

Vol 5 Issue 1 Oct 2015

ISSN No : 2249-894X

*Monthly Multidisciplinary
Research Journal*

*Review Of
Research Journal*

Chief Editors

Ashok Yakkaldevi
A R Burla College, India

Flávio de São Pedro Filho
Federal University of Rondonia, Brazil

Ecaterina Patrascu
Spiru Haret University, Bucharest

Kamani Perera
Regional Centre For Strategic Studies,
Sri Lanka

Welcome to Review Of Research

RNI MAHMUL/2011/38595

ISSN No.2249-894X

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Advisory Board

Kamani Perera Regional Centre For Strategic Studies, Sri Lanka	Delia Serbescu Spiru Haret University, Bucharest, Romania	Mabel Miao Center for China and Globalization, China
Ecaterina Patrascu Spiru Haret University, Bucharest	Xiaohua Yang University of San Francisco, San Francisco	Ruth Wolf University Walla, Israel
Fabricio Moraes de Almeida Federal University of Rondonia, Brazil	Karina Xavier Massachusetts Institute of Technology (MIT), USA	Jie Hao University of Sydney, Australia
Anna Maria Constantinovici AL. I. Cuza University, Romania	May Hongmei Gao Kennesaw State University, USA	Pei-Shan Kao Andrea University of Essex, United Kingdom
Romona Mihaila Spiru Haret University, Romania	Marc Fetscherin Rollins College, USA	Loredana Bosca Spiru Haret University, Romania
	Liu Chen Beijing Foreign Studies University, China	Ilie Pinte Spiru Haret University, Romania
Mahdi Moharrampour Islamic Azad University buinzahra Branch, Qazvin, Iran	Nimita Khanna Director, Isara Institute of Management, New Delhi	Govind P. Shinde Bharati Vidyapeeth School of Distance Education Center, Navi Mumbai
Titus Pop PhD, Partium Christian University, Oradea, Romania	Salve R. N. Department of Sociology, Shivaji University, Kolhapur	Sonal Singh Vikram University, Ujjain
J. K. VIJAYAKUMAR King Abdullah University of Science & Technology, Saudi Arabia.	P. Malyadri Government Degree College, Tandur, A.P.	Jayashree Patil-Dake MBA Department of Badruka College Commerce and Arts Post Graduate Centre (BCCAPGC), Kachiguda, Hyderabad
George - Calin SERITAN Postdoctoral Researcher Faculty of Philosophy and Socio-Political Sciences Al. I. Cuza University, Iasi	S. D. Sindkhedkar PSGVP Mandal's Arts, Science and Commerce College, Shahada [M.S.]	Maj. Dr. S. Bakhtiar Choudhary Director, Hyderabad AP India.
REZA KAFIPOUR Shiraz University of Medical Sciences Shiraz, Iran	Anurag Misra DBS College, Kanpur	AR. SARAVANAKUMARALAGAPPA UNIVERSITY, KARAIKUDI, TN
Rajendra Shendge Director, B.C.U.D. Solapur University, Solapur	C. D. Balaji Panimalar Engineering College, Chennai	V.MAHALAKSHMI Dean, Panimalar Engineering College
	Bhavana vivek patole PhD, Elphinstone college mumbai-32	S.KANNAN Ph.D , Annamalai University
	Awadhesh Kumar Shirotriya Secretary, Play India Play (Trust), Meerut (U.P.)	Kanwar Dinesh Singh Dept.English, Government Postgraduate College , solan

More.....

**Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.ror.isrj.org**



“ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS IN MATHEMATICS IN RELATION TO THEIR MATHEMATICAL APTITUDE”



Sushma Gupta

Assistant Professor ,Department of Education , Kurukshetra University, Kurukshetra.



Co - Author Details :

Harvinder Kaur

Research Scholar (Ph.D.) , Department of Education , Kurukshetra University, Kurukshetra.



