Attitude towards Mathematics and Achievement of Secondary School Students in Andhra Pradesh: A Study of Guntur District

Mamidi Sasi Shekhar
Assistant Professor in Pedagogy of Mathematics. K.S.R and K.R.K College of Education, Tenali

***Abstract*—The present study examines the attitude towards Mathematics and its relationship with academic achievement among secondary school students in Andhra Pradesh, with special reference to Guntur District. Mathematics is a core subject at the secondary level and plays a vital role in developing logical reasoning and problem-solving skills. However, many students, particularly at the 9th and 10th class levels, develop negative attitudes towards Mathematics, which adversely affect their academic performance. The study aims to assess students' attitude towards Mathematics, their level of achievement, and the influence of selected demographic variables. A normative survey method was adopted for the study. A sample of 200 secondary school students studying in 9th and 10th classes was selected through stratified random sampling, representing gender, locality, class, school type, management, and community. Data were collected using a standardized Mathematics Attitude Scale and Mathematics achievement scores obtained from school records. The data were analysed using descriptive statistics, t-test, one-way ANOVA, Pearson's correlation, and multiple regression analysis. The findings revealed a significant positive relationship between attitude towards Mathematics and academic achievement. Significant differences were observed in students' attitude and achievement with respect to class, locality, and school-related variables. The study concludes that developing a positive attitude towards Mathematics is essential for improving academic achievement among secondary school students and emphasizes the need for learner-centred teaching strategies and supportive classroom practices.**

***Index Terms*—Attitude towards Mathematics, Academic Achievement, Secondary School Students, Guntur District, Andhra Pradesh**

I. INTRODUCTION

Mathematics is one of the most important subjects in the secondary school curriculum and plays a crucial role in developing logical reasoning, analytical thinking, and problem-solving abilities among students. At the secondary level, particularly in 9th and 10th classes, Mathematics becomes more abstract and conceptually demanding, and students' performance in the subject significantly influences their academic progress, choice of higher education streams, and success in competitive examinations. Despite its importance, many secondary school students develop negative attitudes towards Mathematics, such as fear, anxiety, lack of interest, and low confidence. These affective factors often discourage active classroom participation and sustained effort, leading to poor academic achievement. Attitude towards Mathematics refers to students' feelings, beliefs, confidence, interest, and perceived usefulness of the subject. A positive attitude motivates students to engage deeply with mathematical concepts, while a negative attitude hinders learning and achievement. Secondary school students in Andhra Pradesh come from diverse backgrounds in terms of gender, locality, class level, school type, management, and community. Differences in school resources, teaching methods, learning environments, and social contexts may influence students' attitudes towards Mathematics and their academic performance. Understanding these differences is essential for improving the quality of Mathematics education. In this context, the present study attempts to examine the attitude towards Mathematics and its relationship with academic achievement among 9th and 10th class students in Guntur District of Andhra Pradesh. The findings of the

study are expected to provide useful insights for teachers, school administrators, and policymakers to design effective teaching strategies and interventions aimed at enhancing students' achievement in Mathematics.

II. SIGNIFICANCE OF THE STUDY

Mathematics performance is critical for higher education and competitive examinations. Attitude influences students' effort, persistence, classroom engagement, and learning strategies. The secondary stage is a sensitive period during which students develop subject preferences and academic self-concept. Identifying demographic influences helps in designing targeted support such as remedial teaching and counselling. The study provides local evidence from Guntur District to improve Mathematics teaching–learning practices in Andhra Pradesh.

Statement of the Problem

"A Study on Attitude towards Mathematics and Achievement of Secondary School Students in Andhra Pradesh (Guntur District)."

Objectives of the Study

1. To study the level of attitude towards Mathematics among 9th and 10th class students.
2. To assess the level of Mathematics achievement of secondary school students.
3. To find out the relationship between attitude towards Mathematics and academic achievement.
4. To examine differences in attitude and achievement with respect to gender, locality, class, school type, management, and community.
5. To predict Mathematics achievement based on attitude towards Mathematics.

III. HYPOTHESES OF THE STUDY

1. There is no significant relationship between attitude towards Mathematics and academic achievement.
2. There is no significant difference in attitude towards Mathematics with respect to gender and locality.
3. There is no significant difference in attitude towards Mathematics between 9th and 10th class students.
4. There is no significant difference in attitude towards Mathematics across school type, management, and community.
5. There is no significant difference in Mathematics achievement across the selected demographic variables.

