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Gender perception towards learning mathematics by the Bhutanese grade IX and X students

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Abstract

Students' mathematics performance is one of the main concerns in mathematics education. Many students perceive mathematics as a difficult subject. This negative thinking can be due to many factors that hinder their learning of mathematics. One of the open problems in mathematics education research is the gender perception. To get a better understanding of the issue, this study is an attempt to explore the perceptions of middle secondary school students in two selected districts of Bhutan. Adopting a quantitative approach, the study examined students' perceptions based on six different themes. The sample of 312 students was selected through random sampling from eleven selected schools. The data were analysed using descriptive statistics and an independent sample t-test. The overall findings suggested that there are statistically significant differences in the perceptions and beliefs about mathematics between male and female students in the districts. However, the mathematics teacher's opinion showed the existence of no gender difference in the perceptions of students about mathematics. The study revealed that perceptions of gender were positively influenced by the support of their parents and teachers in the process of learning mathematics.

Keywords: Perceptions, Mathematics Achievement, Attitudes, Beliefs, Misconceptions, Masculine, Gender.

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1. Introduction

Every aspect of our lives involves mathematics in some way. It is prevalent in practically all aspects of political, social, and economic tools, from technological marvels to the implications of values and philosophical presumptions. Many people do not realise that mathematics is more than what is taught in school. This is why most students do not enjoy learning mathematics. Students' negative perceptions of mathematics have a significant impact on their interest in the subject. Instead of using standard empirical research, this article combines evidence from quantitative and qualitative studies to support the claim that gender inequality in mathematics education is still a problem that needs to be addressed.

In order to verify the claim a study has been conducted in Bhutan, a country who is making strides towards technical progress, and has made mathematics a required subject through the tenth grade. In addition, Mathematics is typically required for admission to programmes in the Sciences and Business at the university level. In spite of this, low student achievement in Mathematics and other Science disciplines has been a source of serious worry [1]. People usually think that mathematics is only for the clever ones who have "inherited mathematical ability." Moreover, a widely held belief is that mathematics is a male dominant subject, along with the stereotype that boys are better at mathematics than girls [2].

On the one hand, Bhutan has a severe scarcity of competent and specialised human strangely, the country is experiencing a high percentage of unemployment despite its abundant engineering and technical talent. In Bhutan, mathematicians have an advantage over other applicants for jobs and better opportunities once hired. If students stopped taking math and science classes, they would face tougher competition for jobs and fewer options for advanced education. Hence, a lack of scientifically literate people resources will have a negative impact on a developing economy like Bhutan's [3].

Existing mathematics curriculum have been criticised on a global scale for their focus on rote memorization and rote practise, leaving little room for creativity, critical thinking and invention. The issues aren't that kids shouldn't learn how to compute, but that they don't learn how to analyse mathematical problems critically and come up with good answers. This necessitates that they acquire the ability to comprehend advanced mathematical ideas. Because of this, the current study

set out to discover what was holding back Bhutanese high school pupils from achieving their mathematical potential. [4].

Gender differences in mathematics achievement have remained a source of concern as researchers seek to address the under-representation of women at the highest levels of mathematics, physical sciences, and engineering [5]. Various researchers have focused on the perception of the students in Bhutan related to the mathematics study [6].

This work focuses upon the gender perception related to mathematics learning in Bhutan. The section followed by the introduction section includes background of the study, the problem statement, the purpose and significance of the study, and the main research question and its sub questions.

2. Theoretical framework and research question

One of the foundational classes in the first year of college is mathematics, which is essential to practically all STEM degrees. In order to maintain female students' interest in and self-efficacy in STEM degrees, affirmative experiences in mathematics courses is crucial. Our main objective in this study is to investigate how gender perceptions in mathematics education are perceived, as this is a crucial issue that has to be addressed worldwide. The quantitative analysis method is used to examine the connection between gender and mathematical learning taking the data from Bhutan. The argument that genders imbalance in mathematics education is still a problem that needs to be addressed is supported by this article's combination of evidence from quantitative and qualitative studies. Following are the research questions that are tried to be answered by the medium of the present study:

1. What level of attitude do the students have towards mathematics?

2. Is there a gender-based substantial difference in the attitudes of the students?

3. Does the students' attitude towards mathematics significantly differ depending on where the school is located?

4. To what extent can disparities in mathematics self-efficacy at the start of the course be used to account for gender differences in students' learning outcomes?

2.1 Research method

The study followed a quantitative approach that arises from the belief that human phenomena and variables in human behaviour can be studied objectively [7]. This method was found to be appropriate for studying gender perception in mathematics learning by students in grades IX and X.

The quantitative approach was used to collect data from both genders and teachers as well. Moreover, the quantitative approach provides respondents the freedom to share their opinion through a questionnaire, which makes them feel more comfortable compared to a face-to-face interview [8].

2.2 Location of the study

The study was carried out in the selected schools under the Samtse and Chhukha Dzongkhags. The selection of the location of the study was done based on the mathematics results of students referring to the Bhutan Council for School Examination and Assessment (BCSEA) [9].

