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Relationship Between Attitude Towards Mathematics and Academic Achievement of Eleventh-Class Students

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Abstract
This study explores gender-based differences and the relationship between attitudes toward mathematics and academic achievement among eleventh-grade students. Mathematics plays a pivotal role in intellectual development and societal progress, yet students' attitudes toward the subject often influence their academic outcomes. This research examines the correlation between attitudes and performance, alongside potential gender-based impacts. The study involved 100 eleventh-grade students from D.A.V. Inter College in Unn Shamli, Uttar Pradesh, selected using a mixed random sampling method. Data were collected using the Attitude Towards Mathematics Scale (ATMS) and academic performance records. The ATMS assessed dimensions such as confidence, enjoyment, fear, and perceived utility, while academic achievement was measured through standardized test scores and cumulative performance. Results showed a significant positive correlation ($r = 0.273$, $p = 0.006$) between attitudes toward mathematics and academic achievement. Students with extremely favorable attitudes (67% of participants) achieved higher academic performance, with 46% scoring between 71–80 marks and 21% achieving 81–90 marks. Conversely, students with less favorable attitudes demonstrated lower academic success. Gender differences, however, were not statistically significant in either attitudes ($p = 0.230$) or achievement ($p = 0.445$). Boys, comprising 64% of the sample, exhibited slightly higher confidence levels, but overall attitudes and academic outcomes were comparable across genders. The study highlights the centrality of positive attitudes in academic success, with the mean academic achievement score at 3.13 (SD = 0.747) on a 4-point scale and the mean attitude score at 1.59 (SD = 1.006), reflecting generally favorable perceptions. Most academic achievements were in the mid-range (61–80 marks), suggesting that while attitudes significantly influence performance, external factors such as teaching quality and resources also play crucial roles. This research underscores the importance of fostering positive attitudes toward mathematics to enhance achievement. Interventions aimed at building confidence and enjoyment, alongside addressing systemic barriers like inadequate resources and rigid curricula, are recommended. Future studies should adopt longitudinal designs and explore external influences such as parental support and societal standards to deepen understanding.

Key words: - Attitudes toward Mathematics, Academic Achievement, Gender Differences, Mathematics Education, Educational Interventions.

Introduction

There is no denying the importance of mathematics to human existence on a national, social, and personal level. Many refer to mathematics as a gatekeeper that determines whether a student will succeed or fail in high school and in their carrier. A person's capacity to make critical decisions about their schooling, personal lives and careers is impacted by inadequate mathematics knowledge which is crucial to this civilization's modernity. Mathematics is everywhere, and it has an impact on people's daily life. Despite being theoretical and abstract, it is information derived from actual experience. It is said that mathematics from the foundation of all sciences and the physical universe. For example, we use certain mathematical techniques in our daily operations like purchasing and selling. The most established of all the disciplines, mathematics has shaped the character of human existence in our planet. We all agree that mathematics is the language of technology and innovation.in addition it illustrates the paths of advancement and growths in several spheres of life, such as culture and the arts. Logical skill development is mostly dependent on mathematics.

From various viewpoints, mathematics is seen as a struggle, a peak or a connection. Mathematics can be seen in various ways based on its inherent features as understood by educators and pupil's **(Sterrenberg, 2008).** Students' mental images of mathematics using metaphors. Teachers are influential in shaping students views and feeling towards mathematics.in terms of possessing a positive or negative viewpoint. These pictures show connection and bonding. Metaphorical meanings are generated through the exchange of concepts between mathematical domains. Many individuals share anecdotes from their youth. if they felt discouraged in math class or afraid of problem-solving. their enduring challenges in mastering math in school might produce.

Attitude towards mathematics

Attitudes are frequently described similarly to dispositions that are used interchangeably. They are taught to be more effective and less cognitive than before or valued. On experience, oriented towards a certain object (in this case mathematics) and seen as good or bad. While there are several definitions of attitudes, most of them contain the following: attitudes are taught, show up in how a person reacts to a particular item or circumstances, and are measurable.

