

Journal of Educational Research & Social Sciences Review (JERSSR)

A Comparative Study on Mathematics Difficulties Faced by Male and Female Students at the Secondary Level

- | | |
|--------------------|--|
| 1. Minal Tanveer | (Corresponding Author) |
| | PMAS Arid Agriculture University, Rawalpindi, Pakistan |
| 2. Qaisara Parveen | PMAS Arid Agriculture University, Rawalpindi, Pakistan |
| 3. M. Imran Yousuf | PMAS Arid Agriculture University, Rawalpindi, Pakistan |

Abstract



This study looks at differences in mathematical challenges experienced by male and female students in the 9th and 10th grades in public secondary schools in Islamabad. The study takes a quantitative, descriptive approach and emphasizes geometry, algebra, and understanding of signs, symbols, and typical mathematical mistakes. The population was 5 schools and 500 students and the sample of study was 2 schools and 200 students. The questionnaire is used for data collection purposes. The descriptive statistics is used as an analysis technique. The data show that male students struggle more with mathematics, notably with sign changes, grabbing basic algebraic terminology, principles, and formula application. Female students, on the other hand, have less trouble with algebra but have no interest in studying mathematical patterns and struggle with mathematical assignments. Both genders meet equal difficulties with mathematical signs and symbols, while female students experience them more acutely. Furthermore, females are more likely than men to make errors in calculations involving carrying, order of operations, multiplication, division, unit conversions, and logarithms. Males, on the other hand, have a stronger interest in mathematics and are better familiar with numerous mathematical topics. The study emphasizes the need for gender-specific educational solutions to address these unique barriers and improve mathematics learning.

Keywords: Mathematics Education, Gender Differences, and Learning Challenges.

Introduction

Education is one of the basic human needs. It enables human beings to lead a balanced life and contribute to society in the best possible way. Our Holy Prophet Muhammad (SAWW) advised the Muslims to seek knowledge from cradle to grave. Education is a progressive development of the individual in all faculties: physical, intellectual, and moral. As a result of the disciplined growth of the entire personality, an educated person shows balanced development in all aspects (Malik, Farooq & Tabassum, 2016). Since Mathematics is a science and the foundation of all other disciplines, which place a high focus on both theory and practical application, it holds a major place in education. Another name for mathematics is the science of reasoning. Our reasoning was predicated on a few premises. There are two styles of reasoning in mathematics: deductive and inductive. Inductive reasoning is used when assertions containing mathematical truths are derived from general observations and experience, whereas deductive reasoning refers to statements that are the result of mental processes (Malik, Farooq & Tabassum, 2016).

Maths is a significant deal in high school. Although it can be difficult at times, it helps shape your future. This article examines the math difficulties that both males and girls encounter in high school. To assist everyone to perform better, we want to determine whether there are any discrepancies. For a long time, people have debated whether Maths skills differ between boys and girls. Understanding the difficulties experienced by both male and female students is critical since mathematics education has a significant impact on how pupils go academically. Gender Disparities in Mathematics Performance The results of earlier studies on gender disparities in mathematics performance have been conflicting. According to some research (Smith, 2010; Johnson & Brown, 2012), men perform better than women, but other studies show little difference. These differences show that more research is necessary to determine the causes of these differences.

Several issues have been recognized as possible causes of the Maths challenges that both male and female pupils encounter. Research has demonstrated that self-confidence is critical, with

women frequently displaying lower levels of confidence than men (Gupta & Sood, 2013). Furthermore, stereotype threat might affect students' because they worry that negative perceptions about their aptitude for mathematics will be strengthened by their gender.

Purpose of the study

The purpose of this study is to examine the problems that male and female secondary mathematics students experience, with an emphasis on aspects such as algebra, learner interest, signs and symbols, geometry, prior knowledge, and common mistakes. It seeks to understand how gender affects the learning experience and to devise solutions to enhance confidence and foster a more inclusive learning environment. The study also looks at the influence of self-confidence on mathematics ability, finding that females had lower self-confidence as a result of cultural norms and gender prejudice. It also looks into teaching approaches and how they work with various genders. The findings will help to build targeted interventions and support systems to improve the mathematics learning experience for all pupils. The study is important because it assists teachers.

Objective of the study

The objectives of the study were to:

1. To determine the overall mathematical difficulty levels of male and female students at the secondary level.

Research question

The current research study focused on the following research question.