2.3 Sampling Technique and sample size.

2.3.1 Selection of school

Sampling is the process of selecting individuals from a population such that the chosen groups are representative of the whole target population. The schools were purposively selected using purposive sampling techniques since all selected schools had students in grade X. The selected schools were S1, S2, S3, S4, S5, and S6 under Samtse, and S7, S8, S9, S10, and S11 under Chhukha Dzongkhag.

2.3.2 Selection of student and teacher

Since the study was on gender perception, equal numbers of boys and girls were randomly selected using random sampling techniques from the sampled schools to avoid bias in sampling. However, their grade level, as expected by the study, was X, and only the students of grade X were employed for this study. With regards to the teachers, a purposive sampling technique was used depending on their subject of specialization because the study required only mathematics teachers with experience teaching grades IX and X mathematics.

2.3.3 Sample size

The study aimed to include a sample size of 368 participants, comprising 308 students and 60 teachers from eleven schools. However, due to a lack of mathematics teachers in some schools,

only 40 mathematics teachers from eleven schools filled out the survey questionnaires. An equal number of students from each gender from every sample school was used, and the total participants were 312. The numerical details of teachers and students in the sample from different schools are mentioned in Table 1.

Table 1 The required sample size from each school

S. No	Name of Dzongkhag	Name of School	Total population (Class X)	Required Sample	Teachers	Total Sample
1	Samtse	S1	150	30	3	33
2	Samtse	S2	140	28	4	32
3	Samtse	S3	250	48	5	53
4	Samtse	S4	180	36	5	41
5	Samtse	S5	60	12	4	16
6	Samtse	S6	240	46	5	51
7	Chhukha	S7	170	34	3	37
8	Chhukha	S8	58	12	3	15
9	Chhukha	S9	124	24	3	27
10	Chhukha	S10	120	24	4	28
11	Chhukha	S11	90	18	1	19
	Total		**1582**	**312**	**40**	**352**

2.3.4 Students' survey questionnaire

A questionnaire is a research instrument consisting of a series of questions (or other types of prompts) for the purpose of gathering information from respondents. The students' questionnaire further contained two parts. The first part obtained the demographic information of sample students. The second section included items classified into different themes to determine the students' level of agreement and disagreement using five-point Likert scales. The purpose of the questionnaire was to study how different variables have affected the mathematics performance of different genders.

2.3.5 Survey questionnaire for teachers

Additionally, to collect supplementary information, the survey questionnaire for teachers was used. A survey questionnaire for teachers was used to collect teachers' perceptions and views on students' math performance by gender.

2.3.6 Data analysis

The data was analysed statistically. Quantitative data was obtained from closed-ended items in the student and teacher survey questionnaires. The Statistical Package for Social Science (SPSS, Version 22) programme was used for processing and analysing the data obtained from survey questionnaires and documents.

2.3.6 Ethical consideration

The approval and permission for the successful conduct of the study were sought from all the relevant stakeholders, such as the Ministry of Education, District Education Officers, Thromde Education Officers, and the principals of the sample schools, before the commencement of the study.

3. Results

A total sample of 312 students in grade X participated in responding to the survey questionnaires with their expressions of their self-perceptions towards learning mathematics. They were selected from eleven schools under two districts that were divided into three categories, such as urban, semi-urban, and remote schools.

Since the study was based on gender, an equal number of male and female students were considered in the sample. There were 108 students from urban schools, 110 from semi-urban schools, and 94 from remote schools as presented in Table 2.**Table 2** Demographic Information of Students (N=312)

	Group involved	No. of participants	Percent	Grade level		School Category	
Gender	Male	156	50	X		N	%
	Female	156	50		Urban	108	34.6
					Semi-Urban	110	35.3
Total		312	100		Remote	94	30.1

3.2 Overall perceptions of the students

Males were commonly believed to have a stronger interest in mathematics than girls, with a few notable exceptions. Recent research, however, has shown that gender gaps in mathematics education appear to be closing in many nations [10]. As discussed by Kiptum (2013), females prefer to engage in conversational patterns that promote group work, where ideas are shared and knowledge is gained by collaborative effort [11]. On the other hand, males acquire knowledge through conflict, which encourages a sense of competition. An increasing number of male pupils performed better in mathematics as the study advanced into later grades. The disparities between the gender show how gender affects success in mathematics. As a result, it is critical that teachers and researchers account for gender variations while creating arithmetic lessons.

In the present work, the descriptive analysis was used to determine the mean and standard deviation to evaluate gender perceptions towards learning mathematics by the students in grade X. A total of 312 sample students were surveyed through 38 different items on a 5-point Likert scale. The overall perception of learning mathematics is found to be high (M = 3.63, SD = 1.024). Male and female students' mean and standard deviation are M = 3.64; SD =.412; and M = 3.52; SD =.439, respectively, with the mean difference (0.12) indicating differences in attitudes towards learning mathematics as shown in Table 3. An independent sample t-test result also confirmed the existence of a statistically significant difference between the genders (df = 310; t = 2.54; p =.012).

