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Editorial

Knowledge is not merely the accumulation of facts; it is the continuous awakening of human consciousness and the relentless pursuit of truth. With this profound belief, we humbly present the current issue of the **Writers Crew International Research Journal** to our thoughtful readers.

In the continuous flow of time and an ever-evolving global landscape, each generation carries the responsibility of shaping the future. Today's scholars, researchers, and youth, guided by awareness and critical inquiry, are no longer passive recipients of information but active architects of society. Their questions reflect a deeper engagement with global challenges, values, and human purpose. As the academic community moves toward higher ideals, platforms for robust research and reflection like the **Writers Crew International Research Journal** become essential spaces for intellectual dialogue and creative exploration.

A research journal is not sustained by digital pages and print alone; it thrives through the collective spirit of authors, reviewers, critics, and reflective readers. Their curiosity, rigorous discipline, and dedication breathe life into academic discourse. Thoughtful critique sharpens our collective understanding, while sincere

feedback guides the path toward intellectual integrity and research excellence.

We express our profound gratitude to the contributors of this issue—the visionary authors who dared to question the unknown, the peer reviewers who refined these thoughts, and the readers who engage with open minds. Your active participation strengthens the academic ethos of the **Writers Crew International Research Journal** and brings us closer to our aspiration of becoming a meaningful, transformative voice in the global world of research and educational thought.

With deep reverence for knowledge and steadfast faith in collective wisdom, we place this issue before you, trusting it will inspire reflection, spark constructive dialogue, and drive meaningful change.

“Let noble thoughts come to us from all directions, and may they illuminate our shared journey of discovery.”

Dr.Neeraj Tiwari
Editor-in-Chief

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A Study of Boys and Girls Students' Conception of Gaps in Teaching and Learning Mathematics of Government and Private Senior Secondary Schools

Research scholar :Archna Tripathi

Department: Education Jigyasa University (Formely Himgiri Zee University)

Supervisor: Dr Geetu Gupta

Associate Professor & HOD

School of Education , Jigyasa University (Formely Himgiri Zee University)

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Abstract

Abstract

In mathematics education, a learning gap is a disparity between a student's actual mastery of concepts and the expectations for their grade level. Students' conceptual understanding often struggles when they are forced to memorise formulas instead of understanding the spatial, graphical, and algebraic connections. The present study was conducted on the boys and girls studying in government and private senior secondary schools of Hindi-medium instruction in searching the degree of variation in their experiences of gaps in teaching and learning mathematics. The students were sampled from senior secondary schools. A questionnaire was administered to the sampled students for collection of data on a three-point scale (Agree/Neutral/Disagree) with respect to five areas of gaps: Curriculum and Content Gaps, Pedagogical Gaps, Assessment Gaps, Learning Environment Gaps, and Resources and Support Gaps. The Chi-square (χ^2) test was applied in examining the degree of variation in their conceptions of gaps between boys and girls. It was reported that boys and girls certainly have some degree of variation, but not up to a significant level, among the students of government as well as private schools.

Keywords: *Conception of Gaps, Foundational Knowledge, Educational Bottleneck, Snowball Effect, Identification of Pedagogical Mismatches, Curriculum and Content Gaps, Learning Environment Gaps, Resources and Support Gaps, Assessment Gaps*

Introduction

Context and Background

Conceptual understanding in mathematics means grasping why mathematical ideas work rather than just memorising formulas. The process requires one to fully understand the internal rules, logical interconnectivity, and reasons why mathematical rules have a standard acceptance (Hassan et al. 2026). Mathematical equations need a balance between conceptual understanding and step-wise knowledge for leveraging effective competence and maximum efficiency in problem-solving. Balancing conceptual understanding with procedural knowledge is essential for true mathematical competence and problem-solving (Mutawah et al., 2019).