1. What are the comparative levels of difficulty faced by male and female students in mathematics at the secondary level?

Research gap

Research on gender disparities in secondary mathematics achievement is limited due to a lack of understanding of the socio-cultural, psychological, and educational factors affecting students' perceived challenges. This information gap hinders the development of targeted interventions and educational policies to address gender-based gaps in mathematics education. Further comparative analysis is needed to better understand these unique obstacles.

Rationale of the study

The study aims to address gender differences in secondary mathematics instruction by examining educational factors causing difficulties for both genders. It aims to identify areas for assistance and develop targeted interventions to promote gender parity in learning environments. The ultimate goal is to create inclusive, encouraging environments where all students, regardless of gender, have an equal chance to succeed.

Significance of the study

The study intends to discover gender-specific problems in secondary mathematics instruction, highlighting differences in difficulty levels between male and female pupils. This information can help develop programs and improve gender equity in education. The data can also be used to inform curriculum development and policies aimed at improving mathematics education outcomes for all children.

Delimitation of study

The study was delimited to two schools only because by focusing on just two schools, the scope of the study can be more easily managed, facilitating the collection and analysis of data within acceptable time and resource restrictions. Researchers can probe more deeply into the unique dynamics at work in each school when there is a smaller sample size.

Literature review

Maths can be challenging to learn since it frequently involves multi-step problems for which students must be able to perform numerous successive stages correctly to discover a solution. This necessitates actively checking for mistakes at every stage and maintaining a sharp concentration on the current work. Students frequently become side-tracked and lose focus during lessons involving complex maths processes. Consequently, he or she can overlook critical phases in the process of solving issues and subsequently find it difficult to understand mathematical ideas when attempting to solve problems alone. The typical perception of mathematics is useful, valuable, and fixed with faith in one's ability and perseverance (Donovan, 2005).

According to one definition the term "learning" can be used to describe the process of acquiring knowledge and skills. It is the process by which an individual acquires a variety of habits,

skills, and knowledge needed to meet the demands of life. The ultimate goal of all learning is to establish new behaviors. Skinner defines learning as "a process of progressive behavior adaptations." It is known as behavior modification. Learning produces all changes in knowledge, skills, habits, interests, attitudes, and tastes. That is, it includes all changes in thinking, feeling, and behaving throughout one's life (Jay, 2011).

Mathematics is very important in modern society. It is the basis of scientific, industrial, research and development. The complex structures of modern society are understood by mathematics (Smith, 2004). Mathematics is the part of our life from birth to death, the creation of the world and home to society which is why it is an important subject in education. Mathematical applications can be found in nature, technology, architecture, manufacturing, the building industry, the banking industry, research, mapping, and more. It can be found almost everywhere, including engineering, science, and technology. Because legendary mathematician Gauss stated, "Mathematics is the queen of all science," scientists and engineers cannot perform anything without the usage of mathematics. Every aspect of our lives demands the use of mathematics. Mathematics is useful in everyday life and promotes overall personal growth. Mathematics has a tremendous impact on pupils' and students' education, both in a specific field and in terms of moral education. Mathematical applications can be found in nature, technology, architecture, manufacturing, the building industry, the banking sector, research, mapping, and so on (Bhusal, 2021).

Developing mathematical expertise involves adhering to the following guidelines.

1) Considering: Knowing what maths signs and figures mean; comprehending mathematical ideas, techniques, and relationships. 2) Calculating: Performing mathematical operations such as accurate multiplication, division, addition, and subtraction of numbers. 3) Relating: Having the ability to clearly state mathematical issues so that one may suggest methods for correctly applying impressions and procedures to solve them. 4) Cognitive: Applying reasoning to extend from a state of knowledge to one of uncertainty or to explain and justify a solution to a problem. 5) Captivating: "Believing that maths is sensible, useful, and achievable if you put in the effort" (Kilpatrick, 2002. P. 18). Structure Mathematics focuses on the relationships between structures rather than the mathematical objects. Mathematicians apply their mental dynamism to make explicit the content involved in these mental constructs. Modern methodologies to enlighten mathematics include mental expressive, error analysis, neuropsychological, and information-processing approaches. These approaches emphasize the learning features of maths underachievers and focus on learners in exclusion rather than students (Munro, 2016).