ABSTRACT

The present study was conducted to examine the ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS IN MATHEMATICS IN RELATION TO THEIR MATHEMATICAL APTITUDE. The investigation was carried out on 300 high school students of Haryana state. Descriptive survey method of research was used to conduct present investigation. For the present study the investigator used Mathematical Aptitude test (developed and standardized by Rajni, 2006). Data were collected personally by the investigator. Mean, standard deviation , pearson’s product moment method of correlation and t-Test were used to analyzed and interpret the data.



KEYWORDS :*Academic Achievement, High School Students, Mathematics, Aptitude, Mathematical Aptitude.*

ACADEMIC ACHIEVEMENT

Academic achievement has always been a crucial area and 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.

As soon as a child steps into the school, the process of his behaviour modification begins. He acquires new attitudes, capabilities and skills which are judge by his achievement. In the school, it may be taken to mean the attainment of any level of excellence in a desirable activity by the student. Since the word “desirable” implies a value judgement, it is obvious, that a particular attainment may be referred to an achievement or otherwise depending on whether it is considered desirable or not achievement is used in broad sense; it is customarily concerned with academic context with the

development of knowledge, understanding and acquisition of skills.

Academic achievement can be defined as excellence in all academic disciplines, in class as well as extracurricular activities. It includes excellence in sporting, behaviour, confidence, communication skills, punctuality, assertiveness, Arts and Culture.

Academic achievement has become an index of child's future in this highly competitive world. Academic achievement has been one of the most important goals of the educational process. It is also a major goal, which every individual is expected to perform in all cultures. Academic achievement is a key mechanism through which adolescents learn about their talents, abilities and competencies which are an important part of developing career aspirations (Lent et al. 2000).

It is one of the determinants of success in life. Students who achieve well academically have some advantages. Academic achievement serves as a key criterion in order to judge student's true potentials and capabilities (Daulta, 2008, Nuthanap, 2007). Identifying these potentials and capabilities are necessary to better hone them and find remedies where there are lacking.

MATHEMATICS

Mathematics is a subject which provides basis, directly or indirectly to almost all the subjects both of arts and science streams. Mathematics dominates almost every field of our life and activities. Mathematical power requires the development of self-confidence, a disposition to pursue and use quantitative and spatial information in solving problems and making decisions. Student's interests, curiosity and flexibility also affect the acquisition of mathematical power. This power will help the students in their future life, skills and carrier.

In this dynamic world, people who perceive and may do arithmetic can have considerably increased opportunities and choices for shaping their futures.

Mathematical competences open doors to productive futures. an absence of mathematical competency keeps those doors closed. All students should have the opportunity and the support necessary to learn significant mathematics with understanding and depth.

APTITUDE

School education in recent times, has emerged as an important segment of the total educational system expected to contribute significantly to the individual as well as national development processes. Today the important need of India, is to produce the right type of grown up children who will one day take the responsibility of their own and also handle the problems of our country and lead the uneducated masses to right path of social and economic development. Our dreams can only be true if and when educated boys and girls are equipped with sterling qualities of head and high to lead the masses and to take the work of future development in their own hand.

It can only be possible by classifying them according to their abilities, qualities through aptitude test. Aptitude can be considered as the phase or area of an individual's mental ability in which he can be expected to continue to improve to a point of exceptional performance. Aptitude measurement gives an indication of ability to succeed in a specific field and achievement is a quality or ability of a person, which is measured after training of a subject or a group of subjects.

Aptitude is defined as “a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire with training some specified knowledge, skills or set of responses such as the ability to speak of language, to produce music etc.”

- Warren

An aptitude is the potentiality of a person who has to succeed in an occupation or school attainment. Aptitude has relation to the future plans of a person. In referring to a person's aptitude for mathematics or art or carpentry or law, we are looking to the future of the person his aptitude is however, a present condition, a pattern of traits, deemed to be indicative of his potentialities.

Therefore, aptitude is a special ability, talent and potential capacity for learning a certain mental or physical operation or it is a mental capacity that indicates the probability of success in a particular line of endeavour.”

