

# A STUDY OF ACADEMIC ACHIEVEMENT IN MATHEMATICS IN RELATION TO LEARNING STYLES OF HIGH SCHOOL STUDENTS

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## INTRODUCTION

A central goal for all levels of mathematics education is the development of mathematical power for all students. Mathematics holds an important place in schools. Infact, it starts right from kindergarten and holds a key position among other subjects even at primary and high school level. Today, children are sent to schools for achieving different goals and it is assumed that the child will be able to achieve the following objectives:

Acquisition of knowledge and skills

Acquisition of various values as discipline, tolerance etc.

Acquisition of desired attitudes and ideals.

In post independence India, great emphasis has been placed on mathematics teaching and learning. **The Indian Education Commission (1964-1966)** has recommended "Mathematics and science should be taught on compulsory basis to all pupils as a part of general education during the first ten years of schooling. The advent of automation and cybernetics in this century make the beginning of the new scientific, industrial revolution and makes it all the more imperative to devote special attention to the study of mathematics".

Mathematics helps in training and disciplining the mind. It also develops the power of thinking and reasoning. Any student of average intelligence can learn mathematics. Study of mathematics is helpful in learning most of the school subjects, as it is believed to be the art of all arts and science of all sciences. Directly or indirectly, mathematics does not only help everybody in earning but also helps in wise spending. It is mathematics that makes use of physical properties of matter for the benefit of man. Mathematics not only tests result, but very often directs researches.

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Mathematics is an exact science and involves high cognitive abilities and powers. In this connection **Courant and Robbins (1941)** have expressed their views about the nature of mathematics in beautiful words as, "Mathematics as an expression of the human mind reflects the active will, the contemplative reason and the desire for aesthetic perfection. Its basic elements are logic and intuition, analysis and construction, generality and individuality."

Academic Achievement has always been the main topic of educational research. Academic Achievement, in general, referred to the degree or level of success or proficiency attained in some specific area concerning scholastic or academic work. **Good (1973)**, in the Dictionary of Education defined academic achievement as "knowledge attained or skills developed in the school subjects, usually designated by test scores or marks assigned by the teacher." As soon as a child steps into the school, the process of his behavior modification begins. He acquires new attitudes, capabilities and skills, which are judged by his achievement. Achievement need is a learned motive to compete and strive for success. Achievement in mathematics is the competency shown by the student in the subject. It is the knowledge attained or skill developed in the field of mathematics.

The concept of Learning Styles has been treated as a potential individual difference that might be employed by the teacher to enhance student's learning. Learning style is simply, the way, method, or approach by which a student learns. Learning Style is the way in which individuals begin to concentrate on, process, internalize and retain new and difficult academic information. **Vermunt (1992, 1996)** describes the concept of learning style as consisting of four aspects:

Processing Strategies

Regulation Strategies

Mental Models of Learning

Learning Orientation

Pupils individually are different from one another and possess diverse learning styles. They also possess different intelligence, such as, being able to work better individually or with in a group. The mathematics teacher has a major responsibility in assisting pupils to learn in ongoing lessons and units in

mathematics. 'High expectations' has become a key word. It has been seen that if teacher has high expectations from pupils in mathematics, the latter will achieve higher grades.

**Dunn and Dunn (1992)** define Learning Styles as those environmental, emotional, sociological and physical characteristics through which an individual learns most easily. In other words, these are the ways in which individual begins to concentrate on process, internalize and retain new and difficult academic information.

**In view of Jackson (2002)** Learning Styles are personal qualities that influence a student's ability to acquire information and to participate in learning experience.

### **REVIEW OF RELATED LITERATURE**

**Joy (1991)** in his study investigated the impact of learning style factors on college students' retention and achievement. The purpose was to determine the effect of exposure to different level of learning styles information on the academic achievement and retention rate of full time college students. The results of the study established no significant impact of learning style factor on college student's achievement. **Setia (1991)** conducted a study on a sample of 510 students and explored the effect of some socio- psychological and educational factors of differential learning rate in modern mathematics. She revealed that male rapid learners perform better on achievement tests in mathematics as compared to female rapid learners. However, male- female average and slow learners do not differ significantly with each other on achievement in mathematics.