Mathematical problems are typically composed of controlled and basic activities, but can be identified using various methods and techniques. Underachievers often face problems with directional concepts, elementary spatial ideas, and unsuitable criteria (Mulligan, 2011). A study on Mathematics Learning Difficulties in Early Primary School Years found that children struggle with directional concepts, elementary spatial ideas, and unsuitable perceptual features (Ismail, 2007). Geometry, Arithmetic, and Algebra are the most common applications of signs and symbols. During the learning process, these symbols are frequently confused. Some key symbols are listed below. + Plus: sign augmentation $5 + 4$, Minus: subtraction signs $6 - 2$, Multiplication: multiplication sign $5 * 3$, Divided by $6/2$, = Equals: $2 + 3 = 9 - 4$, \neq Not the same as $2 + 3 \neq 9 - 6$, $9 > 4$ or 9 is greater than 4 (Tatlah, Amin & Anwar, 2017).

Geometry is the study of points, lines, curves, and surfaces using pure mathematics. Straight Line Geometrics, which includes rectangles, triangles, trapezoids, octagons, pentagons, and so on, or Radius Geometrics, which includes half-rounds, quarter-rounds, full-rounds, sectors, ellipses, and so on. Geometry is the foundation and key component of mathematics. Students frequently struggle with sketching various objects as well as estimating their sides and other characteristics (Tatlah, Amin & Anwar, 2017).

Arithmetic is the study of numbers through the procedures of addition, multiplication, subtraction, and division to arrive at an understanding of origins. Some students have difficulty distinguishing between rational and irrational numbers. And the majority of pupils struggle with division operations, particularly when using tables (Terezinha, 2014). Algebra is a language used to describe and investigate mathematical relationships; however, some students struggle with comprehension and word-to-word conversion, resulting in issues such as a lack of understanding, policy knowledge, and problem interpretation (Yeo, 2009).

According to studies, pupils' grasp of algebraic symbols is inadequate due to misunderstandings regarding algebraic words. NCTM (2009) suggests strengthening this grasp of the equal sign when developing algebraic notions. Students' observations of symbols, letters, and signs influence their mathematics learning because they understand that symbols used to represent unknown quantities or variables change context (Ali, 2009).

It is possible to conclude that both genders face unique hurdles in this subject. While there may be differences in specific areas of difficulty, such as self-confidence or teaching approaches, it is critical to remember that these challenges are not unique to one gender. The study emphasizes the necessity of giving equal assistance, resources, and opportunities to all students, regardless of gender, to build a more inclusive and effective mathematics learning environment. By addressing these issues, we may work toward a more fair educational experience for all.

Math difficulties are common among both male and female students in high school. Gender disparities in mathematics performance are a topic of debate, with some studies showing men performing better than women, while others show little difference. Factors contributing to these challenges include self-confidence, stereotype threat, and difficulty learning complex problems. In conclusion, both genders face unique challenges in mathematics, and it is crucial to provide equal assistance, resources, and opportunities to all students, regardless of gender, to create a more inclusive and effective learning environment. Addressing these issues will help create a more fair educational experience for all.

Theoretical framework

The theoretical framework of the study shows a comprehensive picture of the investigation. The theoretical foundation for this study was based on Gender Schema Theory. According to this idea, people form gender schemas, or mental frames, in response to societal expectations and cultural conventions about gender. Gender schemas shape how people view themselves and others, as well as their actions and decisions. Gender schemas may impact students' attitudes, beliefs, and performance in mathematics.

Research Methodology:

This chapter was designed for this study to describe the methods and procedures used in a comparative study of the mathematics difficulties faced by male and female students at the secondary level. This study will be descriptive; a quantitative method was used, and a survey technique was used for data collection. The population of the study was 5 schools and 500 students male and female in the 9th and 10th grades from a public secondary school in Islamabad city. The sample of the study was 2 schools and 200 students were chosen through a simple random sampling technique. The data was collected through a closed-ended (5-point Likert scale). The data was analyzed by descriptive statistics. It was developed through the self-effort of the researcher. The data was collected from the two schools: one female' school and one male school. Twenty students (ten students from each school) were the sample for the research. There was an analysis by SPSS which included descriptive statistics

Results and Discussion

This study obtained the results of a questionnaire with public school students (male and female). The researcher provided questionnaires to 20 students to determine the learning difficulties of the students due to their gender.

