

Comparison of mathematics achievement of male and female students in government high schools of Punjab

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ABSTRACT

This research aimed to determine the difference between the mathematics achievement of male and female high school students. For this research, the researcher used a random sampling technique to choose five government high schools out of 46. In order to achieve the target sample size of 400 participants, the study included the complete student population of each selected school and class. Since the research adopted a quantitative approach, the data relating to students' mathematics achievement was entered into SPSS16 software for analysis. To evaluate and interpret, the researcher used statistical methods such as mean, standard deviation, and t-value at a 0.05 significance level. According to the findings of this study, there is no noticeable difference in mathematics achievement between male and female students at government high schools. According to the statistics, their mathematical talents are equivalent, and there is no substantial difference.

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INTRODUCTION

It is worldwide admitted that mathematics is the mother of all sciences. Any logical inquiry without mathematics is absurd to consider. Reading, writing, and math are the three R's that make up mathematics (Unity & Igbudu, 2015). Every student has to accomplish definite, dynamic aims and objectives in their daily life. Mathematics is a crucial component in achieving these goals. Everybody's daily life depends heavily on mathematics, but prior studies have revealed that student achievement in this subject is not up to par. Another factor is that math proficiency among female pupils is acknowledged as a national issue. There is a gender gap in arithmetic achievement, according to worldwide data (Ashim & Ahmed, 2018). The success of a human in every area of life in the twenty-first century is now largely dependent on mathematics. Achievement is defined as knowledge or competence that a student has acquired generally in the academic areas dignified by exam marks and grades provided by the teacher, institution, or both. By completing all of science, mathematics has frolicked a central character in the framework of modern advancement. Achievement in mathematics is a crucial component of educational success in the current era. In a lot of vocations, it is essential for success. Mathematical achievement is the capacity that the learner displays in mathematics. It is the product of acquired data or knowledge, careful consideration, abilities, and procedures created in mathematics at a specific stage. Government high schools are government-run institutions that students attend after middle or primary school, typically including grades 9 through 12.

Mathematics, being a foundational subject, is extremely important in the field of education. A certain amount of mathematical skill is required at all stages of life (Singh & Mahajan, 2021). Even though this is crucial, many students struggle in math classes and fail as a result of their math-related nervousness (Goetz et al., 2013). Although mathematics plays a momentous role in nature, various organizations and researchers have carried out most studies looking at kids' math proficiency in Pakistan. These studies have demonstrated that kids' overall math performance is subpar, and their math performance is poorer than in other disciplines (Ashim & Ahmed, 2018). Previous studies have demonstrated that pupils' inferior arithmetic proficiency levels are typically brought on by their worry about the topic. Math anxiety refers to the worry and tension that any person experiences when engaging with calculation, and it has extended as a foundation of apprehension in schooling (Roos et al., 2015). Numerous research studies have been accomplished in recent years that focus on pupils' math achievement. Earlier studies focused on how anxiety, gender, and other factors affected students' math ability, but it is also essential to determine the kids' current arithmetic accomplishment status. This study compares the math proficiency of male and female students in government high schools at the matric level.

Significance of the Study

This research tries to discover the dissimilarity in the achievement of the government high school for both male & female students. The results of this research will frequently be beneficial for individuals functioning in the domain of schooling, such as educators, syllabus designers, schoolchild specialists, representatives, textbook authors, etc.

Statement of the Problem

Therefore, learning mathematics in government high schools boosts students' ability to acquire knowledge. While some of their accomplishments have been partially or wholly accepted in the form of accepted grades or marks, the learning atmosphere, parental guidance, and teaching materials have all helped to improve them. Mathematics education can give learners a solid foundation; through this, they can develop their efficiency and effectiveness. Pakistan is one of those countries where students attend government, private, and madrassa schools. The curriculum development centre has required this subject for students in grades I through X. Private schools have taught arithmetic using English. Even a few government schools have adopted English as their primary language. Despite the government's efforts, the problem has not been fixed. Students' desire for mathematics, class size, extracurricular math activities, time management, and the utilization of instructional materials in the classroom, periodic tests, unit tests, and regular homework assignments are all variables that can substantially impact learning mathematics.

Objectives of the Study

To identify the difference between the mathematics achievement of male and female high school students.

Research Questions

Is there any difference between the mathematics achievement of male and female high school students?

LITERATURE REVIEW

Everybody's daily life depends heavily on mathematics, but prior studies have revealed that student achievement in this subject is not up to par. The other factor is that math achievement among female pupils is acknowledged as a national concern. According to international research, arithmetic achievement varies by gender as well (Unity & Igbudu, 2015). In today's modern world, having a firm understanding of mathematical ideas and abilities is becoming increasingly crucial for scholastic and financial success. According to Tamayo (2021) research, high school students' mathematical aptitude considerably influences their likelihood of enrolling and graduating from college and their earnings potential in the early stages of their career and beyond. In 2008, the National Mathematics Advisory Panel emphasized the significance of mathematics in preparing individuals for success in a constantly changing world). The strong point of these associations seems to have augmented in modern times, possibly due to an increase in lucrative positions demanding mathematical skills (Letsoalo, 2022).