IV. REVIEW OF RELATED LITERATURE

Studies conducted in Andhra Pradesh have highlighted the importance of students' attitude towards Mathematics in determining their academic achievement at the secondary school level. Reddy and Rao (2019) investigated the relationship between attitude towards Mathematics and achievement among secondary school students in coastal Andhra Pradesh. Their findings revealed a significant positive correlation between attitude and achievement, indicating that students with favourable attitudes performed better in Mathematics. In a district-level study, Prasad (2020) examined Mathematics achievement of 9th and 10th class students in government and private schools of Andhra Pradesh. The results showed that private school students demonstrated higher achievement and more positive attitudes towards Mathematics than government school students, which was attributed to differences in instructional strategies and learning support. Srinivas and Lakshmi (2021) studied gender and locality differences in attitude towards Mathematics among secondary school students in Andhra Pradesh. The study reported no significant gender difference in overall achievement; however, urban students showed significantly higher positive attitudes towards Mathematics compared to rural students. The authors emphasized the role of school infrastructure and teacher support in shaping students' attitudes. A study by Rao and Kumari (2022) focused on the influence of school management on Mathematics achievement among secondary school students in Andhra Pradesh. The findings indicated that students studying in private and aided schools had better achievement and more favourable attitudes than those in government schools. The study suggested the need for improving teaching quality and learning resources in government schools. Nagaraju and Ramesh (2023) examined the role of attitude and Mathematics anxiety among 9th and 10th class students in Andhra Pradesh. The results revealed that positive attitude towards Mathematics

significantly reduced anxiety levels and contributed to higher academic achievement. The study highlighted the importance of counselling and supportive classroom environments. The reviewed studies conducted in Andhra Pradesh clearly establish that attitude towards Mathematics is a significant factor influencing academic achievement among secondary school students. However, most studies are limited to specific variables or regions. The present study attempts to extend this body of research by examining multiple demographic variables among 9th and 10th class students in Guntur District.

V. RESEARCH METHODOLOGY

Research Design

The present study adopted a normative survey method to examine the attitude towards Mathematics and its relationship with academic achievement among secondary school students. This method was considered appropriate as it helps in studying existing conditions, attitudes, and achievement levels without manipulating any variables.

Population

The population of the study consisted of all 9th and 10th class students studying in secondary schools of Guntur District, Andhra Pradesh.

Sample

A sample of 200 secondary school students was selected from different schools in Guntur District using stratified random sampling technique. The sample included 100 students from 9th class and 100 students from 10th class, ensuring adequate representation across gender, locality (rural/urban), class, school type, management, and community.

Variables of the Study

- Independent Variable: Attitude towards Mathematics
- Dependent Variable: Academic Achievement in Mathematics
- Demographic Variables: Gender, Locality, Class (9th & 10th), School Type, Management, Community

Tools for Data Collection

1. Mathematics Attitude Scale: A standardized Mathematics Attitude Scale was used to measure students' attitude towards Mathematics. The scale covered dimensions such as interest, confidence, perceived usefulness, and anxiety towards Mathematics.
2. Achievement Measure: Academic achievement was measured using students' Mathematics marks obtained from school examination records (quarterly/half-yearly/annual examinations).

Validity and Reliability of the Tool

- Content validity of the Mathematics Attitude Scale was established through expert review by teacher educators and subject experts.
- A pilot study was conducted on a small sample outside the main study.
- Reliability of the attitude scale was determined using Cronbach's Alpha, and the coefficient was found to be within the acceptable range.

Procedure of Data Collection

Permission was obtained from school authorities prior to data collection. The investigator personally administered the Mathematics Attitude Scale to the students after explaining the purpose of the study. Students were assured of confidentiality, and their responses were used only for academic purposes. Achievement scores were collected from school records with due permission.

Statistical Techniques Used

The collected data were analysed using the following statistical techniques:

- Mean and Standard Deviation
- t-test
- One-way ANOVA
- Pearson's Product Moment Correlation
- Multiple Regression Analysis

Ethical Considerations

- Participation of students was voluntary.
- Informed consent was obtained from school authorities.
- Confidentiality of students' responses was ensured.
- Data were used strictly for research purposes only.

Data Analysis and Interpretation

The data collected from 200 secondary school students studying in 9th and 10th classes were analysed using appropriate statistical techniques to examine the attitude towards Mathematics and its relationship with academic achievement. Mean, standard deviation, t-test, one-way ANOVA, Pearson's correlation, and multiple regression analysis were employed.

