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Study of learning style of adolescents of Fazilka district in relation to their achievement in mathematics

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Abstract
Mathematics is one of the R's- reading, writing and arithmetic characteristics of a literate person. It is a critical skill in the information age. It inculcates in pupils a problem-solving ability, a clear expression of thoughts, logical reasoning etc. It is the core subject in our education system both at primary and secondary levels. The National Policy on Education (1986) has visualized Mathematics as a vehicle to train children to think, reason, analyze and articulate logically.

Keywords: learning style, adolescen, relation, achievement

Introduction
Mathematics is a universal part of human culture. It is the tool and language of commerce, engineering and other sciences – physics, computing, biology etc. It helps us recognize patterns and to understand the world around us. Mathematics plays a vital, often unseen, role in many aspects of modern life, for example-space travel, safeguarding credit card details on the internet, modeling the spread of epidemics, predicting stock market prices, business decision making.
As society becomes more technically dependent, there will be an increasing requirement for people with a high level of mathematical training. Analytical and quantitative skills are sought by a wide range of employers. A degree in mathematics provides us with a broad range of skills in problem solving, logical reasoning and flexible thinking. This leads to careers that are exciting, challenging and diverse in nature. Indian Education Commission (1964-66) 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 of this century make the beginning of new scientific, industrial revolution and makes it all the more imperative to devote special attention to the study of mathematics."

Mathematics Achievement
Mathematics achievement refers not only to obtaining excellent marks in the grade level final examination but it also refers to the attainment of mathematical ability and skills. Students' mathematics achievement is often associated with the future economic power and competitiveness of a country. Therefore, the desire to understand and identify factors that may have meaningful and consistent relationships with mathematics achievement has been shared among national policy makers and educators around the world.
Understanding concepts of numbers and operating with numbers are necessary components of proficiency in arithmetic and are needed to transfer previously learned procedures to solve everyday problems. Weaknesses in arithmetic will affect the development of other areas such as algebra and problem solving.
It is well known that individual differences in arithmetical performance are marked in both children and young adolescents. We, in this nation, have set a goal to provide all children with a demanding mathematics curriculum that leads to greater learning. The goal is right, but the road there is demanding. Curriculum must be rigorous and coherent by international standards. It must be focused. It must require our middle schools to expect more of our students. It must be taught by teachers well prepared in mathematics and in instructional approaches that themselves are steeped in mathematics as well as cognitive theories of how children learn, and, it must be for all children. Insisting that students master computation skills is not to advocate that they stop at the basics. Basic skills are a floor, not a ceiling. Students must learn arithmetic so that they can move on to more demanding mathematics-algebra, geometry, calculus. An emphasis on the basics should never be used as an excuse to straightjacket students or to slow their progress in the math curriculum.

Learning Styles
The level of learning achieved by a learner is one of the most important factors that indicate the success of a learning environment. Each learner has a distinct level of learning. Some persons with specific styles of learning perform better academically than others with a different learning style. Learning style is a consistent pattern of behavior but with a certain range of individual variability. When most students begin school, their test scores are

comparable but their experiences are varied. As their formal education continues, they are taught in the style that is most compatible to the teacher. Many learners fail to achieve an acceptable level of learning because there is a gap between teaching styles and their learning styles. Learning style is consistent across a wide variety of tasks. It has a broad influence on how information is processed and problems are solved, and it remains stable over many years. In general, the learning styles of the students are determined by their learning strategies. It is necessary to motivate the students to extend their learning styles to all situations so that they could deal with any kind of situations. Teachers should support their students in identifying their learning strengths and weaknesses. This will be helpful to improve the performance of the students and to have mastery over a particular subject.

James and Gardner (1995) [2] state that the ways individual learners react to overall learning environment make up the individual's learning style.

Verma, B. P., & Sharma, J. P. (2000) [1] states that learning style is a coherent whole of learning activities those students usually employ. They're learning orientation and their mental model of learning, a whole that is characteristic of them at certain period.

Statement of the Problem

Study of Learning Styles of Adolescents of Fazilka District In Relation to Their Achievement in Mathematics

Objectives of the Study

- To compare the achievement in mathematics of male and female students.
- To compare the achievement in mathematics of adolescents studying in government and private recognized schools.
- To study the correlation between achievement in mathematics and various learning styles of adolescents.

Hypotheses

- There is no significant difference between mean scores of Mathematics Achievement of male and female adolescents.
- There is no significant difference between mean scores of Mathematics Achievement of adolescents studying in government and private recognized schools.
- There is no significant correlation between Mathematics Achievement and various learning styles of adolescents.

Delimitation of the Problem

Students studying in class IX of government and private recognized senior secondary schools of Fazilka were considered.

Significance of Study

Mathematics has been recognized as one of the central strings of human intellectual activity throughout the centuries and is essential for progress of present age of science and technology. Since the quantitative treatment, measurement, analysis and reasoning are being increasingly used in many other subjects, the relevance of Mathematics is emphasized both in the context of the day to day problems in the child's environment and in the context of the child's learning in other concerned subject areas. Although mathematics is an important subject and is of vital importance but, even the achievement in mathematics at secondary stage is very poor. Mass failure and poor qualitative performance of the students are indicators of the fact that all is not well with mathematics teaching in schools. There have been many attempts to address the problem of low academic achievement and some factors have been identified in explaining academic achievement.

