

Academic Achievement of High School Students in Relation to their Logical Thinking

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Abstract

The present study is related to academic achievement of high school students in relation to their logical thinking. Descriptive Survey Method was used by the investigator. The random sampling technique was used in the study. from that district of Fatehgarh(Punjab).10 high schools were selected randomly 10 high schools were selected randomly. A sample of 10 students (5 boys and 5 girls students from each school) was drawn randomly. Thus, 100 high school students comprised the sample of the present study. A Logical Thinking Test inventory for high school students by Sujeet Kumar and ShikhaTiwari(2012) was used. Statistical techniques- Mean, Standard Deviation, Correlation and t -test were used to analyze data.

KEYWORDS: Academic Achievement, Logical Thinking

Introduction

Education is very important for the progress of individual and society. It's through education that man develops his thinking, power of reasoning and problem solving ability, intelligence, attitude, positive sentiments, values and attitudes. The concept of education has been changing from time to time according to the change in social conditions, physical environment and life styles. Education is dynamic and it cannot afford to be static in this fast changing society. Out of many goals, academic achievement is one of the most important goals of education. Academic achievement may be defined as the range of abilities and skills which the pupils have acquired in academic field. The future success of each pupil is assessed, predicted and linked with the achievement in school grades.

Achievement itself on varying degree depends upon various factors like age, sex, logical thinking, power of reasoning, problem solving ability, intelligence, personality, motivation, socio economic status, attitude, study habits, mental health etc. which are termed as correlates of achievement and in turn categorize pupils as high achievers or average. Out of these, logical thinking can be considered as an important factor. It plays a significant role in total shaping of behavior, personality and academic achievement of students. Academic achievement refers to the skills developed in school subjects that are evaluated by school authorities with the help of achievement tests that may be either standardized or teacher made. In other words, academic achievement may be defined as competence that is really revealed in school subjects in which they have received the instruction. The meaning of the term academy is a school where special types of instructions are imparted. The term achievement is used to denote the level of attainments in objectives prescribed for each subject taught to the pupils in the school and for which there is provision of measurement periodically by written tests in the school .Inspite of all the best efforts made in schools to raise the abilities, capabilities and personality traits of children, it is not possible to attain the optimum level of educational goals i.e. all around

development of one's personality. One of the major factors influencing educational products is one's logical thinking which an index of one's level of achievement is. Recently a lot of emphasis was laid on the role of logical thinking, ability to think logically, efficiently and memorizing the material in determining the conventional intelligence quotient. Logical thinking is thinking based on proven knowledge and information that is accurate and certain.

Logical thinking is the basis of modern technology, and it is commonly referred to as left-brain thinking. Logical thinking uses the straight facts in order to solve problems, as opposed to right-brained thinking, which is more romantic and emotional in nature. While Logical thinking is referred to as left-brain thinking, it actually governs the right side of the body and the right field of vision. There are several aspects to logical thinking. Roger Sperry of the University of California performed a study in which he discovered that logical thinking perceives time and is the foundation for verbalization skills and analytical thinking. Additionally, logical thinking governs the left side of body and is responsible for creativity and imagination. It is the foundation for visualization and perceives space as opposed to time. There are people who are perceived as left-brain thinkers and right-brain thinkers and there are also people that are equally left-brained and right-brained in their thinking patterns. Right-tend to rely on their own intuitions.

Logical thinking is the ability to understand and to incorporate the rules of basic logical inference in everyday activities. Regarded as a universal human trait, the ability to think logically, following the rules of logical inference has traditionally been defined as a higher cognitive skill. The field of cognitive child psychology was dominated for more than half a century by the Swiss Philosopher and Psychologist Jean Piaget, whose studies are considered fundamental. Piaget, identified four stages of cognitive development. During the sensory-motor stage(ages0-2years),the child learns to experience the world physically and attains a rudimentary grasp of symbols. In the preoperational stage(ages2-7years),symbols are used ,but thought is still “ preoperational” which means that the child does not understand that a logical, or mathematical operation can be reversed. The concrete operations stage (ages6 or 7-11years) ushers in logical thinking; children, for instance, understand principles such as cause and effect. The formal operational stage(12years-adulthood),introduces abstract thinking (i.e., thought operations that do not need to relate to concrete concepts and phenomena).Piaget himself, in his search for the origins of logical thinking, studied very young children, ever mindful of the relevance of other mental, and non-mental factors and processes to the emergence of logical thought. Finally, Piaget's work was the foundation from which the insight is emerged, corroborated by empirical observation, that the very young child is already a logician. Philosophers specializing in the study of different stages of human growth and development have found that the logical repertoire of young children is not limited to intentional logic. Many utterances made by children, particularly statements involving the concepts of possibility and necessity, exhibit a grasp, alert rudimentary, of modal logic, i.e., the branch of logic which formulates rules for propositions about possibility and necessity. The fact that the discourse of young children fits easily into the formal context of modal logic, which is related to intentional logic, indicates that the children's logical aptitude may yield new surprises. Building on the rich legacy of Piaget's work, researchers have significantly expanded the field of cognitive development, gaining critical insight which will further elucidate the human paradigm. The crucial relevance of