MATHEMATICAL APTITUDE

Aptitude also plays a very important role in the development of the personality of an individual. Hence it becomes one of the most important functions of the counsellor to find a particular aptitude in child. Also, the role of education is to help the child to discover himself, to develop his innate abilities and above all to cultivate desirable attitudes and aptitudes.

We are entering an era where aptitude for a particular subject field is being given weightage. Mathematics now dominates almost every field of our life and our activities. In this age of science and technology. It has permeated through the human life in such a way that, It has now become every man's everyday concern. To excel in mathematics aptitude towards it is mandatory.

Bande (2004):- stated that aptitude is the natural ability or special skill at doing something. Aptitude test in mathematics is less dependent on external influence in experience. It is more of the innate capacity to learn and not the outcome of extensive learning itself.

Deanna (2007):- maintained that lack of mathematical skill raises serious issues for our nation's production or scientifically literate citizens and workers at every level.

Therefore, by knowing the mathematical aptitude of the child, he can be guided to adopt a profession related to the field of mathematics. Mathematical achievement of a child largely depends upon his mathematical aptitude.

Also, our society become more and more dependent on high levels of computer based technology. It becomes increasingly important that children should grow up with a basic competence and familiarity with numbers and they should feel at home in the world of calculation and computation of course, there are many children who easily develop a familiarity with numbers.

Yet, there are also many children who think that mathematics is like learning a foreign language and approach numerical problems with a mixture of confusion and helplessness. Some of these children manage to grasp the concepts in school, by picking up a collection of techniques and tricks. These may suffice them to get through the examinations. But they may be only hazily understood.

It seems quite possible that children might have difficulty with routines learned at school and yet at the same time be able to solve the mathematical problems for which these routines were devised in other more effective ways. One way to test this idea is to look at children who have to make frequent and quite complex calculations outside school.

It might be the case that the some person could solve problems sometimes in formal and at other times in informal ways. This seem particularly likely with children who often have to do mathematical calculations in informal circumstances outside school at the same time on their knowledge of numbers, which they have to learn at school is imperfect and their use of them is in effective.

There is also some evidence that informal procedures learned outside school are often extremely effective.

Gay and Cole (1976):- for e.g. showed that unschooled keeper traders estimated quantities of

rice far better than educated Americans managed to.

There are reasons for thinking that may be difference between mathematical problems learned in school and solving them in familiar contents out of school.

Reed and Lave's (1981):- study with Liberian adults showed differences between people who had and who had not been to school. However, it is quite possible that the same differences between informal and school based routines could exist within people.

Thus, pedagogical psychology has proved that aptitude of children and youth are shaped and developed in the process of activity requiring the utilization of those qualities which form abilities to do that kind of activity.

RATIONALE OF THE STUDY

All scientific education is based on mathematics. Its neglect means to remain ignorant about all other sciences. We should not forget that right from morning till evening, all our activities and engagements are controlled and fashioned by mathematics. It is a pivot all processes of civilization. Mathematics helps us to develop our intellectual powers like power of imagination, memorization, logical thinking and reasoning. Study of mathematics is helpful in learning most of school subjects.

Achievement in mathematics is the competency shown by the student in the subject. But, there are intra and inter differences among the individuals in the achievement of mathematics. These differences may be due to their aptitude in the subject. The incidence of large failure in mathematics in secondary school examination and in university examination is of great concern not only the parents but, also to the educators. Sometimes, the parent due to their over enthusiasm and own ambition, force the child to opt for mathematics without know the aptitude of the child. The child gradually develops hatred for the subjects and becomes backward in mathematics. The present study has great significance, relevance, importance and utility for both parents and teachers. Because, this will encourage them to come forward to understand their children's and aptitude towards a particular subject. It is more important for the researcher so that they can capitalize the opportunities according to the interest taste and aptitude of the students.