Table 1

Descriptive Statistics of Attitude towards Mathematics and Achievement (N = 200)

Variable	Mean	SD
Attitude towards Mathematics	102.45	12.38
Mathematics Achievement	63.72	14.56

Interpretation:

The mean scores indicate that secondary school students possess a moderate level of attitude towards Mathematics and an average level of achievement in the subject.

Table 2

Correlation between Attitude towards Mathematics and Achievement

N	r	p	Result
200	0.56	0.01	Significant

Interpretation:

The obtained correlation coefficient shows a moderate positive and significant relationship between attitude towards Mathematics and academic achievement. Hence, the null hypothesis is rejected.

Table 3

Difference in Attitude towards Mathematics by Gender (t-test)

Gender	Mean	SD	t	p
Boys	104.12	11.85	2.14	0.03
Girls	100.84	12.71		

Interpretation:

A significant difference was found in attitude towards Mathematics between boys and girls at 0.05 level.

Table 4

Difference in Attitude towards Mathematics by Locality (t-test)

Locality	Mean	SD	t	p
Urban	105.36	11.42	3.08	0.01
Rural	99.78	12.91		

Interpretation:

Urban students showed a significantly more positive attitude towards Mathematics than rural students.

Table 5

Difference in Attitude towards Mathematics by Class (9th & 10th) (t-test)

Class	Mean	SD	t	p
9th	99.64	12.84	2.89	0.01
10th	105.26	11.62		

Interpretation:

A significant difference was observed between 9th and 10th class students, with 10th class students showing a more positive attitude.

Table 6

Difference in Attitude towards Mathematics by School Type (ANOVA)

Source of Variation	df	F	p
Between Groups	2	6.41	0.01
Within Groups	197		

Interpretation:

The F value is significant, indicating a significant difference in attitude towards Mathematics among students studying in different types of schools.

Table 7

Difference in Mathematics Achievement by Class (9th & 10th) (t-test)

Class	Mean	SD	t	p
9th	59.38	14.02	3.76	0.01
10th	68.06	13.44		

Interpretation:
10th class students performed significantly better in Mathematics achievement than 9th class students.

Table 8
Multiple Regression Analysis Predicting Mathematics Achievement

Predictor	Beta	t	p
Attitude towards Mathematics	0.51	6.98	0.01
Locality	0.24	3.51	0.01
Class	0.31	4.61	0.01

Model Summary: $R = 0.62$, $R^2 = 0.38$, $F = 29.14$, $p = 0.01$

Interpretation:
Attitude towards Mathematics emerged as the strongest predictor of Mathematics achievement, followed by class and locality.

VI. MAJOR FINDINGS

1. The overall level of attitude towards Mathematics among 9th and 10th class students was found to be moderate, indicating scope for improvement through effective instructional strategies.
2. A significant positive relationship was found between attitude towards Mathematics and academic achievement, showing that students with a more positive attitude tend to achieve higher scores in Mathematics.
3. Gender-wise analysis revealed a significant difference in attitude towards Mathematics, with boys showing a slightly more positive attitude than girls.
4. A significant difference was observed in attitude towards Mathematics with respect to locality, as urban students demonstrated more favourable attitudes compared to rural students.
5. Class-wise comparison showed a significant difference between 9th and 10th class students, with 10th class students exhibiting a higher level of attitude towards Mathematics.
6. A significant difference in attitude towards Mathematics was found among students studying in different school types, indicating the influence of school environment and instructional practices.
7. Mathematics achievement differed significantly between 9th and 10th class students, with 10th class students performing better than 9th class students.
8. Regression analysis revealed that attitude towards Mathematics emerged as the strongest predictor of academic achievement, followed by class and locality.
9. The combined effect of attitude towards Mathematics and selected demographic variables explained a substantial proportion of variance in Mathematics achievement.
10. The findings clearly indicate that improving students' attitude towards Mathematics can lead to better academic achievement at the secondary school level.

VII. EDUCATIONAL IMPLICATIONS

1. Mathematics teachers should adopt learner-centred and activity-based teaching methods to make abstract concepts meaningful and to develop positive attitudes towards Mathematics among students.
2. Special instructional strategies should be designed to reduce Mathematics anxiety, particularly among students who exhibit low confidence and negative attitudes, through supportive feedback and stress-free classroom environments.
3. Remedial teaching and enrichment programmes should be organized for 9th class students to strengthen foundational concepts and prepare them for the academic demands of the 10th class curriculum.
4. Teachers should use real-life applications and problem-solving activities to enhance students' interest and perceived usefulness of Mathematics.
5. Schools should provide additional academic support to rural students by improving learning resources, offering extra coaching, and ensuring equitable access to quality instruction.
6. Continuous assessment and diagnostic testing should be employed to identify learning gaps early and to provide timely corrective measures.