Piagetian and post-Piagetian studies for the inquiry concerning logical thinking in children lies in the fact that these studies have shed light on the important role played by non-logical factors in the formation of logical thinking.

Justification of the Study

Academic achievement is considered as one of the major factors for sustained participation in the field of education. The reach for quality in academic endeavors has raised several questions for education researchers and practitioners. In the present era of globalization, where fierce competition is everywhere, everybody seeks excellence in academic. Scholastic achievement is the unique responsibility of all educational institutions. Over the years, the investigations carried out on the factors that influence the academic performance of the students has attracted the interests and concerns of the teachers, counselors, psychologists, researchers and school administrators. Different factors have been found which influence the academic achievement of the students. Such factors may be the psychological and environmental. Logical thinking is one of the psychological factors. In his book 'Brain Building,' Dr.Karl Albrecht says that the basis of all thinking is sequential thought .This process involves taking important ideas, facts , and conclusions involved in a problem and arranging them in a chain-like progression that takes on a meaning in and of itself, to think logically in steps. Logical thinking is an important foundational skill of learning. Dr.Albrecht says, ' if you don't grasp others' ideas concepts, fact/or procedure, you can never hope to grasp others that come later, which depend upon it. For example, to understand fractions you must first understand division. To understand simple equation in algebra requires that you understand fractions. Solving word problems depends on knowing how to set up and manipulate equations, and so on. Keeping in view the importance of logical thinking in the academic achievement of students the present study has been taken to study the academic achievement of high school students in relation to their logical thinking.

Statement of the problem

Academic Achievement of high school Students in relation to their logical thinking

Operational definitions

Academic achievement

Academic Achievement refers to the marks of students in the last qualifying examination.

Logical thinking

Logical thinking is the ability to solve problems and make smart decisions. Logical thinking is a process of thinking out each factor and every detail of a problem and get to the end solution.

High school students

High school students here refer to the students studying in IX and X classes.

Objectives of the study

1. To study the relationship between academic achievement and logical thinking of high school students.
2. To study the difference in academic achievement of boys and girls high school students.
3. To study the difference in academic achievement of rural and urban high school students.
4. To study the difference in logical thinking of boys and girls high school students.

5. To study the difference in logical thinking of rural and urban high school students.

Hypotheses of the study

1. There exists no significant relationship between academic achievement and logical thinking of high school students.
2. There exists no significant difference in academic achievement of boys and girls high school students.
3. There exists no significant difference in academic achievement of rural and urban high school students.
4. There exists no significant difference in logical thinking of boys and girls high school students.
5. There exists no significant difference in logical thinking of rural and urban high school students.

Method

In the present study, Descriptive Survey Method was taken by the investigator.

Sample of the study

For the present study, out of 22 districts in Punjab, one district was selected. From that Ludhiana district, 10 high schools were selected randomly. A sample of 10 students (5 boys and 5 girls) from each school was drawn randomly. Thus, 100 high school students comprised the sample of the present study.

Tool used

In the present study, A Logical Thinking Test inventory for high school students by Sujeet Kumar and Shikha Tiwari (2012) was used.

Statistical techniques used

Statistical techniques- Mean, Standard Deviation, Correlation and t -test were used to analyze data.

Delimitations of the study

1. The present study was delimited to only one district of Punjab i.e. District Ludhiana.
2. The present study was delimited to high school students only.

Analysis and Interpretation of data

Hypothesis-1

There exists no significant relationship between academic achievement and Logical Thinking of high school students.