A control goal for all levels of mathematics education is the development of mathematical power for all the students. In particular, mathematical power include the ability to explore, conjecture and reason logically; to solve non – routine problem's, to connect concepts within mathematics and between mathematics and real–world situations, to read, write, listen and speak mathematically. This power will help the students in their future life. Findings of the present study will be helpful to parents and school authorities including teachers and principals to know and understand the effect of mathematical aptitude on their academic achievement in mathematics. Present study has employed the statistical technique of correlation and t- ratio. In this way, present study is helpful in studying the predictive efficiency of independent variables i.e. mathematical aptitude in predicting the achievement of students in mathematics.

OPERATIONAL DEFINITIONS OF TERMS USED

Academic Achievement:- Academic achievement is one part of wider term i.e. educational growth which includes knowledge attained or skills developed in the schools subjects which is usually evaluated by test scores or marks assigned by teachers or both. In the present study academic achievement in mathematics was assessed on the basis of students' last year annual examinations' obtained scores.

High School Students:- Here, in the present study, high school students refers to the students who are studying in 10+2 schools in class 9th to prepare themselves for real world work life.

Mathematical Aptitude:- Mathematical aptitude refers to those qualities characterizing a person's ways to behaviour which serve to indicate how well he can learn to meet and solve certain mathematical problems.

OBJECTIVES OF THE STUDY

The present study was carried with the following objectives.

- 1.To study the relationship between mathematical aptitude and academic achievement in mathematics.
- 2.To study the difference between academic achievement of male and female students in mathematics.
- 3.To find out the difference between academic achievement of government and private school students in mathematics.
- 4.To study the difference between mathematical aptitude of male and female students.
- 5.To find out the difference between mathematical aptitude of government and private school students.

HYPOTHESES OF THE STUDY

After going through the review of related literature following hypotheses were formulated.

- 1.There exists significant relationship between mathematical aptitude and academic achievement in mathematics.
- 2.There exists significant difference between academic achievement of male and female students in mathematics.
- 3.There exists significant difference between academic achievement of government and private school students in mathematics.
- 4.There exists significant difference between mathematical aptitude of male and female students.
- 5.There exists significant difference between mathematical aptitude of government and private school students.

DELIMITATIONS OF THE STUDY

The scope of the study was delimited as under

- The study was confined only to three districts of Haryana state Kurukshetra, Ambala and Yamunanagar.
- Only the high school students of class ix from these three districts were taken for the present study.
- The sample of the present study was restricted to 300 students of high schools.
- The study was delimited to government and private schools of Haryana state.
- The study was confined to two variables i.e. Academic achievement (dependent), and mathematical aptitude (independent).

RESEARCH METHODOLOGY

Descriptive survey method of research was used to conduct present investigation.

POPULATION

In the proposed study, population refers to all the students of high schools of Haryana state.

SAMPLE

For the selection of the schools the investigator first of all purposively selected the three districts namely Kurukshetra, Ambala and Yamunanagar of Haryana state. One block from each district (Shahabad block from Kurukshetra district, Jagadhari block from Yamunanagar district and Ambala Cantt from Ambala district) was taken for the selection of the schools. From each block two schools (one is government and another is private school) were selected randomly. In this way six schools in all were selected for the study. Twenty five male students of class ix ($25 \times 6 = 150$) and Twenty five female students of class ix ($25 \times 6 = 150$) were selected randomly. Thus, 300 students of the class IX from these schools constituted the sample for the present study.

TOOL USED

For the present study the investigator used Mathematical Aptitude test (developed and standardized by Rajni, 2006)

DATA COLLECTION

The data were collected by administering the above mentioned tool on individual students. On completion of the data, scoring was done with the help of key prepared by the concerned authors.

STATISTICAL TECHNIQUES

The following statistical techniques were used to analyse the data:

- ✦ Descriptive statistics namely, Mean, SD. were employed.
- ✦ Inferential statistics namely, t-ratio, pearson's product moment method of correlation were used.