"Mathematical attitude is a crucial attitudinal factor" **(see Ernest,1988; Stevens, olives, Lan and Talent -runnels 2004),** and research has indicated that this was necessary for the successful development of numeracy **(Wikins,2000).** Compared to beliefs or values, attitudes are taught to be more emotive and less cognitive. They are sometimes used interchangeably with dispositions. Attitude is a crucial aspect of human personality, influencing our reactions to objects and thoughts. It influences our progress, accomplishments, profession, and life lifestyle. Students' attitudes towards mathematics are a global concern, as it is essential in today's world. Mathematics is considered as a core subject in school education plans, and student's attitudes towards it can have positive and negative impacts on their achievement.

Students who are not properly taught mathematics suffer for the rest of their life. Teachers generally agree that mathematics is a useful and significant subject for the development of any nation. It is the starting point for success and creativity.it is a subject that typically terrifies kids despite its significance and influence. As a result, mathematics instruction must be sensible and successful from the start. Attitude is indisputable in mathematics as it is essential to each learning cycle. Success in mathematics is greatly influenced by one's attitude, particularly in secondary education. A key component of teaching mathematics as a topic is attitude because it has an impact on pupils' arithmetic results. However, several factors, including the way that teachers teach and the structure of the school, have an impact on student's views about mathematics. However, it has also been noted that even if math teachers' methods and style of instruction were extremely effective pupils still seemed designed with the topics **(Barton,2000).** Studies have indicated that pupils' perceptions of mathematics have a noteworthy influence on their performance in the subject Higher success levels are more probable among students who have a favorable attitude towards mathematics **(Birenbaum and Nassar,2017).** According to **(McLead 2003),** students with a negative attitude toward mathematics are more likely to struggle with the subject and may require further assistance. **(Syeda ,2016)** defines an attitude as consisting of three basic components: The affect thinking and behavior components are linked and include various factors that influence the general attitude toward studying mathematics. We employ the ABC (affective, behavioral, cognitive) model **(Ajzen, 1993)** to analyze students' attitudes toward mathematics, and Walberg's productivity theory to interpret the results in terms of variables influencing liking or hating math, as well as those affecting student performance. According to Elberg's theory, cognitive, behavioral, and attitudinal learning outcomes are influenced by individual student traits as well as the psychological environment around them. Consistent with the investing attitude aspects, such as students' self-confidence in the ABC model, is the focus of our study. Skill in mathematics, fear of mathematics, enjoyment of mathematics, belief in the practicality of mathematics the combination of math and internal drive.

Related Papers

The study focused on the views of Ugandan eleventh-grade students about linear programming. **(Wakhata. R, Balimuttajjo.S,2022)** According to preliminary data, there was no statistically significant difference in students' attitudes about LPMWPs depending on criteria such as age, gender, school status, and geography. Compared to the control group, which got traditional training, the experimental group, which received active learning heuristic problem-solving education, had a somewhat more favorable attitude about LP word problems. Instructors' use of instructional strategies was critical in enhancing students' attitudes toward LPMWPs, reasoning, and conceptual knowledge, highlighting the significance of ongoing professional development for educators. **(Wen.R, Adam K. Dube, 2022)** A comprehensive definition of mathematics attitudes, encompassing mathematical cognitions, affects, and behavioral goals, was proposed by the systematic review of 95 studies on the subject. While enjoyment, self-concept, assurance, perceived value, and behavioral objectives were favorably associated with accomplishment, anxiety and gender roles were shown to be adversely associated with mathematical performance. A considerable portion of pupils still have scholastic difficulties, even though the bulk of them have a good attitude toward mathematics. Even though they are less common, negative attitudes can nonetheless significantly affect students' learning outcomes and should not be disregarded. Ineffective learning and testing procedures, a lack of institutional resources, and insufficient didactic strategies by teachers are some of the factors that lead to subpar academic achievement **(Mowe Yahya Mazana, Montero. Calkin, 2018). (Hwang.S, Teakwon. Son,2021)** The study found that eighth-grade Singaporean pupils had four distinct attitudes toward mathematics: extremely negative, negative, neutral, and favorable. The profiles were determined using latent profile analysis. Students' mathematical attitudes and achievement are positively associated. Students who have a positive attitude toward mathematics, like the subject, understand its importance, and believe in their own abilities are more likely to succeed. According to the study, educators should be conscious of the many perspectives that children have about mathematics and offer customized guidance to encourage a positive outlook. To understand the directionality between attitude and mathematics achievement, future study should investigate the elements that contribute to negative attitudes toward mathematics and carry out longitudinal studies. **(Belbase.S,2010)** knowledge their relationships and the implications for mathematics teaching and learning requires a knowledge of the suggested theoretical model that combines images, worries, and attitudes toward mathematics. A negative perception of mathematics is frequently the cause of mathematics anxiety, which manifests as tension, powerlessness, and mental disarray when working with mathematical ideas. Anxiety related to mathematics is often linked to low mathematical achievers, highlighting the significance of managing anxiety to raise success levels. Instructors have a big part to play in lowering math anxiety and raising accomplishment by fostering a happy, stress-free learning environment that is free from possible sources of shame or disgrace. Over time, attitudes about mathematics can shift significantly, and treatments that target the feelings, connections, expectations, and ideals associated with

