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Academic Achievement in Mathematics in Relation to Study-Habits

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Abstract:

The purpose of this study was to determine if there exist any relationship between various levels and various dimensions of study habits of a student with academic achievement in mathematics. For study a sample of 600 students of XI and XII class was chosen from various senior secondary schools of Punjab to find the level of study habits and its relationship with academic achievement in mathematics. Study reveals that there is significant relationship between academic achievement in mathematics and students differ significantly on various levels of study habits.

Keywords: Study-Habits, Academic achievement in mathematics

1. Introduction

Origin of mathematics is hidden in the evolution of nature. Creation of nature and mathematics are closely related. Mathematics is the science in which calculations are prime. It is an exact science and involves high cognitive abilities and powers. According to 'Chambers Twentieth Century Dictionary (1987)' "Mathematics is the science of magnitude and numbers and their relations." Goods Dictionary of Education (1973) "Mathematics is the Science of measurement, quantity and magnitude." According to Webster's new world dictionary (1973) "Mathematics is the Science dealing with quantities, forms etc. and their relationships by the use of numbers and symbols."

In 20th century mathematics becomes a major profession. Every year thousands of students pass out from various level colleges and universities with various levels of degrees awarded to them. Numerous jobs are available both in teaching in mathematics and in industry. In most areas of the study of mathematics, the explosion of knowledge in scientific age has led to specialization. By the end of the century there were hundreds of specialized areas in mathematics explored. More and more journals were published and by the end of the century the development of World Wide Web led to online publishing. Now in the present age mathematics becomes a biggest profession. Every pupil has to learn mathematics from his first day to school and to the end of his study period. Therefore there is a great need to observe the teaching and learning process in mathematics so that this important subject is so presented to the students that they have a great interest in the subject and they achieve more and more.

2. Nature of Mathematics

Mathematics has its own language and symbols which cut short the lengthy statements. It helps in the expression of ideas or things by giving them the exact form. In other words mathematics is the language which was created by the mind of man. Lindsay a great mathematician remarks "Mathematics is the language of physical sciences and certainly no more marvellous language was ever created by the mind of man."

Mathematics relies on logic and creativity and pursued for both a variety of practical purposes and for its intrinsic interest. The essence of mathematics lies in its beauty and intellectual challenges. For engineers and scientists chief value of mathematics is how it applies to their work field. Mathematics plays a vital role in modern culture and science and technology. Some basic understanding of the nature of the subject is pre-requisite for scientific literacy.

3. Importance of Mathematics

It is said that mathematics is the gate and key of all sciences. According to the famous philosopher Kant "A science is exact only if so far as it employs mathematics. So all scientific education which does not commence with mathematics is said to be defective at its foundation. Neglect of Mathematics works injury to all subjects."

In today's world we are bombarded with large amount of data that must be absorbed, sorted out and has to organize and to make use of it for decision making in everyday's life such as while purchasing or choosing an insurance or health policies and any other planning, we every time needs mathematics. Business and industry need those workers who can solve real world problems and explain pro and cons of every item to the public mathematically. Data from Bureau of Labour and Statistics reveal that students must pursue mathematical and technical occupations. Today employment projections expect that occupations must of the jobs related to

mathematics, engineering and technology. Today's student must master advanced skills in mathematics, science and technology to stay track for college and for promising careers. Mathematics teaches ways of thinking that are essential to work and to live the civil life successfully.

4. Mathematics as an Academic Discipline

An academic discipline is a branch of knowledge that is taught and researched as a part of higher education. Mathematics has very important application in science and technology. Theoretical interest of its ideas and logical region of its methods together bring interest and knowledge in mathematics. It plays a crucial role in the progress of society and its continued growth through the exchange of research ideas, the encouragement and teaching of next generation of mathematical thinkers and philosophers. It is best described as the study of patterns. In that sense everybody is a mathematician. Mathematics as an academic discipline simply carries the study of patterns to a greater depth. Geometry concerns patterns of shape, arithmetic concerns patterns of numbers, calculus concerns patterns of continuous change, and statistics concerns patterns of chance.

In 1937 when Gandhiji propounded the idea of basic education, Zakir Hussain committee was appointed to elaborate on this idea. The committee had recommended that: "Knowledge of mathematics is essential part of any curriculum. Every child is expected to work out the ordinary calculations required in the course of his craft work or his personal and community concerns and activities." The secondary education commission 1952 as very much emphasized the need for mathematics education in schools. The national policy on education 1986 said "Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and articulate logically. Apart from being a specific subject it should be treated as a concomitant to any subject involving analysis, and reasoning."

5. Achievement in Mathematics

It is said that learning is not limited to mere acquisition of knowledge; it includes various other aspects such as attitude, interests, values etc. Rao (1964) said that academic achievement includes life goals, aspirations, study habits, emotional factors, personnel and social adjustment etc. Harrock (1969) defined academic achievement as "The state or level of person's skill, the range and depth of his knowledge and his proficiency in a designed area of learning and behavior."