Table 1

Showing the significant relationship between Academic Achievement and Logical Thinking of High school students

Variables	N	M	Correlation
Academic Achievement	100	316.41	0.8 Significant positive relationship
Logical Thinking	100	24.38	

A pictorial view of the result is also shown in Figure 1

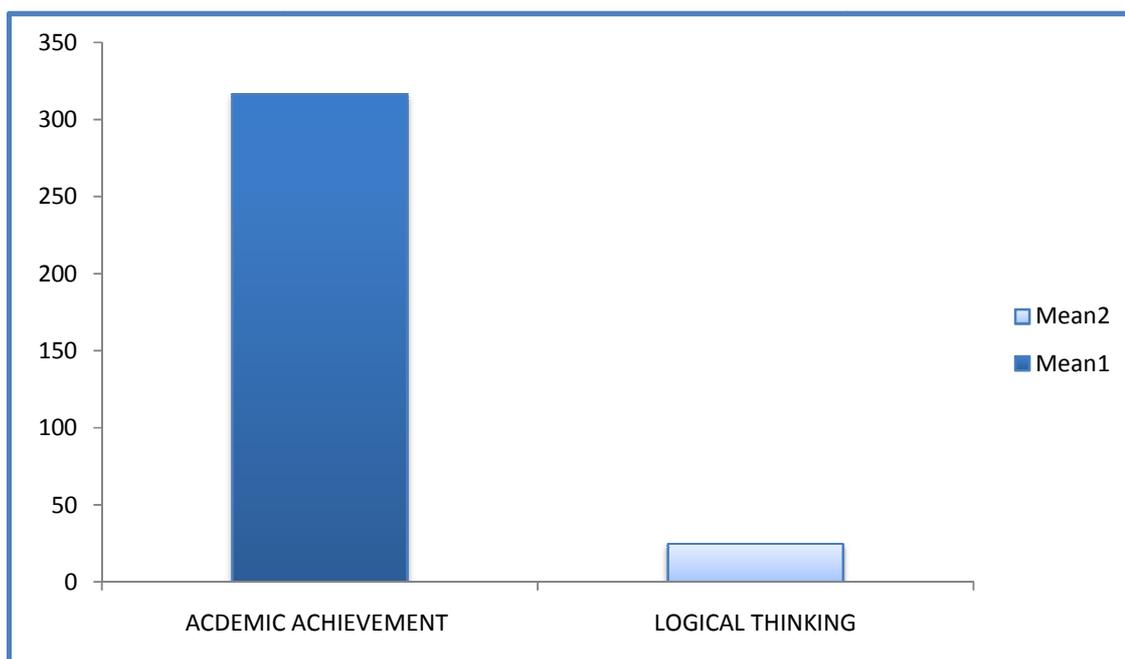


Figure 1: Showing Mean scores of academic achievement and logical thinking of boys and girls high school students.

It is clear from the table no. 1 that the mean scores of academic achievement and logical thinking of high school students are 316.41 and 24.38, correlation is 0.8. It indicated that, there is a significant relationship between academic achievement and logical thinking of high school students. So, Hypothesis-1 stands rejected.

Hypothesis -2

There exists no significant difference in academic achievement of boys and girls high school students.

Table 2

Showing the significant difference in academic achievement of boys and girls high school students

Academic Achievement	N	M	S.D	t -Value	Inference
Boys	50	306	37.27	2.24	Significant at 0.05
Girls	50	322	33.78		

