘Sometimes’, 1 Marks To ‘Rarely’ And Zero To ‘Never’ responses. The particular item belongs to which area is indicated by alphabets near the serial no.

- **For Academic Achievement, Eleventh standard half- yearly examination marks is used as scoring key**

**TABLE-1 SHOWING CORRELATION RELATION BETWEEN SCHOOL ENVIRONMENT AND ACADEMIC ACHIEVEMENT IN MATHEMTICS**

**Hypothesis-1** There is no significant relationship between School Environment and Academic Achievement in Mathematics

<b>Pearson Correlation</b>	<b>r-value</b>	<b>Level of Significance</b>
School Environment	<b>.726**</b>	<b>0.01</b>
Academic Achievement		

**Inference:** The hypothesis shows that there is significant relationship between School Environment and Academic Achievement in Mathematics at 0.01 level. Hence the Hypothesis

is rejected.

**TABLE-2 showing the difference between Tamil and English medium students regarding School Environment**

**Hypothesis-2** There is no significant difference between Tamil and English Medium students regarding School Environment.

Variables	Medium	N	Mean	S.D.	S.E.M	T	Level of Significance
School Environment	Tamil	300	108.2467	5.7518	.3321	70.292	0.01
	English	300	155.1200	10.0160	.5783		

**Inference:** There is significant difference between Tamil and English Medium students in their School Environment at 0.01 level. The Mean Value of English Medium students are high when compared to Tamil Medium students. Hence the above hypothesis is rejected.

**TABLE-3 showing the difference between Tamil and English medium students in their Academic Achievement**

**Hypothesis-3** There is no significant difference between Tamil and English Medium students in to their Academic Achievement.

Variables	Medium	N	Mean	S.D.	S.E.M	T	Level of Significance
Academic Achievement	Tamil	300	54.1500	10.3119	.5954	22.743	0.01
	English	300	73.2833	10.2955	.5944		

**Inference:** There is significant difference between Tamil and English Medium students in their Academic Achievement at 0.01 level. The Mean Value of English Medium students are high when compared to Tamil Medium students. Hence the above hypothesis is rejected.

**TABLE-4 showing the difference between Female and Male students in their School Environment**

**Hypothesis-4** There is no significant difference between Female and Male students regarding School Environment.

Variables	Gender	N	Mean	S.D.	S.E.M	t	Level of Significance
School Environment	Female	300	207.7200	22.8307	1.3181	.860	N.S
	Male	300	206.1133	22.9083	1.3226		

**Inference:** There is no significant difference between Female and Male students regarding School Environment. Hence the above hypothesis is accepted.

**TABLE-5 showing the difference between Female and Male students in their Academic Achievement**

**Hypothesis-5** There is no significant difference between Female and Male students in their Academic Achievement

Variables	Medium	N	Mean	S.D.	S.E.M	T	Level of Significance
Academic Achievement	Female	300	18.8800	2.1790	.1258	1.127	N.S
	Male	300	19.4167	3.2204	.1859		

**Inference:**

There is no significant difference between Female and Male students in their Academic Achievement. Hence the above hypothesis is accepted.

**TABLE-6 showing the difference between Private and Government school**

**Hypothesis-6** There is no significant difference between Private and Government school students regarding School Environment.

Variables	Instiution	N	Mean	S.D.	S.E.M	t	Level of Significance
School Environment	Private	300	46.0833	5.0789	.2932	27.273	0.01
	Government	300	56.4767	4.4378	.2562		

**Inference:** There is significant difference between Private and Government school students regarding School Environment at 0.01 level.. The Mean Value of Private school students are high When compared to the Government school Students. Hence the above hypothesis is rejected.

**TABLE-7 showing the difference between Private and Government students in their Academic Achievement.**

**Hypothesis-7** There is no significant difference between Private and Government school students in their Academic Achievement.

Variables	Instiution	N	Mean	S.D.	S.E.M	T	Level of Significance
Academic Achievement	Private	300	46.6633	5.3521	.3090	26.470	0.01
	Government	300	57.0433	4.1817	.2414		

**Inference:** There is significant difference between Private and Government school students in

their Academic Achievement at 0.01 level.. The Mean value of Private school students are high when compared to the Government school students Hence the above hypothesis is rejected.