mathematics can effectively improve unfavorable attitudes. **(Adamu.A,2017)** A student's attitude toward mathematics is an important factor in determining their academic success. Higher performance in mathematics is correlated with positive views toward the topic. Male students were shown to have significantly different attitudes toward mathematics depending on their gender. When compared to female students, male students showed more confidence in their abilities to learn mathematics and perceived it as a valuable subject, resulting in higher academic achievement. **(Grootenboer.P; Hemmings.B, 2017)**. The study's goal was to fill the gap in the research by investigating how emotional and background variables influenced arithmetic ability among New Zealand students. There is a considerable correlation between predictor variables and math performance, as demonstrated by a logistic regression analysis used to differentiate between arithmetic performers who are below and above average.

The study demonstrated how socioeconomic status (SES) and characteristics such as gender and ethnicity might affect arithmetic ability. Specifically, SES was found to have a substantial correlation with ethnicity and to have an impact on group membership prediction**. (Thiel.O,2010)** It is important to address teachers' attitudes to enhance mathematical education in early life, as teachers' attitudes toward mathematics have a substantial impact on students' mathematical beliefs and knowledge. Beliefs have a significant influence on how instructors behave, which affects how they teach mathematics in early childhood education. The way that children develop depends on their views about three different things: mathematics as a science, mathematics as a subject in nursery school, and mathematics learning as a process. **(Davadas.S, lay. yoon,2017)** Important determinants of kids' attitudes toward mathematics include classroom instruction, teacher affective support, and perceived family effects. These elements are extremely important in determining how pupils view and feel about mathematics. This implies that programs aimed at addressing these issues may have a favorable effect on students' perceptions of mathematics. The results show that attitudes toward mathematics are complex, suggesting the existence of additional factors such as gender, socioeconomic background, and prior accomplishments. **(Ursini.S, Sanchez.G,2008)** Over a three-year period, the study looked at how boys' and girls' attitudes toward mathematics and their level of confidence in the subject changed. The AM-MEC, a 5-point Likert scale, was employed to gauge participants' attitudes toward mathematics, computer-based mathematics, and mathematical confidence.539 kids, most of them around 13 years old, participated in the study; 430 of them used technology for math, whereas 109 did not. When it came to attitudes toward computer-based mathematics in grade 7, there were considerably more males than girls who scored highly. Similarly, in grades 8 and 9, gender inequalities were observed favoring guys in the group employing technology. Research on attitudes has been around since the 1930s and focuses on people's decisions in different situations. Attitudes are important in mathematics education since it is believed that they are essential to learning mathematics. **(Oskamp ,1977)** emphasizes the significance of attitude research by claiming that attitudes serve as the learning mathematics. **(Oskamp,1977)** emphasizes the significance of attitude research by claiming that attitudes serve as the foundation for social conduct, explain behaviors, and reflect perceptions. Learned predispositions that affect how people react to things or situations are called attitudes. A person's attitude toward mathematics can be characterized by their fondness or dislike of the subject, their confidence in their mathematical prowess, and their perception of its utility. Research on the connection between arithmetic achievement and attitude has produced a range of findings. **(Ma and Kishor,1997)** discovered a weak but statistically significant correlation between math attitude and achievement. The purpose of the study is investigating how sixth-grade kids' attitudes and mathematical achievement relate to one another **(Kibrislioglu.N,2015).**

This study emphasizes the three aspects of emotional disposition toward mathematics, vision of mathematics, and perceived competence in mathematics, with an emphasis on the interplay of beliefs and emotions, particularly in the context of attitudes toward mathematics. Perceptions of mathematics can influence students' unfavorable emotional attitudes toward the topic, resulting in different patterns of attitude based on perceived mathematical skill and comprehension. To prevent or reverse negative impacts on students' interactions with mathematics, the study underlines the need of instructors recognizing students' negative emotional disposition toward mathematics as a signal to address students' views of mathematics and perceived competence **(Martino, Zan.R,2002)**

Objectives

To examine the relationship between gender, attitudes toward mathematics, and academic achievement among eleventh-grade students, and to determine whether these factors are significantly correlated.

