



Research Article

GENDER BIAS IN THE TEXT BOOK OF MATHEMATICS OF SECONDARY LEVEL OF W.B.B.S.E

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ABSTRACT

The author observed that gender biasness have been studied in the field various disciplines other than mathematics. It also found that the most of the researcher has done their work gender biasness in text book but no one has been studied on the secondary level (class-IX & X) in West Bengal on the mathematics of W.B.B.S.E (West Bengal Board of Secondary Education). The author has found that gender biasness is relevant issue in this time. The author collected data by observation technique and analysed it using different charts and correlation tables. Finally, it has been observed that there was no significant gender bias found.

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INTRODUCTION

Gender bias in learning materials such as textbooks has been a global issue in research over the years both in undeveloped and developed countries (Broadbridge, 2008; Conwell, 1987; Kim et al., 2009; Stockard, 1992; Strom, 2015). Mathematics textbooks are very important instruments used in teaching and learning at all levels of education in India. The textbooks are used by both teachers and students and these are equally powerful representations of the curriculum and the pedagogical practices at all levels of education. Tang et al.(2010), argued that mathematics textbooks are embedded with gender discrimination in the form of stereotypical roles, omissions, or degradations. As such Bradic, (1972), argued that the instructional materials should balance gender representation in illustrations and text book that will help male and female students to relate to the materials presented. The gender biased representations in textbooks continue to exist despite or phobia the condemnation of textbooks that have stereotypical on gender roles as reported by Dube, (1988) and Lindsey, (1990). In addition, Gary, (2003) observed that bias is embedded in the content of the texts and pictures. Just like other studies, Afanassieva, (2005) pointed that gender bias created a view to male activities being of primary importance and the greatest value, while female activities are marginalized which made them downgraded. Students spend most of their lives in school using different types of textbook and mathematics is one of them. They learn basic skills and also formulate attitudes and behaviour from what they have read in the textbooks. Oakely, (1972) found out that 75% of a child's class work and 90% of the homework are from the textbooks

and the teachers' decisions are based on the text books contents. Chaturvedi et al., (1992) and Ruiz et al.,(2016) said that a pupil reads textbooks from elementary to high school level and internalize what they read, and see that there are suitable potentials and attitudes that are associated with masculine and feminine qualities through family socialization.

It discusses gender stereotypes in the education system specifically in the textbooks which are the primary sources of information to children. When children enter the school environment, the images of females and males portrayed in textbooks, shape their concept about gender and consequently their own self image influencing their behaviour and aspirations. Studies reviewed reflected that females are not only underrepresented but both females and males have been depicted in gender stereotyped ways in textbooks across the world over the years. Representation of gender in textbooks reinforces the gender biases and stereotypes already existing in our society The picture is bleak across the globe as the research reveals that most of the countries, developing or developed, present girls and boys in stereotypical gender roles in their textbooks. There have been stereotypes seen in language used, visuals, depiction in occupation and overall representation of women and men.

Statement of the Problem

The problem may be stated as "Gender biasness in mathematics text books of secondary level of W.B.B.S.E".

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Objectives of the Study

- To find out the textual and image difference among genders in mathematics book of class IX.
- To find out the textual and image difference among genders in mathematics book of class X.

Research Question

- Is there any gender biasness in images and text of mathematics book, class IX ?
- Is there any gender biasness in image and text of mathematics book, class X ?

Significance of the Study

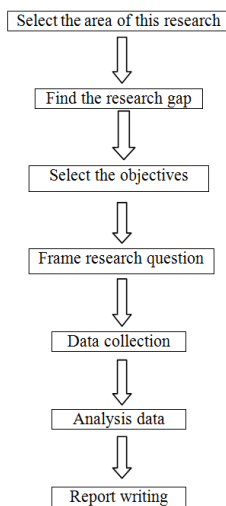
- From the study we will concern about gender biasness.
- We will know about what way gender biasness effect in text books throughout the whole study.
- The effect of women empowerment in text books also seen by the study.
- This study may help to know about gender biasness how much effective in mathematics text books.
- We will know effect of gender bias in mathematics curriculum of W.B.B.S.E.