Problem-Statement

Students around the globe fail to grasp the mathematical efficiency due to an experience "gap" in learning and teaching. However, a lack of basic concept and fundamental equation knowledge lead to a learning gap. Students tend to lose interest and struggle to learn mathematics when they are pressured to memorise formulas. Students need to gain a comprehension to develop an outcome that delivers graphical, spatial, and algebraic connectivity (Rittle-Johnson & Alibali, 1999). A learning gap is created when students actually struggle to align their mastery of learning with their grade level expectations. Mathematics is often considered as a building where steps are mostly foundational blocks.

Without understanding these subsequent blocks, one cannot deliver simple solutions to complex problems. The hierarchical nature of mathematics fosters a culture that is stiff because one small misunderstanding can lead to extensive overtime and numerous educational bottlenecks (Efa & Frimpong, 2023; Tseer, Ngmenkpieo & Damwah, 2025). These challenges curate anxiety, frustration, and disagreements among students. Moreover, when students are taught rigid and complex formulas they tend to focus on the theoretical aspect more than the practical approach generating a majestic conceptual gap. Students also feel less motivated by widening of formula based learning and these "gaps" negatively influence mathematical development.

Significance of the study

Thus, studying students' conceptions of gaps in mathematics teaching and learning is crucial because it diagnoses foundational disconnects in terms of identifying pedagogical mismatches, preventing the "snowball effect," empowering tailored interventions, and boosting

confidence and engagement among students. To overcome these many gaps, teachers generally follow a cycle through four steps: Assess, Diagnose, Re-reach, Re-assess. Empirical studies in this area suggest ways to help students overcome their experiences of various types of gaps. Boys and girls in the classroom often develop differing self-perceptions, learning strategies, and attitudes toward the subject. In this regard, mathematics anxiety, confidence, problem-solving strategies, and cognitive differences also contribute to some extent. The present research study has been carried out to examine the degree of variation among boys and girls studying in government and private schools regarding their experiences of gaps in teaching and learning mathematics.

Research Objectives

1. To study the students' conception of gaps in teaching and learning of mathematics in Government and Private Senior Secondary Schools.
2. To compare the boys and girls students of Government schools on their conception of gaps in teaching and learning of mathematics.
3. To compare the boys and girls students of Private schools on their conception of gaps in teaching and learning of mathematics.

Literature Review

Curriculum and Content Gaps

Curriculum and Content Gaps in mathematics are systemic discrepancies between the intended curriculum (policy goals), the implemented curriculum, and the attained curriculum (Jackson & Van Houtte, 2026). The intended curriculum is the one outlined by policymakers, whereas the implemented curriculum is the actual curriculum that teachers apply in the classroom (Frontiers, https://www.frontiersin.org). The attained curriculum refers to the learning outcomes achieved by students as a result of their learning experiences (Taylor and Francis Online, https://www.tandfonline.com, 28 April, 2025).

Pedagogical Gaps

Pedagogical Gaps in mathematics refer to the disconnection between how mathematics is taught and how students actually learn. This gap pinpoints a nature that reflects over-reliance on procedure more than realism, scarcity of deep knowledge and an overloaded curriculum with no practical implications (Daniel et al. 2026). However, the "Moving Train" fallacy emphasises the curative ideas of theoretical possession of knowledge.