A pictorial view of the result is also shown in Figure 2

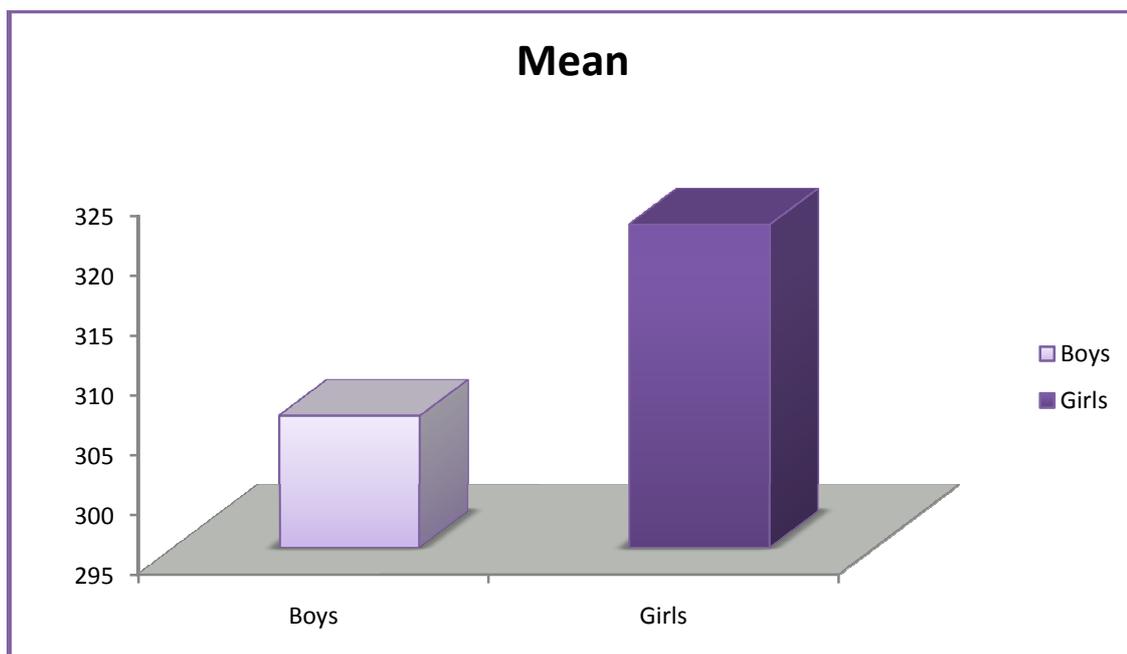


Figure.2: Showing Mean academic achievement scores of boys and girls high school students.

It is clear from the table no.2 that the mean scores of boys' students are 306 and girls' scores are 322, standard deviation is 37.27 and 33.78 respectively. The 't'-value is 2.24, which is significant at 0.05 level. Hence, there exists significant difference in academic achievement of boys and girls high school students. So, the hypothesis- 2 stands rejected.

Hypothesis -3.

There exists no significant difference in academic achievement of rural and urban high school students.

Table 3

Showing the significant difference in academic achievement of rural and urban high school students

Academic Achievement	N	M	S.D	t- Value	Inference
Rural	50	304	26.63	2.15	Significant at 0.05
Urban	50	318	37.42		

A pictorial view of the result is also shown in Figure-3

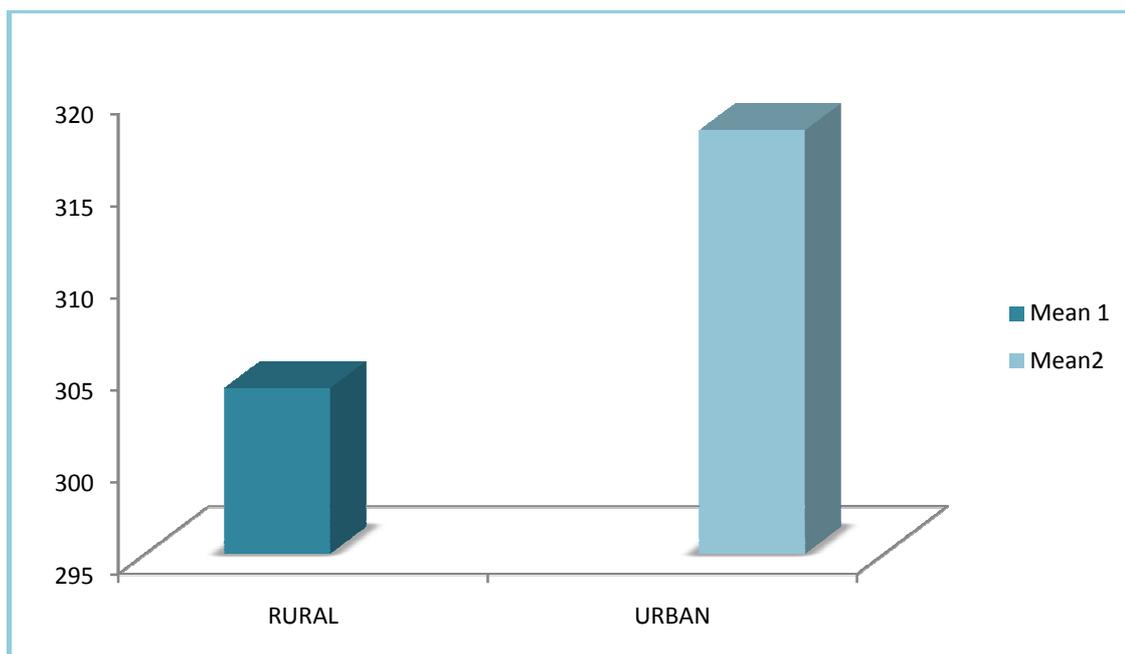


Figure 3: Showing Mean academic achievement scores of rural and urban high school students.