Table 3 Descriptive statistics and independent sample t-test on students' responses in survey questionnaires

Different genders	N	Mean	Std. Deviation	Df	t	p
Both	312	3.63	1.02			
Male	156	3.64	.41	310	2.54	.012
Female	156	3.52	.44			

To determine the perceptions in mathematics learning between the genders separately under each theme, descriptive statistics and an independent samples t-test were used.

The results of the descriptive statistics showed slight differences in mean and standard deviation across all the themes. The independent sample t-test for the first four themes does not suggest a meaningful difference between the perceptions of male and female students. However, the last two themes, "The general misconceptions about mathematics as a masculine subject" and "Personal factors that contribute to difference in gender perception," portrayed a statistically significant difference (df = 310; t = 3.66, p =.001) and (df = 310; t = 2.084, p =.038) about their perception towards learning mathematics as presented in Table 4. Thus, the last two themes contributed to the overall statistically significant difference between the perceptions of male and female students.

Table 4 Descriptive statistics and independent sample test on theme wise genders' perception

Themes	Different genders	N	Mean	SD	df	t	p
1. Students' perceptions of their Parental support in Mathematics	male	156	3.883	.7312	310	-.161	.872
	female	156	3.896	.669			
2. Students' perceptions of their teacher's belief on them	male	156	3.944	.557	310	.12	.905
	female	156	3.937	.578			
3. Gender attitudes and perceptions towards Mathematics	male	156	4.008	.554	310	.434	.153
	female	156	3.899	.762			
4. The beliefs of boys and girls about Mathematics	male	56	.753	.537	10	.241	.216
	female	156	3.656	.820			
5. The general misconceptions about Mathematics as masculine subject	male	56	.353	.929	10	.656	.001
	female	56	.978	.885			
6. Personal factors that contribute to difference in gender perception	male	56	.855	.600	10	.084	.038
	female	56	.709	.638			

The participants were further divided into six themes to determine the levels of perception in different areas. It was found that, in general, there is a slight difference in the perception of students towards mathematics in terms of gender. The tables below show the results of descriptive analysis categorised under different themes.

The students' level of perception is expressed based on their mean score under different themes. As shown in Table 5, the overall M of 3.568 and SD of.989 indicate that students have a high level of perception. The theme "Gender attitudes towards mathematics" received the highest rating (M = 3.939, SD =.943), while "general misconceptions about mathematics as a masculine subject" received the lowest rating (M = 2.17, SD = 1.216). The analysis has also presented in Figure 1.

Table 5 Theme Wise Level of Perception Based on Overall Mean Score

Items	N	Mean	S. D	Level of Perception
1. Students' perceptions of their Parental support in Mathematics.	312	3.89	.996	High
2. Students' perceptions of their teacher's belief on them.	312	3.94	.882	High
3. Gender attitudes and perceptions towards Mathematics	312	3.939	.943	High
4. The beliefs of boys and girls about Mathematics	312	3.686	.937	High
5. The general misconceptions about Mathematics as masculine subject	312	2.17	1.216	Low
6. Personal factors that contribute to difference in gender perception	312	3.783	.964	High
Overall		3.568	.989	

Note: 1-1.80= Lowest, 1.81-2.60= Low, 2.61-3.40=Moderate, 3.41-4.20=High, 4.21-5.0=Highest (Best & Kahn, 1998).

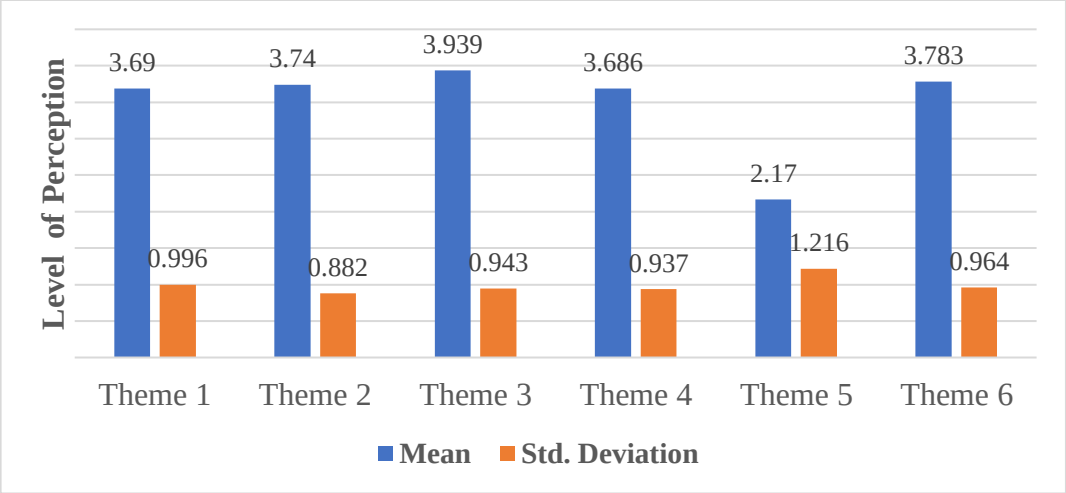

Figure 1: Theme wise level of perception based on overall mean score.