Hypotheses

There is no significant relationship between gender, attitudes toward mathematics, and academic achievement among eleventh-grade students.

Research Methodology

Research design:

Respondents: the study's participants were 100 students of the 11th class from D.A.V inter college in Unn Shamli (U.P) who were selected via random sampling technique.

Sampling technique

The basic sampling technique involves selecting a sample group of subjects using simple random sampling. For research with a border sample size (population). Each participant is chosen at random, with no preference given to any individual. The senior high school was selected using the cluster sampling approach, and the appropriate number of students from the participating school was chosen using the simple random sample technique. In this study, the researcher employed a mixed or multistage random sampling strategy to systematically choose the sample. In this experiment, two sampling strategies, the cluster sampling methodology, and the basic random sample strategy, were used.

Instrument of Data collection

ATMs: The instrument used in collecting the data was the modified attitude towards mathematics scale (ATMs). The instrument was developed by Dr. S.C. Gakhar and Dr. Rajni.

Each item was measured on a five-point Likert scale as follows: SA=strongly agree, A=Agree, U=undecided, D= Disagree and SD=strongly Disagree.

Based on the experience of researcher and discussions with expert in the field, eight components have been identified.to avoid ambiguity in the language and to obtain opinions and criticisms of the nature and difficulty of these statements, a total of 106 declarations were prepared under eight components by five subject's experts at the beginning following their opinion,21 declarations were deleted, and 85 statements remained. A small group of students N=10 was presented with a preliminary draft composed of 85 statements for further modification and to determine the level of difficulty in this statement. Twelve more statements have been deleted on the basis of that small group's opinion and only 73 are on the table at present.

Academic Achievement

A student's grades and general performance on standardized tests and coursework in important disciplines like math, science, English, and social studies are the main indicators of their academic progress in the class. It includes keeping up a high-grade point average (GPA), doing well on final examinations and unit assessments, and receiving honors like subject-specific awards, honor roll placement, or distinctions. A student's profile is further enhanced by their active involvement in extracurricular academic activities including science fairs, debate groups, and math competitions. Instructors' evaluations and suggestions are also very important because they point out a student's areas of strength, growth, and participation in the classroom. A student must also show that they have improved and progressed consistently throughout the academic year, as seen by their performance on midterm and cumulative tests. Another important factor is performance on national or state-level standardized tests, which provide as a baseline for comparison with more general educational norms. In general, a student's academic accomplishment in the tenth grade serves as a comprehensive indicator of their commitment, intellectual development, and preparedness for more advanced coursework.

Procedure of Data collection

First, following the researcher's calculation of the necessary number of investigations, the data for the study was gathered. The researchers then employed the procedures stated above in a methodical manner to administer this instrument to the greatest extent feasible. Collect relevant data for this research. The instrument was presented to the subjects with the assistance of research assistants, and they were instructed to provide honest responses to the items.

Frequencies

Table 1

Statistics				
		Gender	**Attitude towards Mathematics**	**Academic Achievement**
N	**Valid**	100	100	100
	Missing	0	0	0
Mean		1.64	1.59	3.13
Std. Deviation		.482	1.006	.747
Percentiles	**25**	1.00	1.00	3.00
	50	2.00	1.00	3.00
	75	2.00	2.00	4.00

The dataset contains descriptive statistics for three variables: Gender, Attitude toward Mathematics, and Academic Achievement, based on a sample of 100 participants with no missing values. Gender, which is most likely coded numerically (1 = Female, 2 = Male), has a mean of 1.64 and a standard deviation of 0.482, indicating a very balanced representation, but somewhat skewed toward one category. Most participants fell into the second category, as seen by median and 75th percentile values of 2. On a numerical scale, attitudes toward Mathematics have a mean of 1.59 and a standard deviation of 1.006, showing generally low attitudes with significant variability. The median and 25th percentile

are both at one, indicating that a major chunk of the sample scored at the low end of the scale, with some moderate scores reaching the 75th percentile (value of 2). Academic Achievement, most likely measured on an ordinal or continuous scale, has a mean of 3.13 and a standard deviation of 0.747. The median and 25th percentile are both 3, indicating that most participants received mid-range values, with higher scores reaching 4 at the 75th percentile. Overall, the statistics show small gender disparities, poor average attitudes toward mathematics, and moderate academic achievement centered in the mid-level range.