**Susabda (1992)** reported that learning style of the average and below average students tended to be more concretely dimensional while superior students tended to be more abstract in their thinking. **Key (1993)** studied the gender difference in learning style of remedial mathematics students. The findings revealed that males scored significantly higher on reflective observation mode of learning style. **Verma and Sharma (2000)** conducted a study on 120 adolescents of IX class of Bharatpur city with the objectives to compare the academic achievement of adolescents students possessing independent and dependent learning styles in respect of Hindi, English, Mathematics, General Science, Social studies and total area of study. It was found that the group of

dependent learning styles students was significantly better than the group of independent learning styles students so far achievement in social studies was concerned. There was no significant difference between mean scores of achievement in Hindi, English, Mathematics, General Science, Social Studies and total area of study in respect of competitive and collaborative learning style groups.

**Jones (2000)** in his study, "Are learning styles subjects area sensitive?", reported that there were statistical significant difference in students learning preferences by academic achievement. **Srivastava (2002)** in her study found that most popular learning style of the students is accommodating learning style and second popular style is convergent. The study also revealed that students following convergent learning style scored better in science than the students following other learning styles. Also a student learning style and their intelligence was related with each other. Study also showed difference in learning styles of boys and girls. Most of the girls preferred convergent and accommodative learning styles and very few girls prefer divergent and assimilative learning styles whereas all the four learning styles were preferred by almost equal number of boys.

**Singh (2006)** in his study found that there was no significant relationship between learning styles and academic achievement of students in fine arts. In other words, academic achievement in fine arts was insignificant with right hemisphere and left hemisphere measures of learning styles. Thus right and left hemispheric have no association with academic achievement of students in fine arts.

### **RATIONALE OF THE STUDY**

In the era of advancement of science and technology, individual are bombarded with the information in all the fields irrespective of its relevance, applicability and adaptability to them. It is very difficult to access the right learning path for students and to cater to individual difference. Hence it becomes increasingly important that right education is imparted to the students so that teaching and learning may be made more meaningful and adaptive for all students.

Also there is a need of studying the problem subject wise, because each subject is unique in itself and it is a common experience to find a student's

achievement high in one subject and low in some other. Such researches will be of great help to teachers, school administrators and to guidance and counseling workers. In view of this, in the present study only achievement in mathematics was taken. The choice of the subject of mathematics was because Mathematics achievement of the students at each developmental stage is likely to be influenced by multiplicity of factors in the past several years; there has been extensive research on various approaches of teaching in higher education. But no one method or approach has been found consistently superior to all. It reveals the fact that no one approach can be best suited to all students. The most important question is to determine which students learn best and under what conditions. An emerging important area of research that holds promise in helping us answer this question is student's learning styles. It is very important for teachers to know what the learning styles of students are. Do they vary significantly? What type of learning procedures and activities promote the most rapid and successful learning by students who have deeply different patterns for their own learning?

It is very much appropriate and necessary to conduct a research study in this area so that parents and teachers must know what level of learning styles are helpful in enhancing student's achievement. Thus, the present study will prove to be a humble effort in studying and determining the relationship of these variables.

### **STATEMENT OF THE PROBLEM**

“A Study of Academic Achievement in Mathematics in relation to Learning Styles of High School Students.”

### **OBJECTIVES OF THE STUDY**

To know the relationship between various activities related to learning and achievement in mathematics.

To know the relationship between motivation for learning and achievement in mathematics.

To know the relationship between student's views regarding learning and achievement in mathematics.

To know the relationship between learning styles and achievement in mathematics

### **HYPOTHESES**

There will be no significant relationship between various activities related to learning and achievement in mathematics.

There will be no significant relationship between motivation for learning and achievement in mathematics.

There will be no significant relationship between student's views regarding learning and achievement in mathematics.

There will be no significant relationship between learning styles and achievement in mathematics.