Table 6 showed the overall (M = 3.69, SD =.996) regarding their general perceptions of parental support for mathematics learning. However, the parental support is slightly low (M = 3.62, SD = 1.09) in terms of the "provision of math-related games in my childhood that helped me develop good mathematical skills." "My parents inspire me to perform better in mathematics" is perceived positively by both genders (M = 4.14, SD =.929). The analysis has also presented in Figure 2.

The results of the current study suggested that parents who provide their children with appropriate guidance and assistance tend to help their children perform better in mathematics than parents who do not provide their children with such support. According to studies, how effectively parents or families support learning at home and get involved in their children's education is the best indicator of student success in academic life [12]. Although parents have great expectations for their children, they also play a crucial part in their education. According to this study, parent educational attainment and student accomplishment are related. Students with more educated parents outperformed their peers in mathematics compared to students with less educated parents [13].

Table 6 Students' perceptions of their parental support in Mathematics

Items	N	Min	Max	Mean	Std. Deviation
1. My parents inspire me to perform better in Mathematics.	312	1	5	4.14	.929
2. Positive perceptions of my parents on my Mathematics ability encourage me to do well in Mathematics.	312	1	5	3.99	.933
3. Provision of Math related games in my childhood help me develop good mathematical skills.	312	1	5	3.62	1.090
4. My parents want me to succeed in Math related fields.	312	1	5	3.83	1.047
5. My parents have made me feel I have the ability to go on in Mathematics.	312	1	5	3.87	.979
Overall				3.89	.996

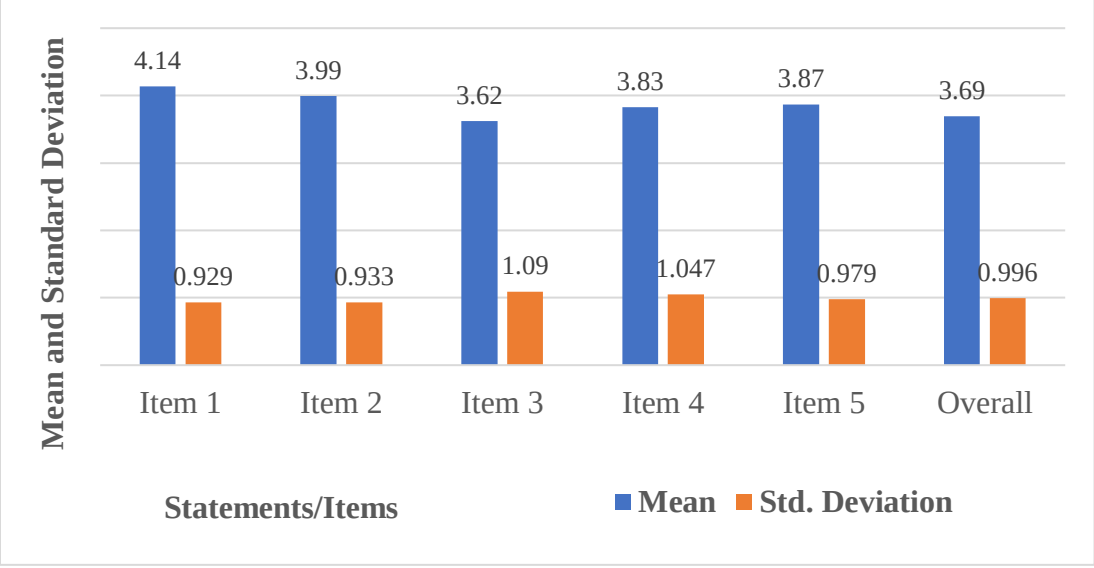

Figure 2: Students' perception of their parental support in Mathematics.

In Table 7, students' perceptions of their teacher's beliefs about them were generally positive (M = 3.74, SD =.882). The students feel satisfied and comfortable with the highest level of perception (M = 4.41, SD =.805) in the item, "My teachers treat all the students the same regardless of their abilities," followed by (M = 4.34, SD =.765) in "My teachers encourage me to study more math." However, their level of perception is a bit low in the statements, "My teachers have been interested in my progress in math" and "My teachers want me to take all the math I can," with M = 3.62 and SD =.909, respectively. Figure 3 also shows the results of the study.

Table 7 Students' perceptions of their teacher's belief on them

Items+	N	Min	Max	Mean	S. D
1. My teachers encourage me to study more Math.	312	1	5	4.34	.765
2. My teachers treat all the students same regardless of their abilities.	312	1	5	4.41	.805
3. My teachers think I'm the kind of person who could do well in Math.	312	1	5	3.70	.942
4. My teachers have been interested in my progress in Math.	312	1	5	3.62	.909
5. My teachers want me to take all the Math I can.	312	1	5	3.63	.989
Overall				3.94	.882

Figure 3:Students' perceptions of their teacher's belief on them.