ALGEBRA DIFFICULTIES

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
Change positive and negative signs correctly.	Male	10%		10%		80%	4.3
	Female			10%	40%	50%	4.0
Misconception about basic terms of Algebra.	Male	10%		60%	20%	10%	3.3
	Female		10%	30%	50%	10%	3.6
Difficulties in understanding the basic laws of Algebras.	Male	10%	30%	40%	10%	10%	3.5
	Female		10%	20%	20%	50%	4.1
Difficulty in understanding abstract concepts	Male	10%	10%	30%	10%	40%	3.9
	Female			30%	40%	30%	4.0
Difficulty with manipulating algebraic expressions and equations.	Male	20%		30%	30%	20%	3.3
	Female			70%	10%	20%	3.5

A Comparative Study on Mathematics Difficulties faced byTanveer, Parveen & Yousuf

Difficulty in applying algebraic concepts to world problems.	Male	10%	10%	30%	10%	40%	3.5
	Female		10%	30%	10%	50%	4.0
Difficulty with reasoning and proving algebraic concepts and thermos	Male	10%	30%	60%			3.0
	Female		30%	30%	10%	30%	3.4
Difficulty with memorizing and applying algebraic formulas	Male		20%	50%	10%	20%	3.1
	Female	20%		40%	30%	10%	3.1

Table (1)

Table 1 shows that male students face more difficulties in algebra, such as changing the signs, misconceptions in basic terms of algebra, understanding the basic laws of algebra and memorizing and applying algebraic formulas and thermos. On the other hand, female students face fewer difficulties than male students, but sometimes these difficulties are faced by both male and female students.

INTEREST OF LEARNER

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
I like Mathematics.	Male	40%	30%	10%	10%	10%	2.0
	Female	50%	20%	30%			1.8
Interested in exploring mathematical patterns	Male	30%	20%	20%	10%	10%	2.7
	Female	10%	40%	30%	10%	10%	2.7
Tackle my Mathematical exercise alone	Male	20%	30%	20%		10%	2.7
	Female		30%	50%		20%	3.1
Put up my hands to answer Mathematics questions	Male	10%	20%	40%		10%	3.1
	Female	10%	10%	30%	20%	20%	3.5
Hate maths homework	Male	10%	20%	50%	10%	10%	3.8
	Female		10%	20%	30%	40%	4.0
Think tuition is necessary	Male		30%	20%	10%	40%	2.7
	Female		20%	10%	40%	30%	3.8
I did not understand previous ideas	Male	20%	70%	10%			3.3
	Female	10%		30%	30%	30%	3.7
Enjoy solving real-world math problems	Male	20%	20%	40%		20%	3.2
	Female		30%	30%	30%	10%	3.2
We work in mathematics class and have no relationship to daily life.	Male	10%	30%	10%	10%	40%	3.5
	Female	20%	30%	10%	20%	20%	2.9
Interested in learning about mathematical proofs and logical reasoning.	Male		10%	30%	20%	40%	2.2
	Female	30%	10%	50%		10%	2.5

Table (2)

Table 2. Present that female students have less interest in mathematics. They are not interested in exploring mathematical patterns and hate mathematics homework. On the other hand, male students have more interest in mathematics, are more confident, and enjoy mathematics tasks.

SIGNS AND SYMBOLS

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
I found it most difficult to understand the Mathematics symbols and signs.	Male			50%		50%	3.6
	Female	10%	20%	10%	30%	30%	3.5
Struggle with interpreting Mathematical expression	Male	20%	40%	10%	10%	20%	2.9
	Female	10%	10%	30%	40%	10%	3.3
Often struggle with understating the equal (=) sign	Male	30%		40%	10%	20%	3.2
	Female	20%		20%	50%	10%	3.3
Find it challenging to differentiate between the greater than (>) and less than (<) symbols	Male		40%	20%	10%	30%	2.9
	Female	10%	20%	70%			3.3
Often struggle with	Male	30%	30%		10%	30%	2.9

understanding the concept of ratios and proportions	Female	10%	20%	40%	20%	10%	3.0
Often find it challenging to interpret the decimal point in number.	Male	20%	10%	30%	30%	10%	2.9
	Female	40%	10%	20%	20%	10%	2.5
Find it challenging to interpret the square root symbol	Male	20%	10%	30%	30%	10%	2.8
	Female	10%	30%	40%	20%		2.7

Table (3)

Table 3. Display that both genders have the same level of difficulty with signs and symbols. However female students face these difficulties more than male students. Difficulties like understanding the mathematical signs and symbols, mathematical expression, and sometimes the concept of ratios and proportions