Frequency Table

Table 2

Gender					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**GIRL**	36	36.0	36.0	36.0
	BOY	64	64.0	64.0	100.0
	Total	100	100.0	100.0	

The frequency table for Gender displays the distribution of individuals in the sample, which are classified as "GIRL" and "BOY." Out of 100 participants, 36 identified as "GIRL," accounting for 36% of the entire sample. Meanwhile, 64 respondents identified as "BOY," accounting for 64% of the sample. The Valid Percent is the same as the Percent values because there is no missing data. The Cumulative Percent implies that by including all "BOY" responses, we have accounted for 100% of the sample. This distribution demonstrates that the sample is more heavily weighted toward boys, who account for approximately two-thirds of the participants.

Table 3

Attitude towards Mathematics					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**Extremely Favorable**	67	67.0	67.0	67.0
	High Favorable	18	18.0	18.0	85.0
	Above Average Favorable	5	5.0	5.0	90.0
	Average Favorable	9	9.0	9.0	99.0
	Below Average Favorable	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

The frequency table for Attitude towards Mathematics highlights how participants scored their attitudes, which are divided into five categories of favorability. Most participants (67%) indicated an Extremely Favorable attitude, making it the most popular response. A further 18% expressed a Highly Favorable view, bringing the total percentage to 85%. Smaller percentage showed less favorable sentiments. 5% reported an Above Average Favorable attitude, 9% an Average Favorable attitude, and only 1% evaluated their attitude as Below Average Favorable. The cumulative percentages demonstrate that virtually all participants (99%) assessed their attitudes as at least Average Favorable, with very few falling below that level. Overall, the statistics show that most participants have an extremely positive opinion toward mathematics.

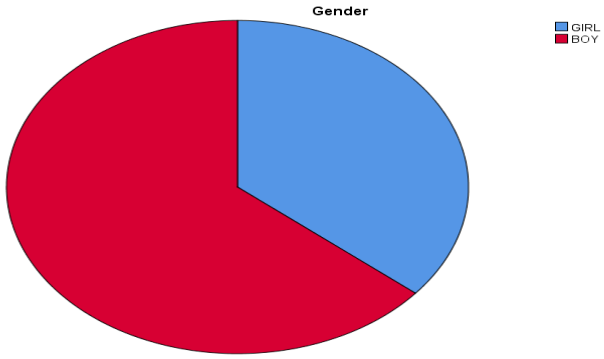
Table 4

Academic Achievement					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**81-90**	21	21.0	21.0	21.0
	71-80	46	46.0	46.0	67.0
	61-70	32	32.0	32.0	99.0
	51-60	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

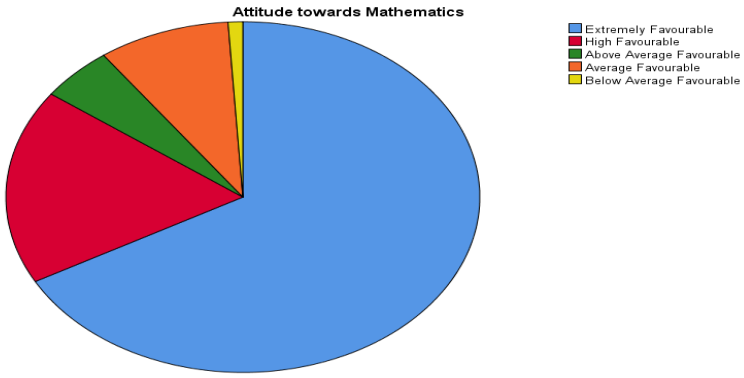
The frequency chart for Academic Achievement divides participants' scores into four ranges. The largest group, accounting for 46% of the participants, received scores ranging from 71 to 80, making this the most prevalent range. This is followed by 32% of individuals who scored between 61 and 70. Furthermore, 21% of the individuals received higher scores in the 81-90 range, while just 1% scored in the lowest range of 51-60. The cumulative percentages show that by adding individuals in the 61-70 range, 99% of the participants have been represented, with only 1% scoring in the lowest

category. Overall, the statistics show that most participants scored in the middle (61-80), with a smaller number scoring higher (81-90) and very few falling into the lower ranges.