Delimitation of the Study

- The study has following delimitations:
- The study is delimited to Govt. approved secondary study books of W.B.B.S.E.
- The study is delimited to class IX-X class text books.
- The study is delimited to class IX-X class mathematics text books.

Research Design

This will be a descriptive qualitative research. The research design was as follows



Research Sample

Mathematics text books GANIT PRAKASH of class IX-X of W.B.B.S.E.

Research Tools and Technique

For data collection the researcher used mainly observation technique. Table and graphical representation are used for analysis and interpretation purpose for this study.

Procedure of Data Collection:-

At first Researcher collected those text books of class-IX, X and find out the no of males and females in text and images on each page of those collected books one by one classes.

Software used

The author used Microsoft office Excel 2007 and Microsoft office Word 2007 for analysis and interpretation.

Analysis and Interpretation:-

Objective-1 To find out the textual and image difference among genders in mathematics book of class IX.

Table 1 No of male & female in image and text in mathematics book of class-IX

Chapter	Class-Ix					
	Image		Text		Image & Text	
	Male	Female	Male	Female	Male	Female
1	27	21	5	4	32	25
2	16	8	4	2	20	10
3	13	8	10	7	23	15
4	6	5	5	1	11	6
5	21	19	19	14	40	33
6	21	31	8	8	29	39
7	25	20	5	3	30	23
8	14	15	7	3	21	18
9	6	4	3	4	9	8
10	23	23	32	13	55	36
11	32	20	7	7	39	27
12	7	5	2	6	9	11
13	4	5	2	0	6	5
14	2	2	3	2	5	4
15	7	4	20	15	27	19
16	1	4	6	1	7	5
17	12	8	1	2	13	10
18	9	7	14	16	23	23
19	5	1	0	1	5	2
20	4	3	1	1	5	4
21	10	11	6	3	16	14
TOTAL	265	224	160	113	425	337

From the above table it was found that the total numbers of males in book Ganit prakash of class-IX were 265 and total numbers of females were 224 in the images of this book. Also in the text it was found that the total numbers of male & female were 160 and 113 respectively with in the 23 chapters and also we observed that last two chapters contained no such type of data.

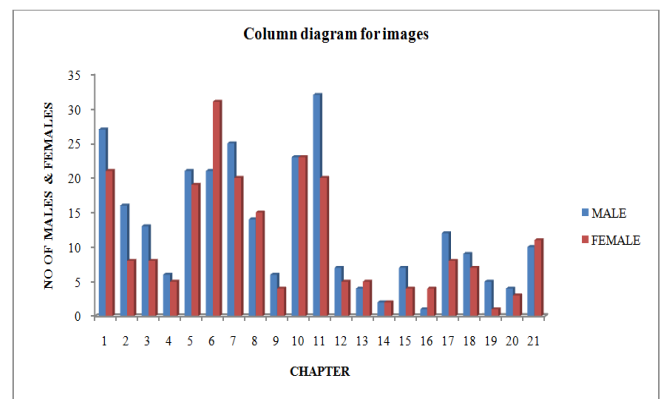


Figure 1.1

Here horizontal axis mention the chapter and vertical axis denoted the number of male and female in that chapter in images.

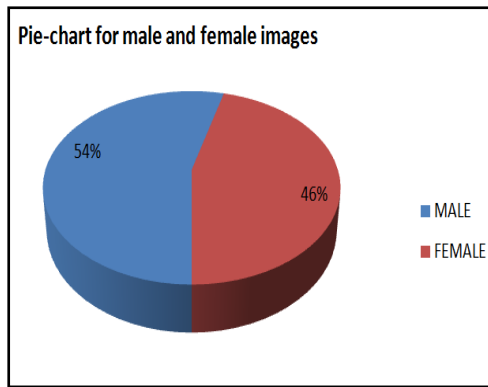


Figure1.2

Left hand side of the figure mention the total no of males in images of this book and right hand side denoted the total no of females in images of that book.

Table-1.2 Correlation of male & female in images

	Male	Female
Male	1	
Female	0.875586	1

From the above figure-1.2 and the correlation table it was found that number difference of male and female in images of this text book was very small.