### **SAMPLE**

Sample for present study was selected from schools located in different districts of Punjab state. For this students of 9<sup>th</sup> class studying in different government and private schools were selected. Sample comprised of both male and female students (total 700 subjects). Subjects were selected with the help of multistage random sampling technique.

### **TOOLS USED**

Inventory of Learning Styles ( By Vermunt, Hindi version by Verma & Mishra, 1998)

Mathematics Achievement Test For 9<sup>th</sup> Class (This was developed by the investigator herself).

### **STATISTICAL TECHNIQUE USED**

Pearson's Product Moment Method of Correlation was used to find out relationship of the variable learning styles with academic achievement of students in mathematics.

**ANALYSIS AND INTERPRETATION**

**Table- I**

**The values of coefficient of correlation between Activities Related to Learning and Achievement in Mathematics**

<b>Variables</b>	<b>N</b>	<b>r</b>
Activities related to learning	700	.124**
Achievement in mathematics	700	

\*\* Significant at 0.01 level

Table I revealed that correlation of achievement in mathematics with measure of learning styles i.e. activities related to learning was positive and significant at 0.01 level. (r = .124).

On the basis of above results, hypothesis 1 that there will be no significant relationship between various activities related to learning and achievement in mathematics was rejected.

**Table- II**

**The values of coefficient of correlation between Motivation for Learning and Achievement in Mathematics**

<b>Variables</b>	<b>N</b>	<b>r</b>
Motivation for Learning	700	.131**
Achievement in mathematics	700	

\*\* Significant at 0.01 level

Table II revealed that correlation of achievement in mathematics with measure of learning styles i.e. motivation for learning was positive and significant at 0.01 level. (r = .131).

On the basis of above results, hypothesis 2 that there will be no significant relationship between motivation for learning and achievement in mathematics was rejected.

**Table- III**

**The values of coefficient of correlation between Student's Views Regarding Learning and Achievement in Mathematics**

Variables	N	r
Views Regarding Learning	700	.095*
Achievement in mathematics	700	

\* Significant at 0.05 level.

Table III revealed that correlation of achievement in mathematics with measure of learning styles i.e. views regarding learning was positive and significant at 0.05 levels. ( $r = .095$ ).

On the basis of above results, hypothesis 3 that there will be no significant relationship between student's views regarding learning and achievement in mathematics was rejected.

**Table- IV**

**The values of coefficient of correlation between Learning Style and Achievement in Mathematics**

Variables	N	r
Learning Styles	700	.141**
Achievement in mathematics	700	

\*\* Significant at 0.01 level

Table IV revealed that correlation of achievement in mathematics with measure of learning styles was positive and significant at 0.01 levels. ( $r = .141$ ).

On the basis of above results, hypothesis 4 that there will be no significant relationship of learning styles and achievement in mathematics was rejected.

### **CONCLUSION OF THE RESULTS**

These significant correlations have established that activities related to learning, motivation for learning and student's views regarding learning have significant relationship with achievement of the students in mathematics. These significant correlations may be explained on the nature of subject of mathematics. Mathematics is such a subject which is purely based on good styles of learning on a specified system. It follows some sequence. The student of mathematics not only relates himself with the text of the given problem but also with the context of that field. The more accurate are the activities related to learning and the more students feel motivated, more will be the achievement of students in the subject. Student's achievement can be maximized with motivation as it is the heart or golden road to learning. It's the motivation that can increase efficiency of one's work and facilitate learning. Moreover we come across individual differences in the class room. Students vary not only in the things they know or in their capabilities for learning but also the approaches they follow to accomplish a given task. Thus, these activities are directly related to learning.

### **EDUCATIONAL IMPLICATIONS**

As per the result of the present study, learning style have significant positive correlation with mathematical achievement of the students. Therefore, teacher should try to motivate the children for activities related to the learning. In order to fix up the concepts in the minds of the students from the field of mathematics, some new learning devices should be employed by the teacher. Teachers can identify the 9<sup>th</sup> class student's level of achievement in the subject of mathematics with the help of Mathematical Achievement Test standardized by the investigator.

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