Academic achievement in the present socioeconomic and cultural context is of paramount importance. Dictionary of Behavioral Sciences (Wolfman, 1973) defined academic achievement as the level of proficiency attained in some specific area concerning scholastic domain such as reading, mathematics, science and social studies or some other subject. To optimize academic achievement parents and teachers and educational planners has a great role to play. Modern age is an age of science and technology, every student must need to outperform in science and mathematics.

6. Study Habits

It is rightly said that character is the bundle of habits. This reveals the importance of habit in character. Education helps the learner in development of self-concepts and the attainment of knowledge by ways of good study habits. Every student have different kind of study habits, some study regularly, some study when examinations approaches nearby. Some study while listening music while some study in complete silence and calm. No matter how dull or bright a student is he can, make most of his ability only if his study habits are good and effective and he devotes plenty of his time towards his studies.

Study habits are an individual ability. Some children like to read alone, some in a group, some read aloud and some silently; there is no strict yardstick to measure the type of study habits. It may be inherited or acquired. The child can formulate its own study habits by itself. William et. al. Study-habits is the total of all habits, determined purposes and enforced practices that the individual uses in order to learn.

Azikiwe (1998) describes The study habits as "The adopted way as manner a student plans his private readings, after class-room learning so as to attain mastery of the subject" According to her, "Good study habits are good assets to learners because they assist students to attain mastery in areas of specialization and consequent excellent performance, while opposite constitute constraints to learning and achievement leading to failure." Good. (1998). define study habits as "The student's way of study, whether systematic, efficient or inefficient etc".

7. Study habits and Academic Achievement

Many students fail in their examinations not because they lack of knowledge or ability, but because they do not have adequate study habits and study skills (Menzal, 1982). Good students are not born but are made by constant and deliberate practice of good study habits for which there is no substitute. Thus in order to improve students' academic achievement in different aspects of education it is essential to improve their good study habits. According to (Kizlik 2001) development of good study habits in children depends upon the combined efforts of parents and teachers. Study habits are the pattern of behaviour adopted by students in the pursuit of their studies which serves as the vehicle of learning. It is the degree to which the students engages in regular acts of studying that are characterized by appropriate studying routines occurring in an environment that is conducive for study. Good study habits are associated with a favourable attitude towards learning in general.

Study habits as a research variable has been studied by many of the researchers (e.g. Kochar 2000, Hopper 2005, Jain 1965, Januar 1961, Bhaduri 1971, Sinha 1972). Most of the pupils of today lack depth of thought and breadth of vision due to bad study habits. Effective study habits are learned at home. Parenting means teaching our children, these skills and making them habits. Study skills are so important to improving grades and achievement in academics. There are some poor study habits such as poor attendance, poor

note taking, poor time management, last minute work, procrastination, failure to read directions, over confidence, lack of concentration during learning, etc, a student has to overcome these systematically to increase in his academic achievement. M. Mukhopadhyaya and D.N.Sansanswal identifies the following nine different kinds of the study habit behaviours. These are Comprehension, Concentration, Task-Orientation, Study Sets, Interaction, Drilling, Support, Drilling and Language.

8. Related Literature

Gelat (1999) in his study investigated effect of study habits on academic achievement of secondary school students and found that: There is no significant positive effect of study habits on educational achievement of students and there is no significant effect of sex on academic achievement of secondary school students.

Dinesh (2003) in his study on a sample of 300 students of XI class selected randomly from government and private senior secondary schools of Chandigarh concluded significant difference in the study habits of students belonging to science and arts stream. However he found that there is no significant difference between study habits of students of science and commerce group as held at arts and commerce group.

Sud & Sujata(2006) Conducted a study on academic performance in relation to self handicapping test anxiety and study habits of high school students (N = 200) from Government senior secondary schools of H. P. Results from the study revealed that boys were poor in study habits than girls and hence shows less achievement than girls.

Hudson (2010) conducted a study on performance of college students-impact of study time and study habits in which they found that some study habits had a positive direct relationship on student's performance but others had negative direct relationship.

Ergene(2011) in his study investigated relationship among study habits, test anxiety environment motivation and academic success in a Turkish high school for class 10th students by using study habits inventory and showed that study habits and anxiety were positively associated with academic achievement.

Lancaster and Robinson(2011) in a study to determine the characteristics that influence students course performance and showed that how students study habits change during the semester in order to facilitate better course performance in a science course at Oklahoma state university students with good study habits and poor study habits.

9. Objectives of the study

The present study was undertaken by keeping in view the following objectives:

- To find out the level of Study-Habits of senior secondary stage students.
- To study the difference in academic achievement in Mathematics due to high and low levels of Study Habits.

9.1. Hypotheses

On the basis of above mentioned objectives the following null hypotheses have been framed.

- H1. There is no significant difference between levels of Study-Habits of the secondary stage students.
- H2. There is no significant relationship between academic achievement in mathematics and Study-Habits of a student.

9.2. Tools Used

The following Research tools are used to collect data for the study.

- Achievement test in Mathematics (Developed by the Investigator)
- Study-Habits Scale (By M. Mukhopadhyay , 1994).