As stated in Table 8, the general attitude of the students towards learning mathematics is most favourable when they enjoy doing math problems. "I enjoy doing math problems when I know how to do them," both genders rated highly (M = 4.66; SD =.695). Their overall level of attitude towards mathematics is (M = 3.939; SD =.943), and they also perceive mathematics as being as important as any other subject (M = 4.40; SD =.943). The students displayed a comparatively good attitude in "I enjoy the challenge presented by a mathematics problem" (M = 4.02; SD = 1.011). Figure 4 also shows the results of the analysis. However, their attitudinal level is low in other areas, such as "I have always been braved in mathematics," with a score of (M = 3.40; SD = 1.044) being the lowest.

The study's findings are in line with those of another study by Mutodi, P., & Ngirande, H. (2014), which found that students' self-concept and beliefs were substantially related to their high levels of exam performance [14]. Positive perspective can inspire critical thinking in pupils, increase active engagement, and motivate students to understand the material more effectively. Positive student perceptions therefore tended to suggest a key contributor to the students' strong mathematical performance in this study. Yet, there are a number of other possible causes that have been linked to the study's participants' subpar math ability.

Table 8 Gender attitude and perception towards Mathematics

Items	N	Min	Max	Mean	S. D
1. I have always liked Mathematics	312	1	5	3.92	1.099
2. I have been always braved in Mathematics	312	1	5	3.40	1.044
3. I do feel sure of myself in Mathematics	312	1	5	3.62	.945
4. I do not think Mathematics is fun, but I always want to do well in it	312	1	5	3.94	1.113
5. I'm enthusiastic about Mathematics	312	1	5	3.55	.796
6. Mathematics is as important as any other subjects.	312	2	5	4.40	.843
7. I enjoy doing Math problems, when I know how to do them.	312	1	5	4.66	.695
8. I enjoy the challenge presented by a Mathematics problem.	312	1	5	4.02	1.011
Overall	312			3.939	.943

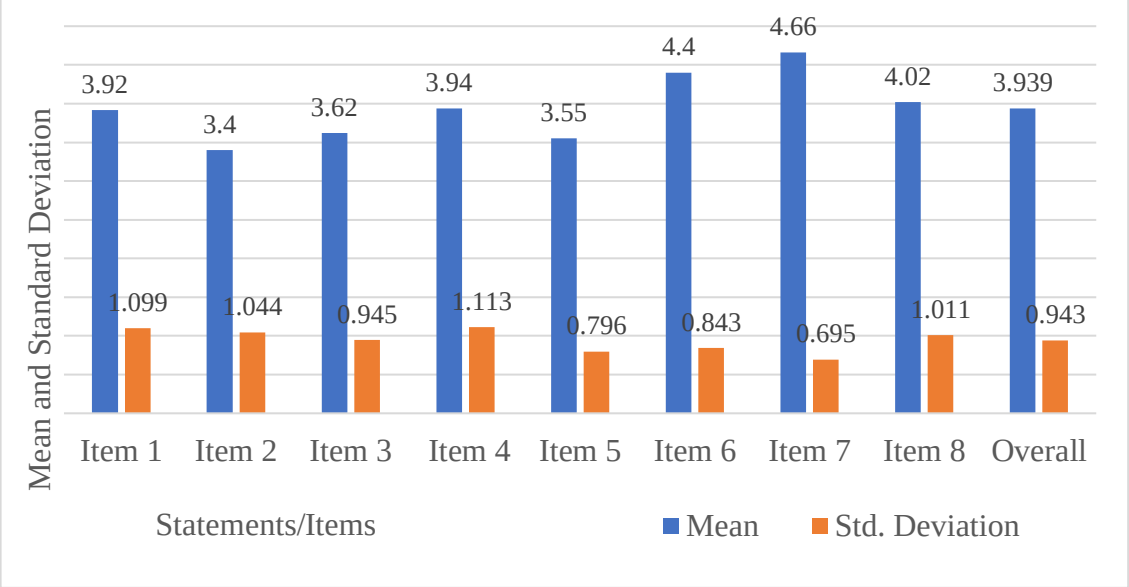

Figure 4:Gender attitude and perception towards Mathematics.

The general beliefs of boys and girls about Mathematics is good with an overall (M=3.686; SD=.937) as evident in Table 9. In addition, Figure 5 illustrates the analysis. The students are more confident with their belief in Mathematics in terms of its usefulness with (M=4.25; SD=.806) and (M=4.22; SD=.825) in "Mathematics is useful for solving everyday problems" and "I study Mathematics because I know how useful it is" respectively.

Although their belief strongly contradicts with "Mathematics is only for brilliant student" (M=2.05; SD=1.217), they still have some confidence with their belief regarding the practicality of Mathematics (M=3.83; SD=.951). Moreover, the degree of their belief is also good in "Mathematics has made me more critical (M=4.08; SD=.886).

