

ACHIEVEMENT IN MATHEMATICS SUBJECT AMONG SECONDARY SCHOOL STUDENTS IN VIJAYAWADA CITY, ANDHRA PRADESH

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Paper Received On: 25 OCTOBER 2022

Peer Reviewed On: 31 OCTOBER 2022

Published On: 01 NOVEMBER 2022

Abstract

The present research aims to investigate the achievement in mathematics subject among secondary school students. A sample of 305 secondary school students studying in Vijayawada city of Krishna district was selected by using a stratified random sampling technique. In this research, the researcher took the achievement in mathematics marks obtained from 6 secondary school students of classes VIII and IX in their Formative-I for the academic year 2019-2020 as an indicator of their academic achievement in mathematics. The findings showed that nearly 15% of the sample of secondary school students performed poorly in achievement mathematics. 18% of the samples scored highly on mathematical achievement. The average result on a mathematical achievement was achieved by 67% of the sample. It may be claimed that secondary school students perform at differing levels in achievement mathematics. Mathematics achievement exams for secondary school students do not significantly differ based on gender. Secondary school students' performance in mathematics achievement depends significantly on their locality of living and class study.

Keywords: Academic achievement and secondary school students

Introduction

Mathematics is considered a fundamental discipline due to its significant contribution to the advancement of science, engineering, and technology. It serves as a foundation for various emerging fields, including communication systems, bioinformatics, uncertainty analysis, and

the management of large-scale data (Lemaire, 2003). According to Prof. Philippe Tondeur, former Director of the Division of Mathematical Sciences at the National Science Foundation, mathematical concepts and principles will serve as essential tools for navigating the increasingly data-driven world of the twenty-first century (Lemaire, 2003). In the present technological era, mathematical knowledge has become crucial for individual success as well as national development. A strong foundation in secondary-level mathematics is essential for students' academic progression, particularly for higher education and professional advancement (Cappellari, Lucifora, & Pozzoli, 2008; Steinberg, Varua, & Yong, 2010). Despite the importance of mathematics in daily life and scientific advancement, a decline in students' participation in advanced mathematics courses has been observed in India and other countries (Mishra, 2011; Smith, 2011). The reluctance of capable students to pursue mathematics may adversely affect their future opportunities and reduce the availability of skilled human resources in science and technology fields (Hembree, 1990).

The researcher's professional experience as a mathematics educator motivated the present investigation. During teaching practice, the researcher observed that many students perceive mathematics as a difficult, abstract, and less interesting subject. Such negative perceptions may influence students' confidence, interest, and achievement in mathematics. However, several students were able to improve their performance through continuous practice, dedication, and effective learning strategies. These observations raised important questions regarding the factors influencing students' mathematical achievement and their attitudes towards mathematics. Therefore, the present study was undertaken to examine the level of achievement in mathematics among secondary school students and to identify the influence of selected variables on their mathematics achievement in Vijayawada City, Andhra Pradesh.

Statement of the Problem

The topic of the current research is "***Achievement in Mathematics Subject Among Secondary School Students in Vijayawada City, Andhra Pradesh***".

Operational definition of the terms:

- a) **Mathematics:** The field of study that focuses on numbers, shapes, abstract structures, and order relationships is known as mathematics. In other words, it is the study of how qualities and sets are measured, related, and examined from a secondary school level using numbers and symbols.
- b) **Mathematics achievement:** An accomplishment is a single score a student receives on an achievement test for any topic. Here, a student's performance on the Mathematics Achievement Test (MAT) is measured against how well they have learned and comprehended the ideas from the class XI mathematics curriculum.
- c) **Secondary School Students:** The secondary students in the current study include those

enrolled in classes VIII and IX in Vijayawada City's Krishna district.

Need and Importance of the Study

Mathematics is often regarded as the foundation of all sciences because of its significant role in developing logical reasoning, analytical thinking, and problem-solving abilities among individuals. It enables students to understand relationships, make rational decisions, and distinguish between essential and non-essential aspects of everyday life. However, the lower performance of students in mathematics may be attributed to ineffective teaching approaches, particularly when classroom instruction fails to connect mathematical concepts with students' prior knowledge and real-life experiences. A strong foundation in mathematics is essential for understanding scientific and technological advancements. Mathematics is not only an academic subject but also a practical tool required in various aspects of daily life. Every individual uses mathematical knowledge in activities such as financial transactions, purchasing goods, employment-related tasks, planning, and decision-making. Therefore, effective mathematics education at the school level is crucial for developing students' intellectual abilities and preparing them to meet the demands of contemporary society.