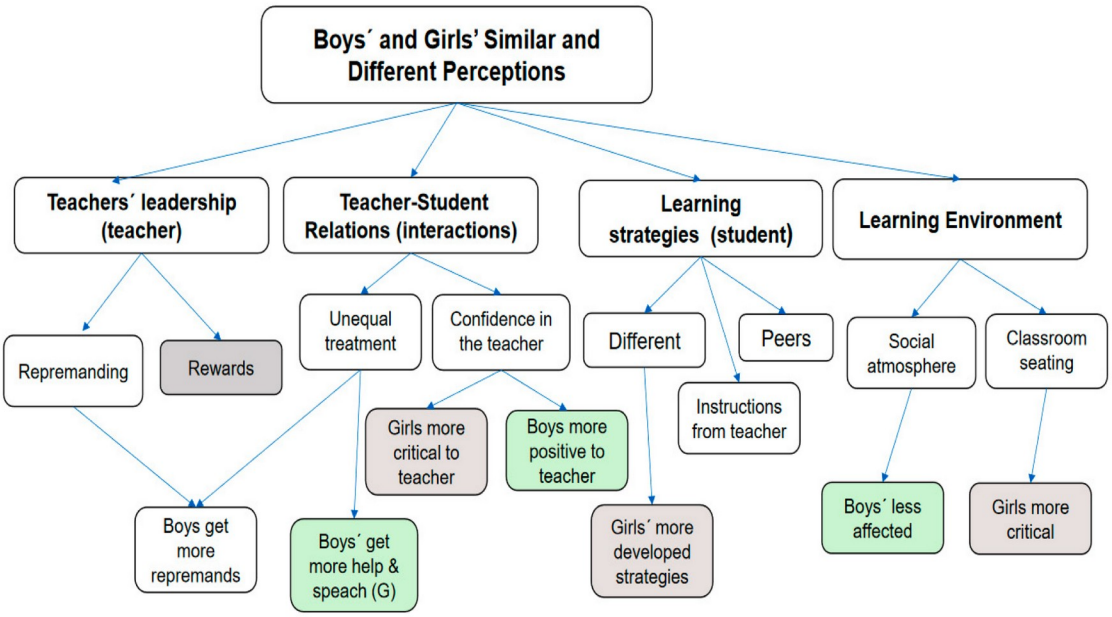

Figure 1: Boys' and Girls' Different Perceptions

(Source: Daniel et al. 2026)

Assessment Gaps

These types of gaps in mathematics are mostly generated from a major disconnection from foundational skill development. Students often feel demotivated to demonstrate their skill because they barely understand the raw meaning. These gaps are developed from a poor concept building and fast curricula, or excessive dependence on memorised studying more than finding logical interpretation (Seni, 2026; Anwana, 2026). These also can be developed from ineffective communication and knowledge gaps.

Learning Environmental Gaps

The gaps in effective learning mostly originate from language barrier, low attention span, and non-viable physical environment. The lacking of deficits in students is ignorable for effective teachers (Perry et al. 2026). These gaps need to be wired on as they support flexible and supportive teaching approaches that have localised standards more than decentralised standards.

Resources and Support Gaps

Resources and Support Gaps in mathematics occur when students lack access to the tools, personnel, and learning frameworks needed to overcome difficulties (Wu, 2026). These include shortages of qualified teachers, inadequate learning materials, poor technological access, and the absence of individualised tutoring.

Methodology

Chosen Design and Methods of the study

A research design acts as a detail-oriented blueprint for a robust research conduct. The successful implementation of core interpretation refers to a generalised design. This study has analysed the problem statement and referred to a **Normative Survey Method**. This method provides a systematic data gathering where researchers find effective and cohesive answers. A number sample is selected and questionnaires are prepared to gather information from people analysing their thoughts and behaviour.

Sample

The sample for the present research study consisted of the students of two Government and two Private Senior Secondary Schools (Inter Colleges) located in the urban area.

The sample strength was as under

No. and Type of school	No. of Boys	No. of Girls	Total
02 Govt. school	100	100	200
02 Private School	100	100	200
	400	400	400

Data Collection Research Tool

The researcher developed a questionnaire for the purpose of data collection with consultation from some experienced teachers of the subject Mathematics. The questionnaire was based on the following five areas of students' conception of gaps in teaching and learning mathematics:

- Curriculum and Content Gaps
- Pedagogical Gaps
- Assessment Gaps
- Learning Environment Gaps
- Resources and Support Gaps

There were five question-items for each area. The responses were to be answered on a three-point scale:

1. Never a Gap

2. Sometimes a Gap

3. Always a Gap

These categories carried scores of 1, 2, and 3 respectively.

This type of data collection method is appropriate to leverage a statistical analysis of how learners are facing conceptual gaps in the mathematical learning process. This systematic process of data collection focuses on the characteristics, behaviours of learners to form an approachable conclusion.

Procedure of Data Collection

The researcher visited the identified two Government and two Private Senior Secondary Schools selected under sampling. After obtaining permission from the principals and with the cooperation of the class teachers, the researcher administered the ***questionnaire to Class XII*** students in both Government and Private schools. The completed answer sheets of the students were collected and scored for the purpose of data analysis and discussion.