Table 9 *The beliefs of boys and girls about Mathematics*

Items	N	Min	Max	Mean	S. D
1. Mathematics has made me more critical.	312	1	5	4.08	.886
2. Mathematics is useful for solving everyday problems.	312	1	5	4.25	.806
3. I study Mathematics because I know how useful it is.	312	1	5	4.22	.825
4. Mathematics is only for brilliant student.	312	1	5	2.05	1.217
5. I like Mathematics because it is practical	312	1	5	3.83	.951
Overall				3.686	.937

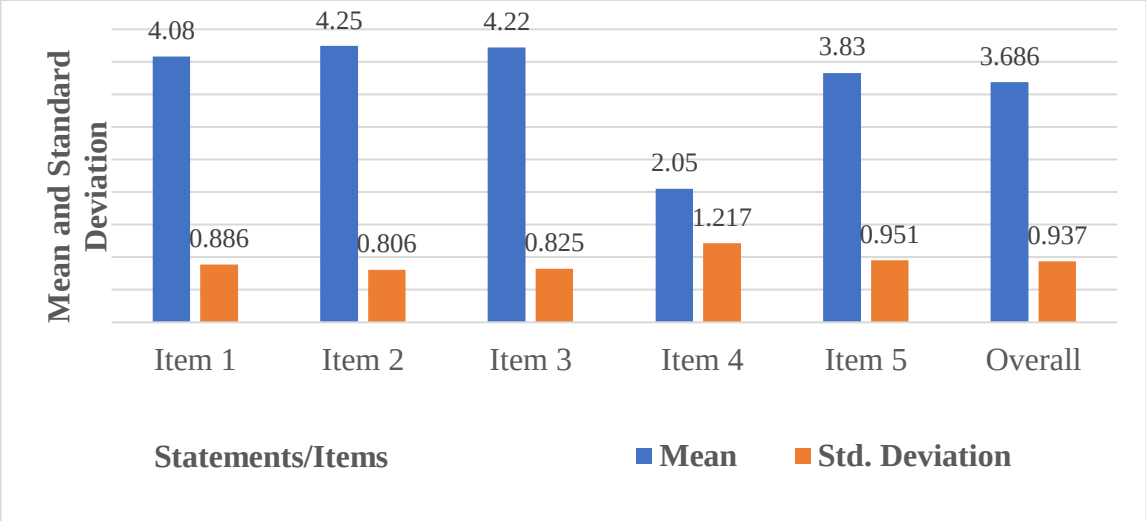

Figure 5: The beliefs of boys and girls about Mathematics.

As evident in Table 10, the students do not have many misconceptions regarding mathematics as a masculine subject. The overall mean and standard deviation under this theme are (M = 2.17; SD = 1.216), which is an indication that the students perceive mathematics as a suitable subject for both genders.

Furthermore, they strongly disagree on the following two statements: "Learning mathematics is only suitable for male students because the contents are masculine in nature" and "Mathematics is for men and literacy is for women" (M = 1.94; SD = 1.022) and "M = 1.94; SD = 1.102), respectively. Figure 6 depicts the results of the analysis.

Table 10 The general misconceptions about Mathematics as masculine subject

	Items	N	Min	Max	Mean	S. D
1.	I would have more faith in the answer for a Math problem solved by a man than a woman.	312	1	5	2.52	1.280
2.	Learning Mathematics is only suitable for the male students since contents are masculine in nature	312	1	5	1.94	1.022
3.	Mathematics is for man and literacy for woman	312	1	5	1.94	1.102

4. Males are naturally better than females in Mathematics	312	1	5	2.13	1.278
5. Males are more interested in Mathematics than females	312	1	5	2.32	1.398
Overall				2.17	1.216