In the contemporary world, mathematics serves as a key tool for understanding and advancing scientific knowledge. Mathematics education has multiple dimensions, including practical utility, intellectual development, and cultural significance. The study of advanced mathematics is not only valuable for academic and professional purposes but also provides opportunities for exploration, creativity, and logical reasoning. Many learners are attracted to mathematics because of its challenging nature, precision, and the satisfaction derived from discovering solutions to complex problems. The process of solving mathematical problems enhances critical thinking, analytical ability, and confidence among students. Thus, mathematics education plays an important role in developing cognitive skills and preparing learners to address challenges in scientific, technological, and real-life contexts.

Review of the Related Literature:

Benjamin and Murugaraju (2021) investigated the achievement in mathematics among IX standard students. The findings revealed that students' mathematics achievement did not differ significantly based on gender and locality. The study indicated that these demographic variables did not have a significant influence on students' performance in mathematics.

Maamin et al. (2021) examined the influence of student engagement on mathematical achievement among secondary school students. The findings of multiple linear regression analysis revealed that different dimensions of student engagement significantly contributed to mathematics achievement. Among these, effective engagement showed the highest contribution, followed by behavioural engagement and cognitive engagement, indicating that

active participation and involvement play an important role in improving mathematical performance.

Nne and Ekene (2020) studied the relationship between students' self-esteem, achievement goal orientation, and academic achievement in mathematics among secondary school students in Anambra State. The findings revealed a significant relationship between psychological factors and mathematics achievement. Students' self-esteem and achievement goal orientation were found to influence their academic success in mathematics, highlighting the importance of motivational and emotional factors in learning mathematics.

Varghese and Jasmine Suthanthira Devi (2019) investigated the relationship between parental involvement and mathematics achievement among first-year higher secondary students in the coastal region of Kerala. The findings indicated that parental involvement positively influenced students' mathematics achievement, with a considerable proportion of students demonstrating higher achievement levels when supported by their parents. The study concluded that parental encouragement and active involvement play an important role in enhancing students' performance in mathematics.

Objectives:

The following objectives were formulated for the present investigation.

- To find out the levels of achievement in mathematics of secondary school students.
- To study the impact of the following variables on the achievement in mathematics of secondary school children.
 - a) Gender
 - b) Locality of living
 - c) Class study

Hypotheses:

The following hypotheses were formulated to test the stated objectives.

- Secondary school children differ in their levels of achievement in mathematics.
- The following variables make a significant difference in the achievement in mathematics of secondary school children.
 - a) Gender
 - b) Locality of living
 - c) Class study

Limitations of the Investigation:

- The current study does not take into account the following variables: social status, religion, birth order, parental economic position, family structure, and other aspects.
- The study was only conducted in Vijayawada city, which is located in the Krishna district of A.P.
- In the current study, only 305 students from 6 secondary schools (3 Rural & 3 Urban) are included.
- Only secondary school students in classes VIII and IX are included in the current study.

Methodology: The following sub-headings provide details on the study's methodology:

- a) **Research Design:** A descriptive survey approach was used to carry out the current investigation. If the study is based on the criteria given below, expand its design.
- b) **Sample:** From six secondary schools including rural and urban in Krishna District's Vijayawada city, 305 students were chosen as a sample.
- c) **Sapling technique:** Using random sampling techniques, the necessary sample was chosen.
- d) **Research tool:** At the end of an academic programme, a student's scholastic, academic, or learning success is referred to as their "achievement." According to Super, the proficiency exam practice is used to determine what has been learned, how much has been learned, and how effectively it has worked. The purpose of the Achievement Test, according to Robert L. Ebel, is to gauge a student's competence in or familiarity with particular abilities. To determine the academic achievement of the students in classes VIII and IX in mathematics, the researcher used their scores on their Formative-I for the academic year 2019–2020.

Statistical Techniques Used

Mean, S.D., Percentage, and Critical Ratio were used in this study to analyze the data.

Analysis of Data and Interpretation of Results

Table 1: Classification of the Total Sample of an Achievement in Mathematics

Score	Size (N)	%	Verbal Description
33 and below scores	047	15.00	Low achievers
Between 34 and 60 scores	203	67.00	Average achievers
61 and above scores	055	18.00	High achievers
	305	100.00	

Table 1 includes information regarding the aforementioned three groups as well as their written descriptions.