GEOMETRY DIFFICULTIES

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
Angles in Geometry are challenging.	Male	10%	50%	10%	30%	20%	2.6
	Female	10%	30%	40%	20%		2.7
Struggled with identifying different types of triangles.	Male	20%	30%	30%		20%	2.8
	Female	10%	50%	30%	10%		2.4
Challenging to apply geometric formulas and theorems to solve problems.	Male	20%	20%	30%	20%	10%	2.7
	Female		30%	40%	20%	10%	3.1
Difficulties while finding a right angle bisector.	Male	10%	10%	30%	30%	20%	3.3
	Female	20%	10%	40%	20%	10%	2.9
Difficulties in finding areas of different shapes.	Male		30%	40%	20%	10%	3.0
	Female	10%	30%	50%	10%		2.6
Difficulties in finding the volume of different shapes.	Male	10%	50%	20%	20%		2.6
	Female	10%	10%	50%	10%	20%	3.2
Hard to understand and apply the properties of parallel lines.	Male	10%	30%	30%	10%	20%	3.0
	Female	10%	30%	30%	30%		2.8
Struggled with understanding and applying the Pythagorean theorem.	Male	10%	50%	20%	10%	10%	2.8
	Female	20%	10%		20%	40%	3.5
Difficulty in differentiating between acute, obtuse, and right angles.	Male	20%	20%	10%	10%	40%	3.5
	Female	20%	40%	10%	30%		2.5
Struggle with understanding the relationships between different types of polygons.	Male		10%	20%	20%	50%	3.5
	Female	20%	40%	20%	20%		2.4
Find difficulties in applying geometric reasoning and proofs.	Male	10%	40%	30%	10%	10%	2.5
	Female	10%	50%	30%		10%	2.8

Table (4)

Table 4 demonstrates that female students face more difficulties in geometry, such as angles in geometry, identifying different types of triangles, applying geometric formulas and theorems, and finding the right angle bisector, but male students face fewer difficulties in geometry.

PRIOR KNOWLEDGE

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
Strong foundation in basic mathematical concepts.	Male	30%	30%	10%	20%	10%	2.5
	Female		50%	20%	20%	10%	2.9
Comfortable working with decimal (.) fractions and percentages (%).	Male		40%	40%	10%	10%	2.8
	Female	30%	20%	40%	10%		2.3
Solid understanding of algebraic concepts such as solving the equation	Male	30%	60%	10%			2.1
	Female	10%	50%	40%			2.2

The grip on probability and its application in real-life situations	Male	20%	30%	40%	10%		2.4
	Female	30%	10%	40%	10%	10%	2.6
Solid understanding of mathematical reasoning and logic	Male	30%	20%	20%	10%	10%	2.7
	Female	20%	40%	20%		20%	2.6
Comfortable working with matrices and vectors	Male	20%	30%	30%		10%	2.6
	Female	30%	10%	40%	20%		2.5
Comfortable doing factorization	Male	50%	20%	20%	10%		2.6
	Female	30%	30%	20%	20%		2.3
Comfortable with measuring and working with different units of length, area, and volume	Male	30%	20%	40%		10%	1.9
	Female	30%	40%	20%		10%	2.2
Basic knowledge of mode, mean, and median.	Male	10%	40%	20%		30%	2.4
	Female	50%	30%	10%	10%		1.8
Comfortable while doing BODMAS	Male	40%	40%	20%			3.0
	Female	40%	40%	10%	10%		2.0

Table (5)

Table 5 shows that both genders have strong and good prior knowledge about mathematical concepts such as arithmetic, decimals, fractions, percentages, and algebraic, and are also comfortable with BODMAS rules.