Data Analysis and Discussion

The data were collected, scored, and tabulated according to the objectives and hypotheses of the study. The data were arranged in tables for testing the variation between the conceptions of gaps among boys and girls students. For this purpose, the ***Chi-square (χ^2)*** test was applied. The obtained χ^2 values were examined for deviations in percentage form, and the framed hypotheses were tested.

Results

Hypotheses

H1: There is no significant deviation between boys and girls students of Government schools on their conception of gaps in teaching and learning of mathematics.

H2: There is no significant deviation between boys and girls students of Private schools on their conception of gaps in teaching and learning of mathematics.

Testing of Hypothesis

No.1

Hypothesis 1:

"There is no significant deviation between boys' and girls' students of Government schools on their conception of gaps in teaching and learning mathematics." In this regard, the following table has been prepared, and the data were analysed as follows.

Area	Group	Agree	Neutral	Disagree	Total	χ^2	Deviation
Curriculum & Content	Boys	76(78)	18(17)	6(5)	100	0.658	25%
	Girls	80(78)	16(17)	4(5)	100		
	Total	156	34	10	200		
Pedagogical	Boys	63(61)	27(28)	10(11)	100	0.382	15%
	Girls	59(61)	29(28)	12(11)	100		
	Total	122	56	22	200		
Assessment	Boys	73(79)	16(11)	11(10)	100	5.650	94%
	Girls	85(79)	6(11)	9(10)	100		
	Total	158	22	20	200		
Learning Environment	Boys	78(79)	20(18)	2(3)	100	1.134	42%
	Girls	80(79)	16(18)	4(3)	100		
	Total	158	36	6	200		
Resources & Support	Boys	76(73)	18(19)	6(8)	100	1.350	49%
	Girls	70(73)	20(19)	10(8)	100		
	Total	146	38	16	200		

Degree of Freedom

$df = (r - 1)(c - 1)$

$= (2 - 1)(3 - 1)$

$= 1 \times 2 = 2$

The significant level of χ^2 Value at 0.05 level (95%) = 5.991

It is evident from the above Table No. 1 that, in the case of students of Government schools:

- The boys' students experienced a greater degree of gaps than the girls' students in the areas of Pedagogical Gaps and Resources and Support Gaps in teaching and learning mathematics.
- The girls' students experienced a greater degree of gaps than the boys' students in the areas of Curriculum and Content Gaps, Assessment Gaps, and Learning Environment Gaps.

The deviations between boys' and girls' students, in terms of χ^2 values and percentage deviations were found as follows:

Types of Gaps	**χ^2 Value**	**Percentage Deviation**
Curriculum and Content Gaps	0.658	25%
Pedagogical Gaps	0.382	15%
Assessment Gaps	5.650	94%
Learning Environment Gaps	1.134	42%
Resources and Support Gaps	1.350	49%

- However, the boys and girl's students could not be found to be significantly deviated in experiencing learning gaps at the 95% or 99% level of significance in any of the above types of gaps.

It leads to the conclusion that boys' and girls' students of Government schools are found to differ in their conceptions of gaps in teaching and learning mathematics, but not up to a significant level in any of the above categories of gaps.

As such, the hypothesis is accepted.

This may be due to the nearly similar learning experiences provided in Government school classrooms.

Testing of Hypothesis No. 2

Hypothesis:

"There is no significant deviation between boys' and girls' students of Private schools in their conception of gaps in teaching and learning mathematics."

In this regard, the following table has been prepared for data analysis, as presented below.