## MAJOR FINDINGS OF THE STUDY

Within the restricted realm of the present study, the following conclusions are drawn.

- There is significant difference between Tamil and English Medium students in their School Environment at 0.01 level The Mean Value of English Medium students are high when compared to Tamil Medium students. Hence the above hypothesis is rejected.
- There is significant difference between Tamil and English Medium students in their Academic Achievement at 0.01 level. The Mean Value of English Medium students are high when compared to Tamil Medium students. Hence hypothesis is rejected.
- In Gender wise there is no difference between Female and Male in their School Environment and Academic Achievement. Hence the hypothesis is accepted.
- There is significant difference between Private and Government school students in their School Environment and Academic Achievement at 0.01 level. The Mean Value of Private School Students are high when compared to Government school students.. Hence the hypothesis is rejected.

## SCOPE OF THE STUDY

Academic performance in mathematics of higher secondary education plays a crucial role and it decides the future of students to select the higher studies as well as their career. It is highly beneficial to enter into higher education but also to obtain employment in various reputed organizations. This study will hopefully facilitate the quest to improve the academic performance of higher secondary students particularly in mathematics.

This research study helps to provide some relevant insights on measurable aspects of major factors influencing higher secondary students' academic achievement in mathematics and such knowledge will help academics in designing strategies in mathematics teaching that can improve and enhance learners' interest towards mathematics learning.

The Environment plays major roles in the life of every individual whether a student, teacher, employer or employee. The challenge of education today is to offer experiences that provide students with opportunities to develop the understanding, skills, and attitudes necessary to become lifelong learners, capable of identifying and solving problems and dealing with change. One of the factors that influence academic performance is school location/site of the school.

Despite wide applicability and importance of achievement, particularly for a developing country like India, many students are still not finding their feet to perform better at the higher

secondary level. Hence, there is a vital scope for the researcher to study the.” A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS AMONG HIGHER SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR SCHOOL ENVIRONMENT”.

### **EDUCATIONAL IMPLICATION OF THE STUDY**

The Academic Achievement that has emerged from the study revealing the nature performance among the Eleventh standard student has got vital implications. The variable namely School Environment, seem to contribute significantly to Academic Achievement. All educational Programmes have their essential ultimate.

Learners must be permitted to make their own mistakes and to correct these errors themselves. Therefore, classroom instruction must be planned to facilitate the process of construction, assimilation and accommodation through which physical/empirical abstraction and reflective abstraction can occur. The classroom should provide situations to children in constructing their own knowledge so that the children can comprehend the world in new ways at different cognitive levels.

Government and proprietors of schools should provide adequate classroom buildings and should ensure that students are not overcrowded in a particular classroom. They should keep and check existing dilapidated physical facilities are renovated and maintained.

The physical environment consists of providing a consciously structured and pre-planned environment that includes proper classroom space, proper lights, ventilations, desks and benches, blackboard and other teaching aids. Infrastructure must also be properly planned according to the needs and demands of the school. The teacher student ratio must be maintained for a well-balanced school environment. Recreational facilities must be made available, so that children are given opportunities for their all-round development.

The implications of educational practice are important. First, a variety of activities games and experiences should be provided to that the learner can exercise his or her developing subsystems. One suggestion is to use individualized mathematics laboratories that utilize a variety of materials for measurement and experimentation.

### **Conclusion**

Academic performance in Mathematics of Higher Secondary Education plays a crucial role and it decides the future of students to select the higher studies as well as their career. This study will hopefully facilitate the quest to improve the Academic Performance of Higher Secondary Students particularly in Mathematics.

School environment has a substantial impact on the development of children. Different aspects of school environment in an organized manner interact to create an inclusive good or bad environment and therefore influence the performance i.e., achievement of students. School environment, school engagement and academic achievement have a significant correlation. Physical as well as psycho- social environment of a school influences cognitive, cognitive as

well as affective domain of student's mind which in turn influences academic performance. School environment as a whole in general and physical environment in particular has a significant impact on academic performance and wellbeing among students. Physical environment or out look of a school has an appealing effect on the mind and well-being of students. Class size, density, wall décor and paint colour, lighting system-natural as well as artificial, auditory stimulation and sound system, air flow, air quality, temperature and smell has psychological impact on student's personality. Specifically, school environment- physical as well as psycho-social has a significant impact on well-being as well as academic achievement among students

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