COMMON MISTAKE

Statements	Gender	Strongly agree	Agree	Sometime	Strongly disagree	Disagree	Mean
Often forget to carry over when add or subtract	Male	30%		10%	40%	20%	1.8
	Female	10%	30%	10%	20%	30%	3.3
Sometimes mix up the order of operation in calculation	Male	10%	20%	40%	20%	10%	3.2
	Female		20%	30%	20%	30%	3.6
Frequently make errors when multiplying or dividing decimal (.)	Male	20%	30%	30%	20%		3.0
	Female	10%	10%	50%		10%	3.3
Often forget to convert units when solving measurement problems	Male	10%	10%	50%	10%	20%	3.2
	Female	10%	30%	20%	30%	10%	3.0
Sometimes mixed interpret word problems and make a calculation error	Male		20%	40%	20%	20%	3.4
	Female		20%	40%	20%	20%	3.4
Forget to include the negative sign (-) in the calculation	Male		20%	40%	20	20%	3.1
	Female	10%	10%	20%	30%	30%	3.6
Make errors when working with factorization	Male	20%	20%	20%	20%	20%	3.0
	Female	20%	10%	30%	20%	20%	3.1
Forget to simplify or reduce fractions in their calculation	Male	10%	20%	30%	20%	20%	3.2
	Female	20%	10%	30%	10%	30%	3.2
Make mistakes when working with exponent and power	Male		20%		10%	30%	3.1
	Female	10%	10%	10%	40%	30%	3.7
Confused about the rules of logarithms and make mistakes in it	Male		20%	20%	30%	30%	3.5
	Female	10%	40%	40%		10%	2.6

Table (6)

Table 6 presented that female students face more common difficulties; they forget to carry while adding and subtracting, mix up with orders of operation in the calculation, frequently make errors in multiplication or division, forget to convert units when solving problems, and make mistakes in logarithms. However male students face these difficulties less than female students; they are more comfortable with these things.

Findings of study

1. The study makes evident the different kinds of maths difficulties faced by male and female students. Mathematical ideas that are more difficult for female students to grasp include geometry, signs and symbols, expressions, and arithmetic operations (such as forgetting to carry, dividing or multiplying numbers incorrectly, and logarithmic errors). However, male pupils seem to have an easier time understanding mathematical ideas and generally have fewer problems.
2. Compared to their male counterparts, female students show less enthusiasm for mathematics and are less likely to find mathematical assignments enjoyable. Their distaste for maths homework assignments could be attributed to this disparity in interests. Male pupils are more confident in their mathematical abilities and find mathematical work more enjoyable. This implies that male students might view mathematics more favorably, which might affect their general performance and interest in the topic.
3. The study notes that although there are obvious gender variations in the kinds of mathematical problems encountered, male and female students may occasionally confront comparable difficulties.

Conclusion

The study's goals are to detect gender difficulties in mathematics education, modify educational strategies, promote inclusivity, improve educational policy, drive curriculum creation, and support gender equality in STEM disciplines. It strives to dispel gender preconceptions and promote equal participation in these fields. The findings can be used to inform teacher education programs, assisting educators in recognizing and addressing gender-specific difficulties in the classroom. The ultimate goal is to develop a more inclusive and supportive school environment by providing a pleasant learning experience for all students. Educators can contribute to a more inclusive and equitable learning environment by recognizing and addressing gender-based challenges in mathematics.

Discussion

The study was conducted in 2017 "An Investigation of Students' Learning Difficulties in Mathematics at Secondary Level" by Ijaz Ahmed Tatlah, Muhammad Amin, & Muhammad Anwar The purpose of the study was to investigate the secondary level students' learning difficulties in mathematics in the areas of Geometry, Arithmetic and Algebra. All maths teachers and students of public secondary schools in nine towns of Lahore were the population of this study. The sample of 60 mathematics teachers and 300 students was selected through simple random sampling. Findings of the study revealed that teachers highlight students as feeling difficulty in learning Geometry, Arithmetic, and Algebra. Similarly, students also pointed out that they face difficulty in learning Geometry, Arithmetic, and Algebra.

The study was conducted in 2016 "Challenges in Mathematics Learning: A Study from the Perspective of School Students" by Mohd Rustam, Mohd Rameli, Azlina, and Mohd Kosnin. A qualitative research design based on case studies was used. A total of 150 secondary school pupils from forms four and 2 were chosen using a stratified random selection procedure to answer an open-ended questionnaire. Respondents were asked to provide feedback on the difficulties they face when learning mathematics According to the findings, the sources of challenges can be divided into five major themes and thirteen sub-themes: a) self-factors (negative perception, low self-regulation), b) teachers (behaviors, practices, characteristics), c) parents (lack of cognitive, emotional, and financial support), d) friends (negative attitudes, behaviors, lack of support), and e) other factors (nature of maths and assessment pressure). The findings of this study have significant significance for practitioners and researchers in enabling children to deal with problems, impediments, and difficulties in daily school life, particularly in mathematics learning. This study is a comparative study on Mathematics difficulties Faced by male and female students at the Secondary Level. The study,

composed of 9th and 10th grade students from public secondary schools in Islamabad, discovered that both genders struggle with mathematics. Males struggle more with algebraic concepts such as changing signs and grasping basic principles, whilst females struggle less. Women are also less interested in mathematics and loathe doing homework. Both genders have a solid prior knowledge of mathematical ideas, although female students experience more common issues, such as forgetting to carry, making errors in multiplication or division, and making errors in logarithms. To solve these concerns, more study is required.