Area	Group	Agree	Neutral	Disagree	Total	χ^2	Deviation
Curriculum	Boys	70(73)	22(21)	8(6)	100	1.674	45%

& Content							
	Girls	76(73)	20(21)	4(6)	100		
	Total	146	42	12	200		
Pedagogical	Boys	68(62)	24(29)	8(9)	100	3.102	79%
	Girls	56(62)	34(29)	10(9)	100		
	Total	124	58	18	200		
Assessment	Boys	81(84)	10(9)	9(7)	100	1.578	53%
	Girls	87(84)	8(9)	5(7)	100		
	Total	168	18	14	200		
Learning Environment	Boys	76(79)	21(16)	3(5)	100	4.952	91%
	Girls	82(79)	11(16)	7(5)	100		
	Total	158	32	10	200		
Resources & Support	Boys	73(70)	16(17)	11(13)	100	0.976	38%
	Girls	67(70)	18(17)	15(13)	100		
	Total	140	34	26	200		

Degree of Freedom

$df = (r - 1)(c - 1)$

$= (2 - 1)(3 - 1)$

$= 2$

Critical Value

At the 0.05 level of significance (95%),

$\chi^2 = 5.991$

It can be analysed from the above Table No. (2) That, in the case of students of private schools: The boys experienced a greater degree of gaps (Agree) than the girls in the areas of Pedagogical Gaps and Resources and Support Gaps in teaching and learning mathematics. The girls experienced a greater degree of gaps (Agree) than the boys in the areas of Curriculum and Content Gaps, Assessment Gaps, and Learning Environment Gaps in the teaching and learning of mathematics.

The boys and girls students were found to be deviated in terms of χ^2 values and percentage deviations as follows:

Types of Gaps	χ^2 Value	Deviation (%)
Curriculum and Content Gaps	1.674	45%
Pedagogical Gaps	3.102	79%
Assessment Gaps	1.578	53%
Learning Environment Gaps	4.952	91%
Resources and Support Gaps	0.976	38%

Although the boys' and girls' students were found to be deviated in percentage terms, the deviation did not reach the 95% level of significance in any of the types of gaps. This leads us to deduce that boys and girls students of private schools differ in their conceptions of gaps in teaching and learning mathematics, but not up to a significant level in any category of gaps. Hence, Hypothesis No. 2 stands accepted.

Discussion

Interpreting Results

The findings clearly show that even though girls and boys show different perceptions of gaps in learning mathematics across government and private schools, the statistically significant differences are always not at 0.05 levels. The obtained value of Chi Square that is around 0.5991 supports the acceptance of both null hypotheses. However, irrespective of gender and schools, children face equal challenges in mathematical learning. The physical environment like classroom, infrastructure, curriculum and resources all affect girls and boys in a comparable tone. In government schools girls reported higher perceptions in learning environment, assessment, and curriculum gaps whereas boys show gaps in pedagogical means and resources and support groups. Private schools also demonstrate similar patterns and results. The variations are curatively equal and gender differences suggest a school-level practice that is more influential than students' learning experiences (Bhutta et al. 2026).

Comparison with previous research, unexpected outcomes, and interpretation

The results are consistent with previous research that states procedural knowledge and conceptual understanding are necessary for mathematical competence irrespective of genders. The percentage deviations recorded in certain learning dimensions such as Assessment Gaps, Learning Environment, and Private Schools. These major findings tap into a differential educational disparity that varies considerably in inferential statistics. A notable observation is

that students from private and government schools address teaching-related challenges across five dimensions and pinpoints conceptual teaching, assessment practices, inadequate resources, and classroom learning patterns (Sass & Edmark, 2026).

Conclusion

This study shows that the quality of mathematics teaching needs to remain as a priority for student irrespective gender. Adoption of engaging pedagogy and developing strong concept can only ensure equitable access to mathematics leaning. Based on the analysis and discussion in *table no (1) and (2)* it can be concluded that boys and girls students experience various types of gaps to varying degrees in both government and private schools due to several reasons. In light of these findings, mathematics teachers in both types of schools should pay greater attention to providing appropriate means and strategies to help students overcome the various gaps in teaching and learning mathematics. In this context, mathematics teachers should seek the utmost cooperation from school authorities as well as students' guardians in order to improve students' learning experiences and reduce the different types of gaps in mathematics education.

Delimitations of the Study

The study was carried out on the students of **Class XII** studying in Government Inter Colleges and Private Schools (Senior Secondary Level).

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