H1: To test this theory, the following process is used. Based on the secondary school student's performance in mathematics, the mean and SD of the entire group are determined. The mean is diminished by one standard deviation. Low achievers are the responders who had scores below 33. They have 47, which has been translated to a percentage, representing 15%. Therefore, on a mathematics achievement exam, 15% of the sample of secondary school students performed poorly. The mean is increased by one standard deviation. High achievers are those with scores more than 61. When expressed as a percentage, their number, 55, equals 18%. As a result, 18% of the samples scored highly on mathematical achievement. The remaining respondents are rated as performing on par with a mean (+ 1SD) to mean (- 1SD). They have 203, which has been translated to a percentage, representing 67%. The average result on a mathematical achievement was achieved by 67% of the sample. It may be

claimed that secondary school students perform at differing levels in achievement mathematics.

Table 2: Data and Result of Test of Significant Difference in The Mean Score of Achievement in Mathematics Based on Gender, Locality of living, and Class studying

Variables	Sub-variables	N	Mean	SD	D	$\frac{\sigma}{D}$	C.R.	Remarks
Gender	Boys	176	47.23	13.78	1.49	1.56	0.96*	NS @ 0.05 level
	Girls	129	45.74	13.20				
Locality of living	Rural	072	43.01	9.19			3.26**	S @ 0.01 level
	Urban	233	47.71	14.45	4.70	1.44		
Class study	8 th	170	45.18	12.21			2.02**	S @ 0.05 level
	9 th	135	48.39	14.89	3.21	1.59		

H2: The computed C.R. value (0.96) is less than the table value (1.96), as shown in Table 2. At the 0.01 level, it is not significant. The null hypothesis is thus accepted. In other words, results on a mathematics achievement exam for secondary school students do not significantly differ based on gender.

The table value of 2.58 is lower than the second computed C.R. value of 3.26. At the 0.01 level, this becomes significant. The null hypothesis is therefore rejected. That is, a secondary school student's performance in mathematics achievement depends significantly on their locality of living. The average difference (4.70) favours students in urban areas. Therefore, it can be shown that urban students do better on mathematics achievement tests than their rural counterparts.

The final C.R. value (2.02), which is greater than the table value (1.96), was computed. At the 0.05 level, it is significant. The null hypothesis is, therefore, rejected. In other words, a class study of secondary school students differs significantly in their mathematics achievement. The average difference (3.21) favours ninth-graders. Thus, it can be shown that, when compared to their peers, ninth-grade students have high achievement in mathematics.

Major Findings of the Study

- Nearly 15% of the sample of secondary school students performed poorly in achievement mathematics. 18% of the samples scored highly on mathematical achievement. The average result on a mathematical achievement was achieved by 67% of the sample. It may be claimed that secondary school students perform at differing levels in achievement mathematics.
- Mathematics achievement exams for secondary school students do not significantly differ

based on gender.

- Secondary school students' performance in mathematics achievement depends significantly on their locality of living.
- Class study of secondary school students differs significantly in their mathematics achievement.

Conclusion

This investigation leads us to the conclusion that secondary school students in Vijayawada, Andhra Pradesh, succeed in mathematics. to raise the student's capacity for higher-level mathematical problem-solving. Understanding math is fundamentally about solving problems. Giving students the tools and building blocks they need to solve problems-that is, to overcome challenges they wish to overcome-is the entire point of teaching the numerous concepts that makeup mathematics a tool. Today's mathematics curriculum promotes problem-solving in its broadest meaning and its application. The teacher is no longer just constrained to the written word issues' abstract solutions, as was once done in textbooks. Instead, the instructor could use a range of strategies to encourage the student to connect the mathematical concepts they are learning to real-world scenarios. Thus, the teacher merely offers advice to help the students develop their skills, particularly their aptitude for solving mathematical problems. It could come in handy for them in the future. Everyone needs to be able to handle some serious issues in today's competitive environment. So, we must understand how to handle and resolve it.

The present study was carried out to explore the achievement in mathematics subject among secondary school students in Vijayawada city, Andhra Pradesh. Keeping this in view, the researcher found that nearly 15% of the sample of secondary school students performed poorly in achievement mathematics. 18% of the samples scored highly on mathematical achievement. The average result on a mathematical achievement was achieved by 67% of the sample. It may be claimed that secondary school students perform at differing levels in achievement mathematics. Mathematics achievement exam for secondary school students does not significantly differ based on gender. Secondary school student's performance in mathematics achievement depends significantly on their locality of living and class study.

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