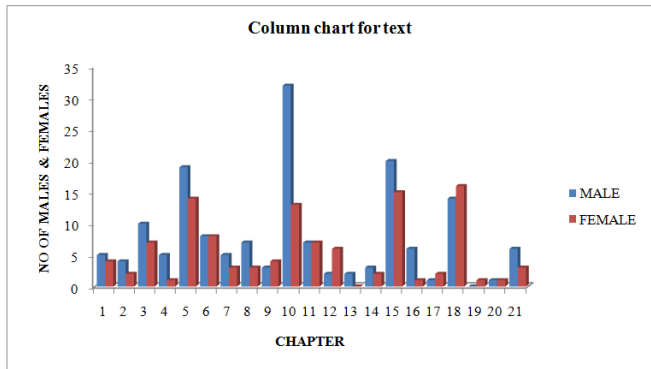


Figure-1.3

Here horizontal axis mention the chapter and vertical axis denoted the number of male & female in those chapters in text.

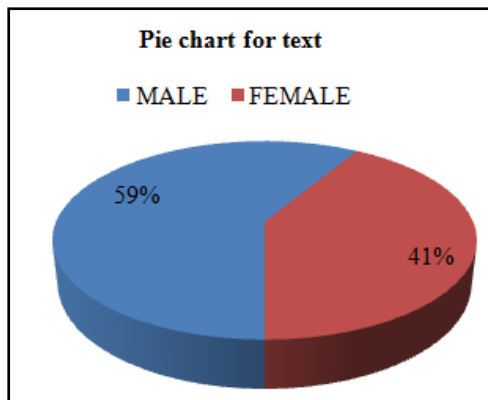


Figure-1.4

Left hand side of the above figure mention the total no of male in text of this book and right hand side denoted the total no of female in text of that book.

Table-1.3 Correlation of male and female in text

	Male	Female
Male	1	
Female	0.830117419	1

From the above figure-1.4 and the correlation table-1.3 it was found that number difference of male and female in text of this book was very small.

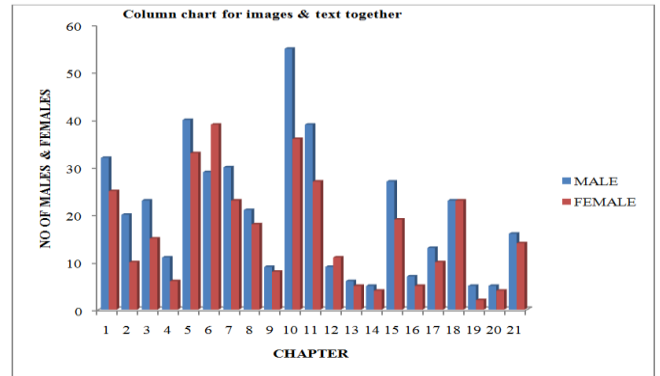


Figure-1.5

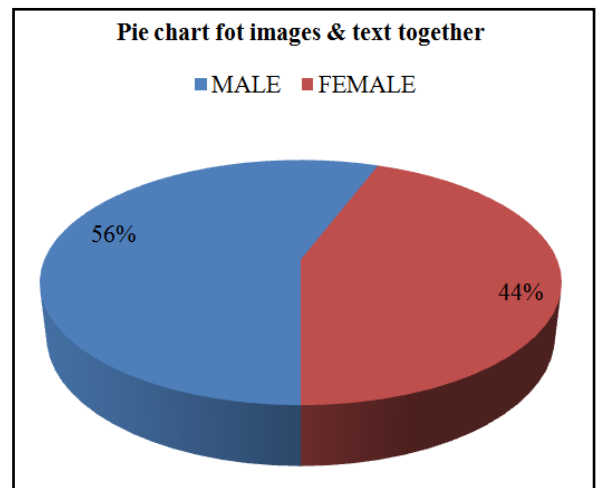


Figure-1.6

Table 4 Correlation of male and female in images & text together

	Male	Female
Male	1	
Female	0.911598909	1

From the figures 1.5, 1.6 and table 1.4, over all in the text book of class-IX there was no significance difference between number of males and females in images and text both.