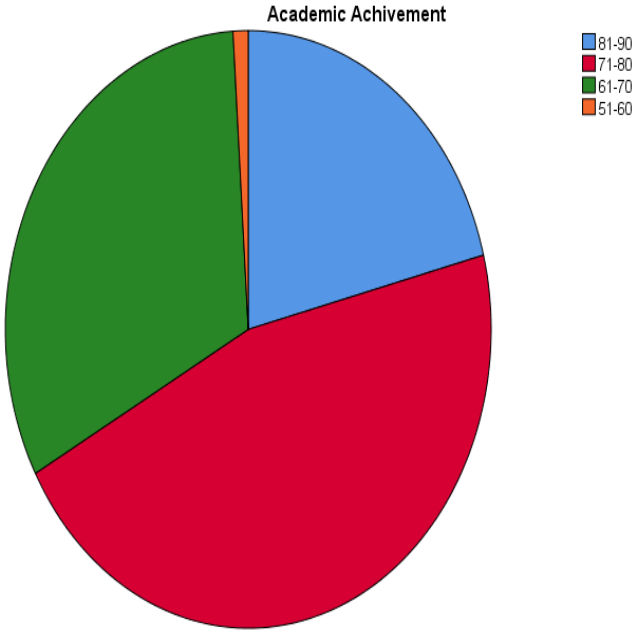
Pie Chart 1



Pie Chart 2



Pie Chart 3



Result
Table 4
T-Test

Paired Samples Statistics					
		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	**Gender**	1.64	100	.482	.048
	Attitude towards Mathematics	1.59	100	1.006	.101
Pair 2	**Gender**	1.64	100	.482	.048
	Academic Achievement	3.13	100	.747	.075
Pair 3	**Attitude towards Mathematics**	1.59	100	1.006	.101
	Academic Achievement	3.13	100	.747	.075

The paired samples statistics provide insights into the relationships between gender, attitude towards mathematics, and academic achievement based on their respective means, standard deviations, and standard errors. For Pair 1, the mean for gender is 1.64, and the mean for attitude towards mathematics is 1.59, with standard deviations of 0.482 and 1.006, respectively. The standard errors indicate the precision of the sample means, with gender having a smaller standard error (0.048) compared to attitude towards mathematics (0.101). For Pair 2, gender again has a mean of 1.64, while academic achievement shows a higher mean of 3.13, with standard deviations of 0.482 and 0.747, respectively. The standard error for academic achievement (0.075) is slightly higher than that for gender. Lastly, Pair 3 compares attitude towards mathematics (mean = 1.59) and academic achievement (mean = 3.13), highlighting the contrast between these variables. Overall, the data reveals consistent mean values for gender while highlighting variability in attitudes towards mathematics and academic achievement.

Table 5

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	**Gender & Attitude towards Mathematics**	100	.234	.019
Pair 2	**Gender & Academic Achievement**	100	.159	.114
Pair 3	**Attitude towards Mathematics & Academic Achievement**	100	.273	.006

The paired sample correlations investigate the links between gender, attitude toward mathematics, and academic achievement. In Pair 1, the correlation between gender and attitude towards mathematics is 0.234, with a p-value of 0.019, indicating a moderate but statistically significant positive relationship. This suggests that gender may have just a minimal influence on attitudes toward mathematics in this demographic. In Pair 2, the correlation between gender and academic success is 0.159 but not statistically significant (p = 0.114), implying that these variables have no meaningful relationship. The correlation coefficient for Pair 3 between attitude toward mathematics and academic success is 0.273, with a p-value of 0.006, showing a modest and statistically significant positive relationship. This suggests that a positive attitude toward mathematics is associated with higher achievement.
Overall, whereas gender has modest connections with the other variables, attitude toward mathematics appears to be a significant influence in academic success.