Table 1: Gender-wise Mean, S.D, N and t-value of mathematics achievement of male and female adolescents.

Gender	Mean	S.D.	N	t-value
Male	13.07	3.16	100	4.165**
Female	14.99	3.35	100	

** Significant at 0.01 level of significance.

Table 2: Type of School-wise Mean, S.D, N and t-value of Mathematics Achievement of adolescents.

Type of school	Mean	S.D.	N	t-value
Government	13	2.73	100	4.499**
Private	15.06	3.68	100	

** Significant at 0.01 level of significance.

From Table 2, it can be seen that the t-value is 4.499 which is significant. It reflects that the mean scores of Mathematics achievement of IX class adolescents studying in government and private recognized schools differ significantly. Therefore, the null hypothesis that there is no significant difference between mean scores of Mathematics achievement of adolescents studying in government and private recognized schools is not accepted.

It may therefore be said that adolescents studying in private recognized schools have higher mathematics achievement than adolescents studying in government recognized schools.

Relationship between Variables

The third to tenth objectives were to study the correlation between Mathematics achievement and Learning styles of adolescents. The data were analyzed with the help of Product Moment Correlation and the result is given in Table 3

Table 3: Showing values of coefficient of correlation of mathematics achievement and learning styles of adolescents (N=200)

Sr. No.	Variable	'r' Value
1	Active Learning Style	0.010
2	Reflective learning style	-0.017
3	Sensing learning style	-0.039
4	Intuitive learning style	0.039
5	Visual learning style	0.082
6	Verbal learning style	-0.082
7	Sequential learning style	0.046
8	Global learning style	-0.046

The value of coefficient of correlation of Active Learning Style with Mathematics Achievement of IX class students is 0.010 which shows positive non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Active learning style of adolescents is accepted. It may therefore be said that Active Learning Style and Mathematics Achievement are found to have no correlation. The value of coefficient of correlation of Reflective Learning Style with Mathematics Achievement of IX class students is -0.017 which shows negative non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Reflective learning style of adolescents is accepted. It may therefore be said that Reflective Learning Style and Mathematics Achievement are found to have no correlation. The value of coefficient of correlation of Sensing Learning Style with Mathematics achievement of IX class students is -0.039 which shows negative non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Sensing learning style of adolescents is accepted. It may therefore be said that Sensing Learning Style and Mathematics Achievement are found to have no correlation. The value of coefficient of correlation of Intuitive Learning style with Mathematics Achievement of IX class students is 0.039 which shows positive non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Intuitive learning style of adolescents is accepted. It may therefore be said that Intuitive Learning Style and Mathematics Achievement are found to have no correlation. The value of coefficient of correlation of Visual learning style with Mathematics Achievement of IX class students is 0.082 which shows positive non-significant correlation, as shown in table 3 Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Visual learning style of adolescents is accepted. It may therefore be said that Visual Learning Style and Mathematics Achievement are found to have no correlation. The value of coefficient of correlation of Verbal Learning Style with Mathematics Achievement of IX class students is -0.082 which shows negative non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Verbal learning style of adolescents is accepted. It may therefore be said that Verbal Learning Style and Mathematics Achievement are found to have no correlation.

The value of coefficient of correlation of Sequential Learning Style with Mathematics Achievement of IX class students is 0.046 which shows positive non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Sequential learning style of adolescents is accepted. It may therefore be said that Sequential Learning Style and Mathematics Achievement are found to have no correlation.

The value of coefficient of correlation of Global Learning Style with Mathematics Achievement of IX class students is -0.046 which shows negative non-significant correlation, as shown in table 3. Therefore, the null hypothesis that there is no significant correlation between Mathematics Achievement and Global learning style of adolescents is accepted. It may therefore be said that Global Learning Style and Mathematics Achievement are found to have no correlation.

Findings of the Study

1. It was found that female students of IX class have higher mathematics achievement than male students.
2. It was found that adolescents studying in private recognized schools have higher mathematics achievement than adolescents studying in government recognized schools.
3. Active Learning Style and Mathematics Achievement are found to have no correlation.
4. Reflective Learning Style and Mathematics Achievement are found to have no correlation.

5. Sensing Learning Style and Mathematics Achievement are found to have no correlation.
6. Intuitive Learning Style and Mathematics Achievement are found to have no correlation.
7. Visual Learning Style and Mathematics Achievement are found to have no correlation.
8. Verbal Learning Style and Mathematics Achievement are found to have no correlation.
9. Sequential Learning Style and Mathematics Achievement are found to have no correlation.
10. Global Learning Style and Mathematics Achievement are found to have no correlation.

Conclusion of The Study

The study reveals that the female students of IX class have higher mathematics achievement than male students. Furthermore, the adolescents studying in private recognized schools have higher mathematics achievement than adolescents studying in government recognized schools.

Moreover, the learning styles of adolescents i.e. active and reflective learners; sensing and intuitive learners; visual and verbal learners; sequential and global learners have no significant correlation with their mathematics achievement as there are many factors other than learning styles like study habits, methods of teaching, motivation etc. which affect their mathematics achievement.

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