It is clear from the table no.3 that the mean scores of rural and urban high school students' are 304 and 318; standard deviation is 26.63 and 37.42 respectively. The 't'-value is 2.15, which is significant at 0.05 level. Hence, there exists significant difference in academic achievement of rural and urban high school students. So, the hypothesis- 3 stands rejected.

Hypothesis -4

There exists no significant difference in logical thinking of boys and girls high school students.

Table 4

Showing the significant difference in logical thinking of boys and girls high school students

Logical Thinking	N	M	S.D	t-Value	Inference
Boys	50	22	7.81	2.73	Significant at 0.05
Girls	50	26	6.81		

A pictorial view of the result is also shown in Figure 4

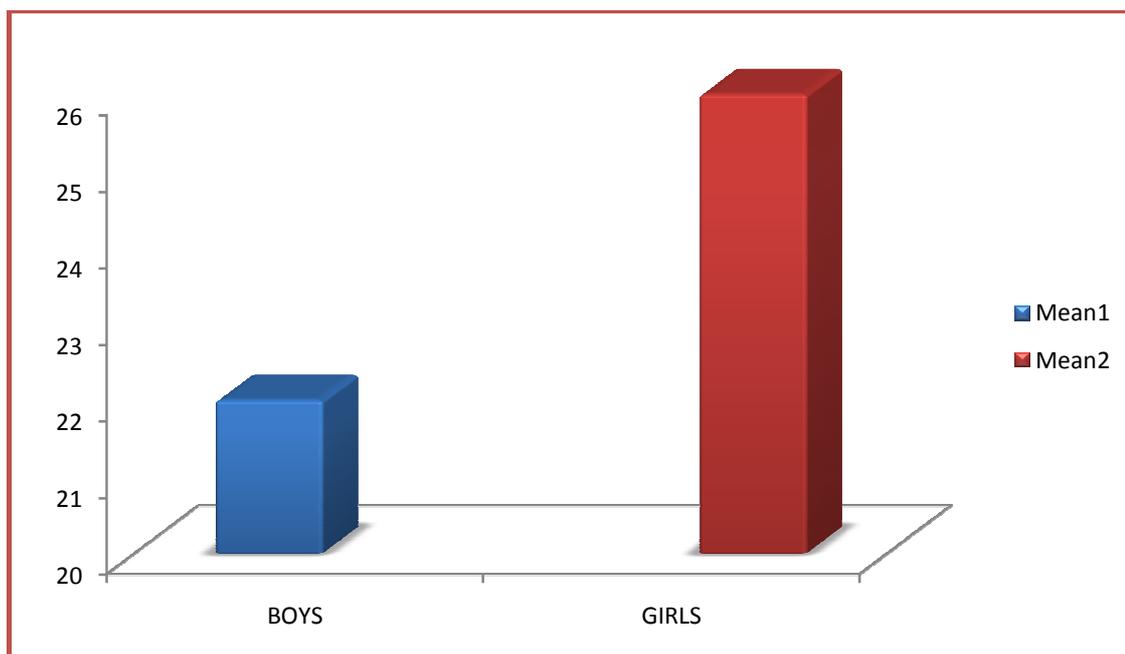


Figure 4: Showing Mean logical thinking scores of boys and girls high school students.

It is clear from the table no.4 that the mean scores of boys and girls high school students are 22 and 26; standard deviation is 7.81 and 6.81 respectively. The 't'-value is 2.73, which is significant at 0.01 & 0.05 level. Hence, there exists significant difference in logical thinking of boys and girls high school students. So, the hypothesis- 4 stands rejected.

Hypothesis -5

There exists no significant difference in logical thinking of rural and urban high school students.