On the other hand, many students lack even the most fundamental mathematical skills needed to succeed in everyday employment within a modern budget. Children who grow up in poverty and slum environments are primarily at risk for poor math performance (Roos et al., 2015). When children begin school and are exposed to a gasping set of approaches, they believe they will have to receive and recall; fresh students' delight and curiosity with arithmetic are swiftly substituted by trepidation and hatred. In Finland, one of the top-performing nations worldwide on the PISA (Program for International Student Assessment) exams, formal mathematical methods are not introduced to children until they are seven. In the US, schoolchildren begin far earlier. By the time they are seven, they have been well-educated about the addition, subtraction, multiplication, and division algorithms of different numbers. They are forced to memorize the multiplication facts (Singh & Mahajan, 2021). Much research has been conducted to study the possible link between students' attitudes towards mathematics and academic achievement. Many researchers have discovered a link between favourable attitudes towards mathematics and academic achievement. A majority of previous research examined how children's math skills were influenced by anxiety, gender, and other variables. Still, it's also crucial to know where the students stand right now in terms of their math proficiency. This study compared male and female pupils' matric level maths performance in government high schools.

RESEARCH METHODOLOGY

A quantitative research design was used in this study. The study's target population included all pupils currently enrolled in grade X (having finished grade IX) at various government schools in Punjab. There were around 300 high schools in the chosen region. For this research, the researcher used a random sampling technique to choose five government high schools out of 46. In order to achieve the target sample size of 400 participants, the study included the complete student population of each selected school and class.

Data collection

The investigation began with the identification of schools using a sample approach. Following that, the researcher visited the selected institutions in Lahore on several days and at different times to gather data on the mathematical

achievement of grade IX pupils. The data gathered was then divided into separate groups based on the gender of the pupils enrolled in the sampled schools.

DATA ANALYSIS & FINDING

Since the research adopted a quantitative approach, the data relating to students' mathematics achievement was entered into SPSS16 software for analysis. The researcher used statistical methods such as mean, standard deviation, and t-value at a 0.05 significance level to evaluate and interpret.

Table 1: Descriptive to test the normality of data of government high school students (Mathematics score)

gender of high school		Statistic	Std. Error
male	Mean	40.28	1.899
	95% Confidence Interval for Mean	Lower Bound	36.51
		Upper Bound	44.05
	5% Trimmed Mean	40.21	
	Median	39.00	
	Variance	360.668	
	Std. Deviation	18.991	
	Minimum	5	
	Maximum	75	
	Range	70	
	Interquartile Range	26	
	Skewness	.173	.241
	Kurtosis	-.775	.478
female	Mean	36.72	1.574
	95% Confidence Interval for Mean	Lower Bound	33.60
		Upper Bound	39.84
	5% Trimmed Mean	36.69	
	Median	36.00	
	Variance	247.699	
	Std. Deviation	15.738	
	Minimum	5	
	Maximum	74	
	Range	69	
	Interquartile Range	23	
	Skewness	-.024	.241
	Kurtosis	-.713	.478

In Table 1, our concern is the skewness and kurtosis of the male and female students. In SPSS, the skewness and kurtosis metrics should be as near to zero as feasible. To get the male's z value, divide the skewness metric by its standard error. $173/.241=0.717$, this value is neither below -1.96 nor above +1.96. Then, the value of kurtosis measures divided by its standard error $-.775/.478 = -1.62$, and this value is also neither below the -1.96 nor above +1.96. To find out the z value of female data, we calculate the skewness and kurtosis of females. The value of skewness is $-.024/.241=0.99$ which is neither below the -1.96 nor above +1.96, and the kurtosis value is $-.713/.478=-1.49$, which is neither below the -1.96 nor above +1.96. All the four z values are within ± 1.96 . Hence, we will conclude that this data is somewhat skewed and kurtotic according to the test for skewness and kurtosis for both male and female high school pupils. As a result, we may infer that our data is roughly generally distributed regarding skewness and kurtosis.

Table 2: Group statistics of between male and female students' mathematics achievement

Gender of students	N	Mean	Std Deviation	Std. Error Mean
Male	200	38.38	16.977	1.200
Female	200	42.23	15.697	1.110

Table 3: Independent sample t-test between male and female student's mathematics achievement

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
mathematics score	Equal variances assumed	1.142	.286	-2.358	398	.019	-3.855	1.635	-7.069	-.641
	Equal variances are not assumed.			-2.358	395.580	.019	-3.855	1.635	-7.069	-.641

The Levene's test has confirmed that the mean math achievement of males and females is the same, $p > 0.05$. The independent sample t-test has shown that the mean math achievement of males and females is the same, $t(398) = -2.358$, $p > 0.05$.

DISCUSSION

According to this research, the previous studies only talk about the mathematics achievement of the schoolboys of government high schools and private schools and their achievement differences. They also spoke about the factors affecting students' mathematics achievement, but the researcher did not find any research about students' mathematics achievement in government high schools.

According to data from many sources, including academic records and examinations, pupils in government high schools had lower levels of mathematical ability than their peers in madrassas. Students at government high schools performed considerably below the expected norms for their grade level, with poorer math scores and marks compared to other disciplines.

The research question sought to evaluate any variations in mathematics achievement between male and female students in Lahore government high schools. The data analysis revealed that the mean mathematics scores of male and female government high school students were similar. According to the findings of this study, there is no noticeable difference in mathematics achievement between male and female students at government high schools. According to the statistics, their mathematical talents are equivalent, and there is no substantial difference.

CONCLUSION

Overall, the study reveals discrepancies in math proficiency between government high schools and gender inequities within each educational environment. It is critical to interpret these findings cautiously, considering other factors that may impact mathematical success, such as curriculum, teaching techniques, and students' socioeconomic position.

RECOMMENDATIONS

The government should focus on the male & female students of government high school's mathematics achievement. The researchers should attempt to research the qualifications of the teachers of the new math curriculum. The researchers should conduct a case study to determine the factors behind the difference in mathematics achievement between government high schools & private schools.

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