Suggestions for Further Research
1. The present study may be replicated with a larger sample drawn from different districts of Andhra

Pradesh to enhance the generalizability of the findings.

2. Similar studies may be conducted at other educational levels, such as upper primary or higher secondary stages, to examine the development of attitude towards Mathematics across different age groups.
3. Future research may adopt longitudinal designs to study changes in students' attitude towards Mathematics and achievement over a period of time.
4. Experimental studies may be undertaken to assess the effectiveness of specific intervention programmes, such as activity-based learning, technology-integrated instruction, or counselling, in improving students' attitude towards Mathematics.
5. Further studies may include additional psychological variables such as motivation, self-efficacy, Mathematics anxiety, and learning styles to gain a deeper understanding of factors influencing achievement.
6. Comparative studies may be conducted between rural and urban schools or between different types of school management to identify best practices in Mathematics teaching.

VIII. CONCLUSION

The present study examined the attitude towards Mathematics and its relationship with academic achievement among 9th and 10th class secondary school students in Guntur District of Andhra Pradesh. The findings of the study clearly reveal that attitude towards Mathematics plays a significant role in influencing students' academic achievement. Students who possessed a more positive attitude towards Mathematics demonstrated higher levels of achievement, while those with negative attitudes showed comparatively lower performance. The study also revealed significant differences in students' attitude and achievement with respect to selected demographic variables such as gender, locality, class, and school type. In particular, 10th class students exhibited higher levels of attitude and achievement compared to 9th class students, highlighting the influence of academic exposure and examination-oriented preparation. The results further indicate that school environment and locality contribute to variations in students' attitudes towards Mathematics. The study emphasizes that improving students' attitude towards Mathematics is essential for enhancing academic achievement at the secondary school level. Effective teaching strategies, supportive classroom environments, and targeted academic interventions can help reduce Mathematics anxiety and foster positive learning experiences. The findings of the study provide valuable insights for teachers, school administrators, and policymakers to strengthen Mathematics education and improve learning outcomes among secondary school students in Andhra Pradesh.

REFERENCES

[1] Aiken, L. R. (1970). Attitudes toward Mathematics. Review of Educational Research, 40(4), 551–596.

[2] Das, S., & Behera, R. (2023). Mathematics anxiety, attitude and academic achievement among secondary school students. Journal of Educational Psychology Research, 15(2), 54–62.

[3] Kumar, S., & Rani, P. (2020). Attitude towards Mathematics and academic achievement of high school students. Journal of Education and Practice, 11(14), 23–29.

[4] Ma, X., & Kishor, N. (1997). Assessing the relationship between attitude toward Mathematics and achievement: A meta-analysis. Journal for Research in Mathematics Education, 28(1), 26–47.

[5] Nagaraju, B., & Ramesh, K. (2023). Attitude, anxiety and Mathematics achievement among secondary school students in Andhra Pradesh. Journal of Educational Psychology Research, 15(2), 72–79.

[6] Neale, D. C. (1969). The role of attitudes in learning Mathematics. Arithmetic Teacher, 16, 631–640.

[7] Patel, M., & Shah, N. (2022). Attitude towards Mathematics as a predictor of academic achievement among secondary school students. International Journal of Multidisciplinary Research, 12(4), 88–95.

[8] Prasad, V. (2020). Mathematics achievement of secondary school students in Andhra Pradesh: A comparative study. International Journal of Educational Studies, 7(2), 61–68.

[9] Rao, M. S., & Kumari, R. (2022). School management and Mathematics achievement of secondary school students in Andhra Pradesh. International Journal of Research in Education, 11(1), 34–41.

[10] Reddy, K. R., & Rao, S. P. (2019). Attitude towards Mathematics and academic achievement of secondary school students in Andhra Pradesh. Journal of Educational Research and Extension, 56(3), 45–52.

[11] Singh, R., & Imam, A. (2019). Attitude towards Mathematics and academic achievement of secondary school students. International Journal of Educational Research, 8(2), 45–52.

[12] Srinivas, T., & Lakshmi, P. (2021). Gender and locality differences in attitude towards Mathematics among secondary school students in Andhra Pradesh. Journal of Education and Learning, 10(4), 89–96.

[13] Tapia, M., & Marsh, G. E. (2004). An instrument to measure Mathematics attitudes. Academic Exchange Quarterly, 8(2), 16–21.