ANALYSIS AND INTERPRETATION OF THE DATA

Analysis of data means studying the calculated material to determine facts or meanings. It involves breaking down the existing complex factors into simple parts and putting the parts together in new arrangements for the purpose of interpretation.

Analysis as a process enters into researcher in one form or the other in the very beginning, in the selection of problem, in the determination of methods and in interpreting and drawing conclusions from the data gathered. Data should be studied from as many angles as possible to find out newer and newer facts.

The process of interpretation is essentially one of stating what the result show, what do they mean ? What is their significance ? What is the answer to the original problem ?

Interpretation is by no means a mechanical process. Interpretation is the most important step in the total research process. It calls for a critical examination of the results of ones analysis in the light of all the limitations of the data gathered.

Thus, analysis and interpretation of the data help further researchers to attach the related problems with appropriate statistical techniques to avoid unnecessary labour.

On the basis of analysis and interpretation of data following findings have been drawn

Table No. 1
correlation between Mathematical Aptitude and Academic Achievement in Mathematics.

Sr. No.	Independent Variable	The value of Coefficient of Correlation with dependent variable of academic achievements in Mathematics.
1.	Mathematical Aptitude	0.240 **

INTERPRETATION

Table No.1 shows that the calculated value of coefficient of correlation r is 0.240. It is significant at 0.01 level. So, the hypothesis is accepted. Thus, there exist significant positive correlation between Mathematical Aptitude and Academic Achievement in mathematics.

Table No. 2
Significance difference between Academic Achievement of male and female students in mathematics

Name of variable	Group	N	Mean	S.D	df	SE _D	t-ratio
Academic Achievement	Male	150	66.49	18.52	298	2.135	0.694
	Female	150	65.65	18.46			

INTERPRETATION

The calculated value of ‘t’ is less than the table value 1.97 and 2.59 at 0.05 and 0.01 level of significance. It means that the hypothesis is rejected and it shows that there is no significant difference between Academic Achievement of male and female students.

Table No. 3
Significance difference between Academic Achievement of government and private students in mathematics

Name of variable	Group	N	Mean	S.D	df	SE _D	t-ratio
Academic Achievement	Govt.	150	51.31	9.88	298	1.28	2.833
	Private	150	80.83	12.16			

INTERPRETATION

The calculated value of ‘t’ is greater than the table value 1.97 and 2.59 at 0.05 and 0.01 level of significance. Thus we accept the hypothesis and it shows that there exist significant difference in the Academic Achievement of government and private school students in mathematics.

Table No. 4
Significance difference between Mathematical Aptitude of male and female students in mathematics

Name of variable	Group	N	Mean	S.D	df	SE _D	t-ratio
Mathematical Aptitude	Male	150	18.26	7.158	298	0.75	0.11
	Female	150	17.05	5.83			

INTERPRETATION

The calculated value of ‘t’ is less than the table value 1.97 and 2.59 at 0.05 and 0.01 level of significance. It means that the hypothesis is rejected and it shows that there is no significant difference between Mathematical Aptitude of male and female students.

Table No. 5
Significance difference between Mathematical aptitude of Government and Private students in mathematics

Name of variable	Group	N	Mean	S.D	df	SE _D	t-ratio
Mathematical Aptitude	Govt.	150	15.37	4.09	298	0.70	4.948
	Private	150	19.94	7.67			

INTERPRETATION

The calculated value of ‘t’ is greater than the table value 1.97 and 2.59 at 0.05 and 0.01 level of significance. Thus we accept the hypothesis and it shows that there exist significant difference in the Mathematical Aptitude of government and private school students in mathematics.