Table 6

Paired Samples Test						
		Paired Differences			t	Sig.
		Mean	Std. Deviation	Std. Error Mean		
Pair 1	Gender - Attitude towards Mathematics	.050	1.009	.101	.496	.621
Pair 2	Gender - Academic Achievement	-1.490	.823	.082	-18.113	.000
Pair 3	Attitude towards Mathematics – Academic Achievement	-1.540	1.077	.108	-14.299	.000

The paired samples test investigates the mean differences between gender, attitude toward mathematics, and academic achievement, providing information about the links between these factors. Pair 1 had an average difference in gender and attitude toward mathematics of 0.050, with a standard deviation of 1.009 and a standard error mean of 0.101. With a t-value of 0.496 and a p-value of 0.621, the difference is not considered statistically significant. This demonstrates that there

is no significant difference in gender or attitude toward mathematics in this sample. In Pair 2, the standard deviation is 0.823, the standard error mean is 0.082, and the average difference between gender and academic performance is -1.490. Academic success differs considerably and negatively with gender (t-value = -18.113, p-value < 0.001). Lastly, Pair 3 shows a mean difference of -1.540 between academic achievement and attitude toward mathematics, with a standard deviation of 1.077 and a standard error mean of 0.108. There is a significant difference revealed by the t-value of -14.299 and p-value of <0.001, suggesting that attitudes about mathematics are different from academic performance levels. These findings emphasize the necessity of knowing how these factors interact, as significant changes are observed in certain combinations.

Chi-square

Table 7

Case Processing Summary						
	Cases					
	Valid		**Missing**		**Total**	
	N	**Percent**	**N**	**Percent**	**N**	**Percent**
Attitude towards Mathematics Gender	100	100.0%	0	0.0%	100	100.0%
Academic Achievement Gender	100	100.0%	0	0.0%	100	100.0%

The case processing summary for the chi-square analysis includes information about the completeness of the data as well as the total number of cases used in the study. All 100 cases in all comparisons—attitude toward mathematics and gender, and academic accomplishment and gender—are valid, with no missing data. This signifies that all the data for both pairings has been collected and analyzed. The absence of missing data assures that the chi-square test results are reliable, as the analysis considers the entire data set without the need for imputations or corrections. This completeness reinforces the veracity of the findings made from the relationships between the variables.

The crosstab analysis and chi-square test investigate the relationship between gender and attitude toward mathematics. Crosstab shows the distribution of boys and girls across five levels of attitude toward mathematics. Most of the participants fall into the "Extremely Favorable" category, with 29 girls and 38 boys, making up 67% of the sample. The other categories have fewer participants, with "High Favorable" attitudes comprising 18% (5 girls and 13 boys).

Attitude towards Mathematics
Gender

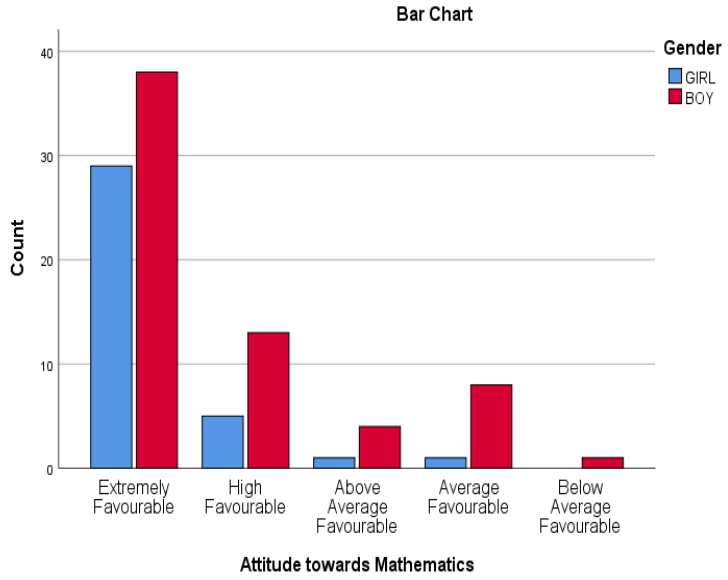
Table 8

Crosstab				
Count				
		Gender		
		GIRL	**BOY**	**Total**
Attitude towards Mathematics	**Extremely Favorable**	29	38	67
	High Favorable	5	13	18
	Above Average Favorable	1	4	5
	Average Favorable	1	8	9
	Below Average Favorable	0	1	1
Total		36	64	100