Implication of the study

By engaging different stakeholders within the educational system, the study seeks to enhance gender equity in mathematical education. It can direct the creation of research-based guidelines, leadership initiatives in schools, parent and community involvement, teacher preparation programs, and student support services. The results can help create inclusive teaching strategies, increase understanding of gender disparities, and enhance school resources, policies, and culture. To combat gender inequality, it can also help schools, parents, and the community have conversations about it. For both male and female students, the study recommends focused interventions and support services that address issues like arithmetic anxiety, self-confidence, and academic drive.

Limitation of study

The study focused on two schools for efficient scope management, data collection, and analysis within time and resource constraints, allowing researchers to explore specific institution dynamics.

Recommendation

Based on the current study, the following comments and suggestions for future research are made:

1. Structured questionnaires were used in this investigation. To increase the credibility of the results, further techniques and a qualitative approach must be used.
2. This research looked at the learning challenges in the topic of mathematics. As a result, studies on other disciplines like science, social studies, and languages may be conducted at the secondary and other levels.
3. This study focused on the more general components of normal students' learning challenges such as Input, Integration, Storage, and Output; specific learning difficulties such as Alexia, dyslexia, dyscalculia, dysgraphia, and aphasia may be examined in future studies.

Acknowledgments

We would like to express our sincere gratitude to all those who have contributed to the completion of this project. Your support, guidance, and encouragement have been invaluable, and we are truly thankful for the collaborative effort that made this endeavor possible.

ORCID

Minal Tanveer  <https://orcid.org/0009-0005-6146-5420>

References

- Ali, M. (2009). Students' Concepts about Algebraic Expressions. *International Journal of Mathematics*, 45-56.
- Bhusal, B. (2021). Student's difficulties in learning mathematics: A case study (Unpublished master's thesis). Kirtipur Tribhuvan University, Nepal.
- Brown, A. L., & Smith, J. L. (2016). Context matters The role of gender identity threat in shaping women's experiences in physics. *Social Psychology of Education*, 19(4), 741-763.
- Donovan, M. S. (2005). *How Students Learn: History, Mathematics, and Science in the Classroom*. National academy of science, Washington.
- Gupta, A., & Sood, S. (2013). A study on gender differences in mathematics achievement and self-efficacy beliefs among high school students. *International Journal of Scientific Research*, 2(2), 165-167.
- http://www.preservavearticles.com/201105206845/meaning_of_learning_process.htm
- Ismail, Q. J. (2007). *Mathematics Learning Difficulties in the Early Primary School Years*
- Jay, p. (2011). *The meaning of the learning process* Retrieved from
- Kilpatrick, J. &. (2002). *Helping Children Learn Mathematics*. Washington: National Academy Press.
- Malik, M. I., Farooq, R. A., & Tabassum, R. (2016). The Comparative Study of Achievement of Male and Female Mathematics Students of Higher Secondary Schools and Colleges at Intermediate Level in Punjab. *Bulletin of Education and Research*, 38(2), 219-227.

- Mulligan, J. (2011). Towards understanding the origins of children's difficulties in mathematics learning. *Australian Journal of Learning Difficulties*, 16(1), 19-39.
- Munro, J. (2016, July). Students Education. Retrieved from Students Education: https://students.education.unimelb.edu.au/selection/pub/readings/mathslid/MLDT_Mathslearningdif.pdf
- Smith, A. (2004). Making mathematics count. An inquiry into post-14 mathematics education. England.
- Tatlah, I. A., & Amin, M. (2017). An Investigation of Students' Learning Difficulties in Mathematics at Secondary Level *Journal of Research and Reflections in Education, Volume (Issue), 141-151*. <http://www.ue.edu.pk/jrre>
- Tatlah, I. A., Amin, M., & Anwar, M. (2017). An Investigation of Students' Learning Difficulties in Mathematics at Secondary Level.
- Yeo, K. (2009). Secondary Students' Difficulties in Mathematics. 70-78.