Table 5

Showing the significant difference in logical thinking of rural and urban high school students

Logical Thinking	N	M	S.D	t-Value	Inference
Rural	50	21.3	6.79	2.38	Significant at 0.05
Urban	50	24.9	8.26		

A pictorial view of the result is also shown in Figure 5

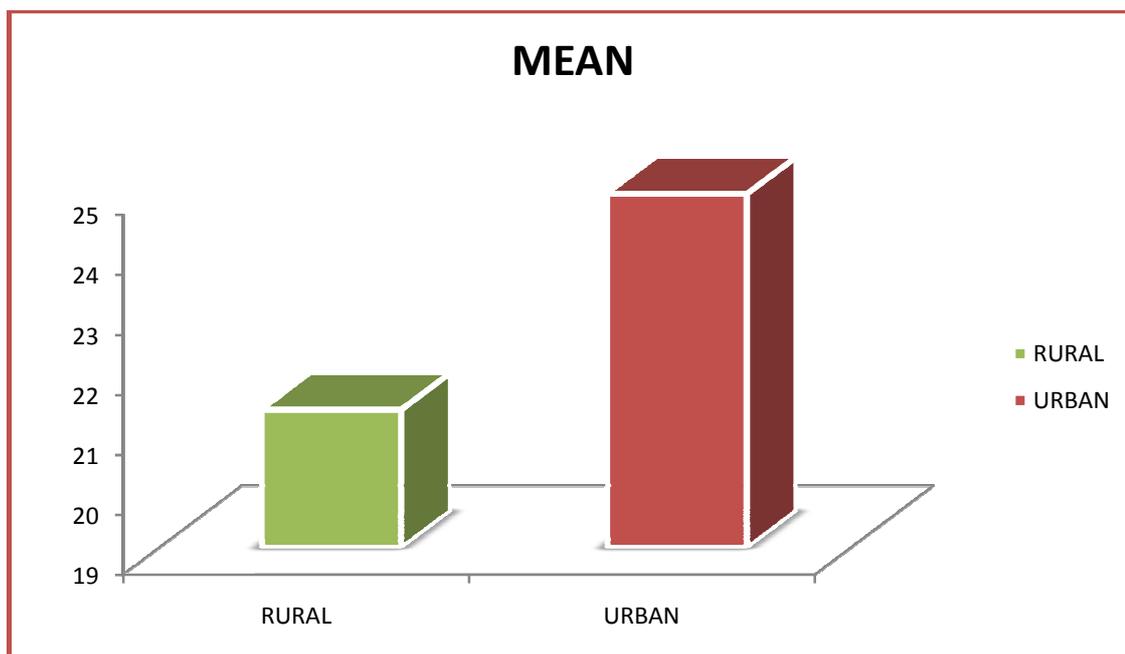


Figure 5: Showing Mean logical thinking scores of rural and urban high school students.

It is clear from the table no.5 that the mean scores of rural and urban high school students are 21.3 and 24.9; standard deviation is 6.79 and 8.26 respectively. The 't'-value is 2.38, which is significant at 0.05 level. Hence, there exists significant difference in logical thinking of rural and urban high school students. So, the hypothesis- 5 stands rejected.

Main Findings of the Study

The main findings of the present study are below:

1. There exists positive relationship between academic achievement and logical thinking of high school students. It means that logical thinking has effect on academic achievement of high school students.
2. The difference between mean scores of academic achievement of boys and girls high school students was found to be significant. The difference was in favour of girls students. Therefore it was concluded that gender did account for difference in academic achievement.
3. The difference between mean scores of academic achievement of rural and urban high school students was found to be significant. The difference was in favour of urban students. Therefore it was concluded that location did account for difference in academic achievement.
4. The difference between mean scores of logical thinking of boys and girls high school students was found to be significant. The difference was in favor of girls students. Therefore it was concluded that gender did account for difference in logical thinking.
5. The difference between mean scores of logical thinking of rural and urban high school students was found to be significant. The difference was in favor of urban students. Therefore it was concluded that location did account for difference in logical thinking.

Educational implications

The findings of the study with respect to correlates of academic performance of high school students will be beneficial for improving curriculum and teaching. It can thus be of great help to teachers, school administrators and to guidance and counseling workers.

Further to understand the factors/variables that tell the success and failure of students does not simply amount to academic exercise but has practical bearing in the sense that it makes possible the proper and full utilization of our limited resources which otherwise can go waste.

To foster logical thinking, teachers must encourage learners to think logically and make associations between things that are not usually connected. They must be able to reinterpret and apply their learning in new contexts, look at things from different points of view and experiment with alternative approaches to solving problem. Teachers must help learners to see possibilities and challenges and all of these skills can be taught.

From the results of the present study it can be inferred that general logical thinking, test anxiety, achievement motivation, study habits, adjustment and home environment are essential factors/ variables for the progress in academic achievement of the students. Therefore proper stress may be given by the school to develop general logical thinking.

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