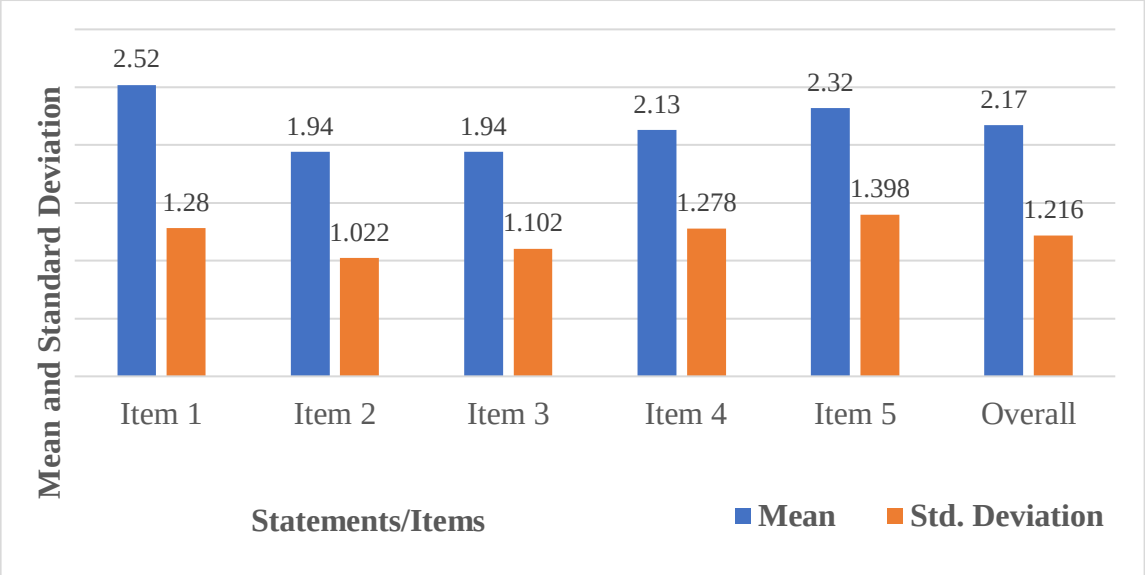

Figure 6: The general misconceptions about Mathematics as masculine subject

With regard to the personal factors that contribute to difference in gender perception, the overall M=3.783; SD=.964 as stated in Table 11. The degree of their perception towards Mathematics is governed by the fact that Mathematics plays a significant role in making the daily lives of people. This is clearly indicated by the statements, "Knowing Mathematics will help me earn a living" (M=4.13; SD=.796), "Mathematics knowledge will help me to solve problems in my daily activities" (M=4.09; SD=.866) and "I can see the relevance of Mathematics lessons in our everyday life and society" (M=4.10; SD=.810).

The students also expressed their positive confidence in their personal level towards learning Mathematics. Moreover, their mean and standard deviation in other statements such as "I know I can do well in Math" (M=3.93; SD=.901), "I can get good grades in Math" (M=3.76; SD=.980) and "I never feel bored in my Mathematics class" (M=3.75; SD=1.136) show relatively equivalent scores. Moreover, Figure 7 has the analysis displayed.

Table 11 Personal factors that contribute to difference in fender perception

Items	N	Min	Max	Mean	S.D
1. I never get tired of working with Mathematics.	312	1	5	3.57	1.149
2. I would like to spend more time at school working on Mathematics.	312	1	5	3.59	1.004
3. I think I could handle more difficult Math.	312	1	5	3.41	.998
4. I know I can do well in Math.	312	1	5	3.93	.901
5. I can get good grades in Math.	312	1	5	3.76	.980
6. I enjoy working and thinking about Mathematical problems outside of school.	312	1	5	3.50	.995
7. I never feel bored in my Mathematics class.	312	1	5	3.75	1.136
8. Knowing Mathematics will help me earn a living.	312	1	5	4.13	.796
9. Mathematics knowledge will help me to solve problems in my daily activities.	312	1	5	4.09	.866
10. I can see the relevance of Mathematics lessons in our everyday life and society.	312	1	5	4.10	.810
Overall				3.783	.964

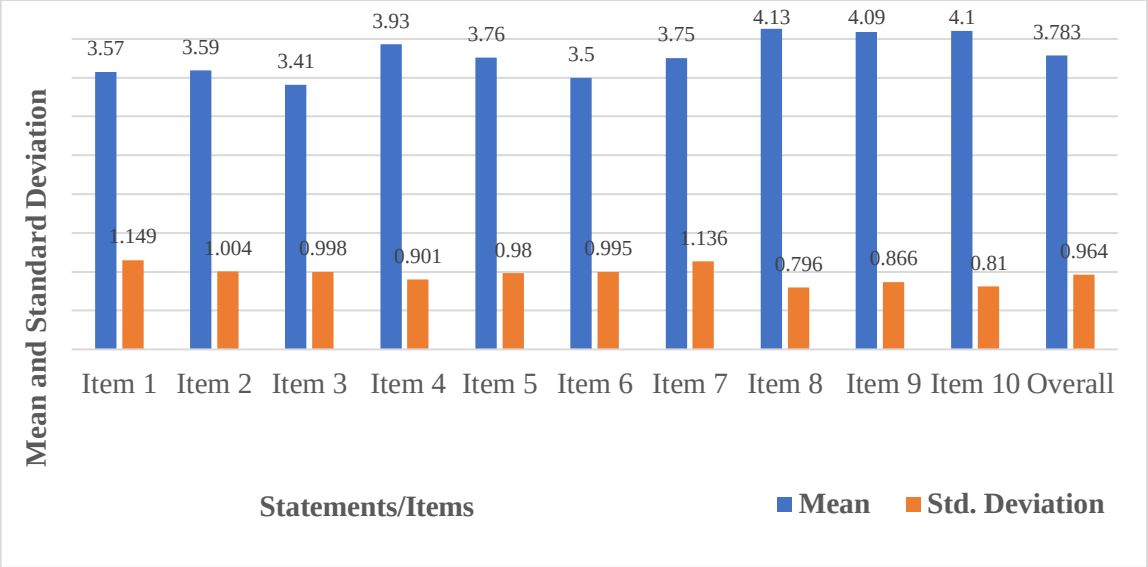

Figure 7: Personal factors that contribute to difference in gender perception.

The mean and standard deviation were also calculated for their test mark to compare how their performance is affected due to differences in terms of gender perceptions. The result indicated that the male students (M = 56.657; SD = 15.706) slightly performed better than the female students (M = 53.805; SD = 17.896), but did not show any statistically significant difference (df = 310; t = 1.49; p = 136) as evident from Table 12.

Table 12 Test Mark Analysis

	Different genders	N	Mean	Std. Deviation	df	t	p
Scores	male	156	56.66	15.71	10	1.49	.136
	female	156	53.80	17.89			

Table 13 shows the result of the opinion of teachers on whether there is a gender difference in the perception of boys and girls towards learning mathematics. A total of 40 mathematics teachers were surveyed, and they are divided in terms of their opinion on gender difference. 67.5% of the teachers reported that there is no gender difference in mathematics. However, 32.5% still responded by saying that there is a gender difference due to differences in their perceptions towards learning mathematics.