Table 9

Chi-Square Tests		
	Value	Asymptotic Significance
Pearson Chi-Square	5.609[a]	.230

Figure 1



The cross-tabulation of gender and attitude toward mathematics indicates significant disparities in distribution. Of the 100 respondents, 36 are female and 64 are male. The category of "Extremely Favorable" attitudes includes 29 girls and 38 boys, making it the most prevalent attitude for both genders. There are 5 girls and 13 males with "High Favorable" attitudes, and 1 girl and 4 boys with "Above Average" attitudes. There are 1 female and 8 boys in the "Average Favorable" group, whereas there is just one boy and no girls in the "Below Average Favorable" category. The Pearson Chi-Square test run to analyze the link between gender and attitude toward mathematics yielded a result of 5.609 with an asymptotic significance of 0.230, indicating that there is no statistically significant relationship

Academic Achievement
Gender

Table 10

Chi-Square				
Count				
		Gender		
		GIRL	**BOY**	**Total**
Academic Achievement	**81-90**	10	11	21
	71-80	17	29	46
	61-70	9	23	32
	51-60	0	1	1
Total		36	64	100

Table 11

Chi-Square Tests		
	Value	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	2.673[a]	.445

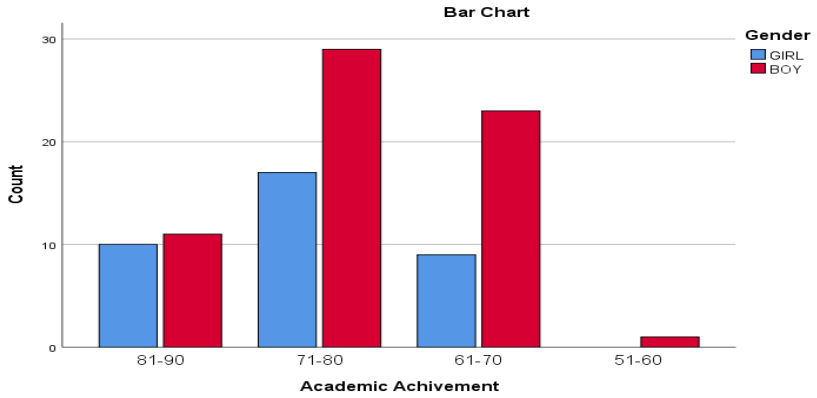


Figure 2

A chi-square test was used to investigate the correlation between academic achievement and gender. The study comprised 100 students, 36 girls, and 64 males, classified according to their academic achievement levels. Ten girls and 11 boys scored 81-90, for a total of 21 students. There were 17 girls and 29 boys in the 71-80 age group, totaling 46 pupils. In the 61-70 range, 9 girls and 23 boys were reported, for a total of 32 students. Finally, there was one boy and no girls in the 51-60 range, for a total of one student. The chi-square test produced a Pearson Chi-Square value of 2.673 and an asymptotic significance (2-sided) of 0.445, indicating that gender has no statistically significant link with academic success at conventional significance levels.

Discussion

- For gender and attitude toward mathematics: Hypotheses accepted.
- For gender and academic achievement: Hypotheses accepted.
- For attitude toward mathematics and academic achievement: Rejected, indicating a significant relationship.

Gender: Although the dataset is skewed toward boys, gender has no significant effect on attitudes about mathematics or academic achievement.
Attitude toward Mathematics: Strongly favorable opinions prevail. Attitudes are marginally associated to academic achievement, emphasizing their significance in education.
Academic Achievement: Scores are largely in the middle, with no significant relationship to gender but a substantial link to attitudes toward mathematics.

Conclusion

The study reveals several important conclusions about gender, attitudes toward mathematics, and academic achievement. While the dataset is skewed toward boys (64%), gender has no significant effect on attitudes toward mathematics or academic achievement. Instead, attitudes toward mathematics have a moderate and considerable positive relationship with academic accomplishment, highlighting the importance of mentality and views in educational success.
Most participants have strong positive attitudes about mathematics, while academic accomplishment is mostly based on mid-range scores. This suggests that, while good attitudes are frequent, they may not fully convert into high success, implying that external or structural factors are influencing performance. To summarize, promoting favorable attitudes toward mathematics is critical for academic success, but other techniques may be required to close the gap between attitudes and results. These findings emphasize the necessity of addressing individual and systemic variables to improve academic achievement.

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