9.3. Sample

In the present study researcher had selected a sample of 600 students from XI and XII class from the Government and Non-Government senior secondary Schools of Hoshiarpur, Jalandhar and Nawanshahar districts of Punjab.

10. Results and Discussion

On analysis of the table1 the students categorized on basis of various dimensions of study habits such as excellent study habits, high study habits, above average study habits, moderate study habits, below average study habits, poor study habits and very poor study habits. It is identified that no student was fall in the excellent study habits category while one each girl student was identified as with high and above average study habits. 150(50.0%) boys were with very poor study habits as compared to 98 (32.7%) girl students. 122(40.7%) of the girl students were found to be poor in study habits as compared to 97(32.8%) boys and similarly, 63(21.0%) of the girls were in below average study habits as compared to 45(14.5%) of the boys. The percentage of the moderate study habits students was 15(5.0%) girls and 8(2.7%) among the boys has been found.

Study Habit Status	Boys	Girls	Total
Excellent Study Habits	0	0	0
High Study Habits	0	1 (0.3%)	1 (0.3%)
Above Average Study Habits	0	1 (0.3%)	1 (0.3%)
Moderate Study Habits	8 (2.7%)	15 (5.0%)	23 (3.9%)
Below Average Study Habits	45(14.5%)	63 (21.0%)	108 (17.8%)
Poor Study Habits	97(32.8%)	122 (40.7%)	219 (36.7%)
Very Poor Study Habits	150(50.0%)	98(32.7%)	248 (41.3%)
Total	300	300	G .T. = 600

Table 1: Distribution of the male and female students in terms of their Study habits scale.

Table 2: gives the correlation analysis of the different dimensions of variable study habits of the students with their academic achievement in mathematics. The null hypothesis H₂ was used in this case. The analysis of the table 2 shows that the null hypothesis H₂ is rejected as there is significant correlation presents between the academic achievement in mathematics of the students and those students who have dominant dimension of study habits as comprehension, concentration and task orientation. It is analyzed that there is significant positive correlation between the academic achievement in mathematics and the comprehension dimension of study habits i.e. $r = 0.090$ and with the concentration and task orientation dimension of the study habits with $r = 0.102$ and $r = 0.122$ respectively. It is further reveals that other dimensions of study habits like study sets $r = .072$, interaction $r = -.058$, drilling $r = -.011$, supports $r = -.020$, recording $r = .018$ and language $r = .062$ had no significant correlation with the academic achievement in mathematics of the students.

Dimension		Academic Achievement
Comprehension	Pearson Correlation	.090*
	P value	.028
	N	600
Concentration	Pearson Correlation	.102*
	P value	.013
	N	600
Task Orientation	Pearson Correlation	.122**
	P value	.003
	N	600
Study Sets	Pearson Correlation	.072
	P value	.080
	N	600
Interaction	Pearson Correlation	-.058
	P value	.159
	N	600
Drilling	Pearson Correlation	-.011
	P value	.784
	N	600
Supports	Pearson Correlation	-.020
	P value	.617
	N	600
Recording	Pearson Correlation	.018
	P value	.652
	N	600
Language	Pearson Correlation	.062
	P value	.132
	N	600
Study Habits Score Total	Pearson Correlation	.043
	P value	.259
	N	600

Table 2: Correlation analysis of the academic achievement in mathematics and the dimensions of the non-cognitive variable i.e. study habits of the students.

The analysis of the table 3 shows that the students having high study habits have 68.00 mean score on academic achievement in mathematics, with above average study habits score is 83.00, with moderate study habits score is 82.43, with below average study

habits score is 75.16, with poor study habits score is 53.03 and with very poor study habits score is 51.35. F value is 1.975 and p value is 0.281 which is significant, thus the null hypothesis assumed H₂ is rejected as there is significant difference was reported among the different study habits of the students regarding their academic achievement scores in mathematics. Statistically it is analyzed that there was significant difference recorded in the average scores of the high (68.00), above average (83.00), moderate (82.43), below average (75.16), poor (53.03) and very poor (51.35) study habits students.

Category	N	Mean	SD	F Test
High study habits	1	68.00	.	1.975
Above Average study habits	1	83.00	.	p = 0.281
Moderate study habits	23	82.43	14.352	Significant
Below Average study habits	108	75.16	16.120	
Poor study habits	219	53.03	14.669	
Very Poor study habits	248	51.35	13.536	
Total	600	74.33	14.534	

Table 3: ANOVA analysis of the academic achievement of the students categorized on basis of their study habit scores.

11. Findings

- i. The present study reveals that students differ on the basis of the various levels of the Study-Habits. Maximum number of students, i.e. 248 (41.3%) lies in the category of very poor study habits. No student was fall in the category of excellent study habits, only one each student exit in the category of high study habits and above average study habits.
- ii. Further, it is revealed that there is significant correlation between academic achievement in mathematics and comprehension, concentration and task-orientation dimensions of study-habits. Therefore, it is stated that there is a significant relationship between academic achievement in mathematics and study habits.

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