Unfortunately, 70% of the teachers did not respond to the question, "If yes, on average, which gender performs better in mathematics?" Out of the 30% of teachers who responded to it, 20% thought that male students' performance was better than female students.

When teachers were asked about their opinion on "If boys outperform girls in mathematics, are there occasions when girls outperform boys in the subject?" 67.5% of them found that there are occasions for girls to outperform boys, and only 10% said no. However, 22.5% of the teachers did not respond to it.

When teachers were asked how often girls outperform boys, 12.5% responded "very often," 25% each for "often" and "moderately," and 2.5% each for "rarely" and "very rarely." 32.5% of the teachers again did not share their views on it.

Table 13 Responses of Teachers from Survey Questionnaires

Statement/Questions	**N**	**Yes**	**No**				**Missing**
Is there gender difference in Mathematics performance by the students?	40	32.5	67.5				
		Male	Female				
If yes, on average, which gender performs better in Mathematics?		20	10				70
		Yes	No				
If boys outperform girls in Mathematics, are there occasions when girls outperform boys in the subject?		67.5	10				22.5
		Very often	Often	Moderately	Rarely	Very rarely	
If yes, how often does this happen?		12.5	25	25	2.5	2.5	32.5

Table shows the result of mathematics teachers' responses on gender differences in mathematics performance that favour boys. However, it favoured girls' better performance in mathematics, such as the completion of homework, participation, confidence, interest, sense of competition, criticality, and attitude.

The mean percentages of teachers who disagree and strongly disagree with the general performance of boys in mathematics are 36% and 7.25%, respectively. Only 23.5% of teachers said they agreed, and 6.39 percent said they strongly agreed. The overall score (M = 2.83, SD = 1.033) also indicated the mathematics teacher's disagreement with the statements. However, due to their gender perception in mathematics, 27.5% of teachers remained undecided about gender differences.

In general, the results of the responses from the teachers' survey questionnaire showed that there was not much difference in terms of their performance in mathematics.

Table 14 Mathematics teachers' responses on gender differences in Mathematics performance (expressed in percentage)

Statements	N	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD
1. Boys generally outperformed girls in Mathematics	40	7.5	20	35	32.5	5	2.92	1.023
2. Boys complete Mathematics homework on time	40	0	10	32.5	55.0	2.5	2.50	.716
3. Boys participate actively in Mathematics lessons than girls.	40	7.5	20.0	35.0	30.0	7.5	2.90	1.057
4. Boys are more confident about solving mathematical	40	2.5	37.5	20.0	32.5	7.5	2.95	1.061

	problems than girls.								
5.	Boys show more interest in Mathematics as a subject than girls do.	40	10.0	25.0	32.5	22.5	10.0	3.03	1.143
6.	Boys have higher sense of competition in Mathematics than girls.	40	2.5	27.5	25.0	37.5	7.5	2.74	.966
7.	Boys are more independent in handling Mathematics problem than girls.	40	7.5	22.5	22.5	40.0	7.5	2.83	1.107
8.	Boys ask more Mathematics doubts than girls.	40	10	25.0	10.0	45.0	10.0	2.74	1.186
9.	Boys are more critical about Mathematics than girls	40	5.0	27.5	27.5	32.5	7.5	2.90	1.057
10.	Boys generally display positive attitude towards Mathematics than girls.	40	5.0	20.0	35.0	32.5	7.5	2.82	1.010
	Overall mean percentage		**6.39**	**23.5**	**27.5**	**36**	**7.25**	**2.83**	**1.033**

4. Summary and conclusion

This study mainly focused on the perceptions of middle school students towards learning mathematics from the perspectives of different genders. The study sought to determine the general perceptions of Bhutanese students in Grades IX and X in two selected districts of Bhutan. Through a quantitative and cross-sectional survey design, the perceptions of grade X students towards learning mathematics were successfully determined, along with the analysis of the results and discussion of the findings. The study also gathered the grade IX annual examination test results of those sampled students to better understand the relationship between student perceptions and performance across genders.

The study's overall findings revealed that students, regardless of gender, have positive and high attitudes towards learning mathematics. The overall finding of this study suggested a statistically significant difference between the perceptions of male and female students towards the subject. However, the students' test mark analysis did not show a significant difference within the genders in terms of their performance. The findings of mathematics teachers' perspectives on their students' mathematical ability revealed a positive result with no gender differences. Though the study's overall findings showed that students have positive perceptions of mathematics, there is a statistically significant difference in their perceptions between genders. This study also confirmed that students are positive about the support and guidance provided by their parents and teachers while learning mathematics. Furthermore, the students demonstrated a positive attitude and believed in the practical aspects of mathematics regardless of the subject's masculinity.

The mathematics teachers' views on their students' perceptions towards learning mathematics were also collected using survey questionnaires. This contributed to further understanding the general perception of students about mathematics.

Conflict of Interest:

The authors declare that they have no competing interests.

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