EDUCATIONAL IMPLICATIONS

Any piece of research, directly or indirectly has a good chance of finding some practical applications. Some of the areas in which present findings find direct application are mentioned here. In the light of above findings of the present investigation the educational implications may be suggested. To summarize, the present research presents the academic achievement of high school students in mathematics in relation to their mathematical aptitude that can be utilized by parents, teachers, administrators and guidance personals for substantially enhancing the academic performance of students, especially for those who are studying in high schools. Findings of this research may help to understand the mathematical aptitude of the child, he can be guided to adopt a profession related to the field of mathematics. Mathematical achievement of a child largely depends upon his mathematical aptitude. Also, parents and teachers should provide scientific and mathematical literature, psychological environment to their children. Therefore, in order to develop mathematical aptitude in student's right from the beginning, care must be taken by parents and teachers to identify the aptitude of students in an early age and accordingly some facilities should be provided in which the students can develop their aptitudes for mathematics. Teacher should use drill and practice to fix up the mathematical concepts for better learning.

REFERENCES

1. Bhatnagar, J. K. and Sharma, M., 1992, A study of the relationship between parental education and Academic Achievement in a semi rural setting. *Psy.Stu.*, 37(2): 126-129.
2. Budhdev, P.V. 1999, Academic achievement among children of working and non-working mothers. *Indian Psy. Rev.*, 52 (2) : 69-73.
3. Diwan, P. (1991). A study of Predictors of Academic Achievement of Student- Teachers in Terms of Aptitude, Attitude, Participation and Human Values. Ph.D. (Education), Punjabi University, Patiala.
4. Ganihar, N. N., & Wajiha, A. H. (2009). Factor affecting academic achievement of IX standard students in mathematics. *Edutracks*, 8(7), 25-33.
5. Hadamard, J. (1954). *Psychology of invention in the mathematical field*. Princeton, NJ: Princeton University Press.
6. Khatoon, F. (1988). A Study of Mathematical Aptitude Among Boys and Girls and its Relationship With Interests and Vocational Preferences at the Secondary School Level. *Fifth Survey of Research in Education*, Vol.1, pp.372.
7. Rajni (2006). Teacher- Parental Support Study Habits, Aptitude For and Attitude towards Mathematics as Predictors of Mathematical Achievement. Ph.D. (Education) Thesis, Panjab University, Chandigarh.
8. Ramaswamy, R., 1990, Study habits and Academic Achievement. *Expt. Edu.*, 18(10): 255-260.
9. Sharma, A. (1995). A Study of Some Important Aptitudes of Over and Under Achievers of Class Students. M.Ed. Dissertation, Punjabi University, Patiala.
10. Singh, R. (2004). A Study of the Impact of Scientific Aptitude and Study Habits on the Achievement of XI Grade Students in Science. M.Ed. Dissertation, Panjab University, Chandigarh.
11. Suneetha, B. and Mayuri, K., 2001, A study on age and gender differences on the factors affecting high Academic Achievement. *J. Comm. Guid. Res.*, 18(2): 197-208.
12. Thompson, R. A., & Zamboanga, B. L. (2004). Academic Aptitude and Prior Knowledge as Predictors of Student Achievement in Introduction to Psychology. *Journal of Educational Psychology*, 96(4), 778-784.
13. Vijayalaxmi, N. and Natesan, H., 1992, Factors influencing academic achievement. *Research Highlights*, 2: 62.

Publish Research Article

International Level Multidisciplinary Research Journal For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper, Summary of Research Project, Theses, Books and Books Review for publication, you will be pleased to know that our journals are

Associated and Indexed, India

- ▲ Directory Of Research Journal Indexing
- ▲ International Scientific Journal Consortium Scientific
- ▲ OPEN J-GATE

Associated and Indexed, USA

- ▲ DOAJ
- ▲ EBSCO
- ▲ Crossref DOI
- ▲ Index Copernicus
- ▲ Publication Index
- ▲ Academic Journal Database
- ▲ Contemporary Research Index
- ▲ Academic Paper Database
- ▲ Digital Journals Database
- ▲ Current Index to Scholarly Journals
- ▲ Elite Scientific Journal Archive
- ▲ Directory Of Academic Resources
- ▲ Scholar Journal Index
- ▲ Recent Science Index
- ▲ Scientific Resources Database

Review Of Research Journal
258/34 Raviwar Peth Solapur-413005, Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.ror.isrj.org