Table No: 1.5 Number of male & female in image and text in mathematics book of class-X

Chapter	Class-X					
	Image		Text		Images & text	
	Male	Female	Male	Female	Male	Female
1	36	32	16	6	52	38
2	19	21	18	7	37	28

3	21	28	5	3	26	31
4	10	11	1	3	11	14
5	24	37	5	2	29	39
6	18	22	3	3	21	25
7	8	16	4	3	12	19
8	8	13	0	0	8	13
9	21	26	3	2	24	28
10	6	9	2	1	8	10
11	5	8	3	1	8	9
12	8	6	1	0	9	6
13	9	15	5	2	14	17
14	7	7	38	28	45	35
15	14	17	2	4	16	21
16	8	9	1	1	9	10
17	7	5	0	1	7	6
18	28	26	4	2	32	28
19	7	6	1	0	8	6
20	12	12	2	1	14	13
21	7	7	2	0	9	7
22	9	8	2	0	11	8
23	23	29	2	3	25	32
24	6	5	1	0	7	5
25	9	8	1	1	10	9
26	57	40	12	12	69	52
TOTAL	387	423	134	86	521	509

From the above table it was found that the total numbers of males in book Ganit prakash of class-X were 387 and total numbers of females were 423 in the images of this book. Also in the text it was found the total number of male & female were 134 and 86 respectively with in the 26 chapters.

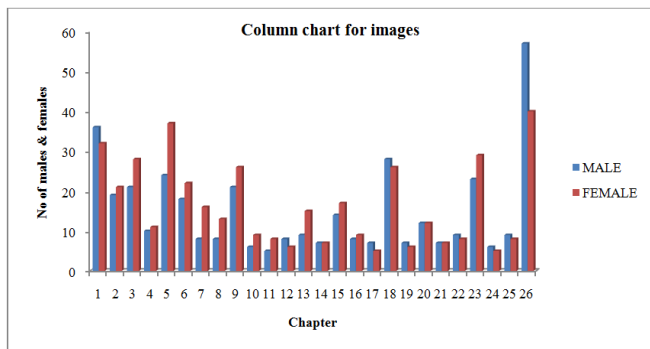


Figure-1.7

Here horizontal axis mention the chapter and vertical axis denoted the number of male & female in those chapter in images.

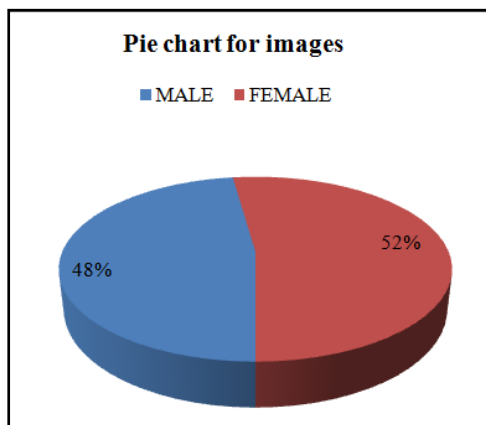


Figure-1.8

Left hand side of the above figure mention the total no of male in images of this book and right hand side denoted the total no of female in images of that book.

Table-1.6 Correlation of male and female in images

	Male	Female
Male	1	
Female	0.889672	1

From the above figure-1.8 and the correlation table-1.6, it was found that number difference of male and female in images of this book was very small.

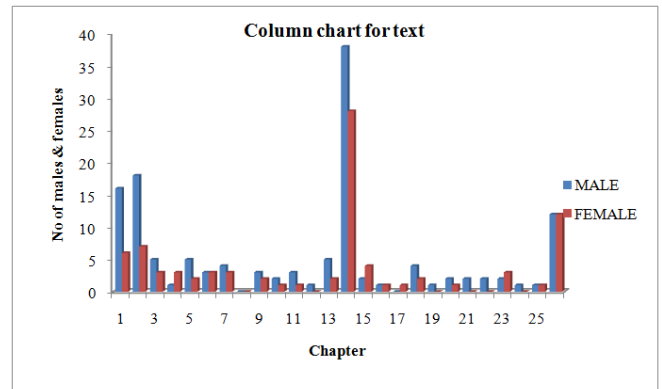


Figure-1.9

Here horizontal axis mention the chapter and vertical axis denoted the number of male & female in those chapters in text.

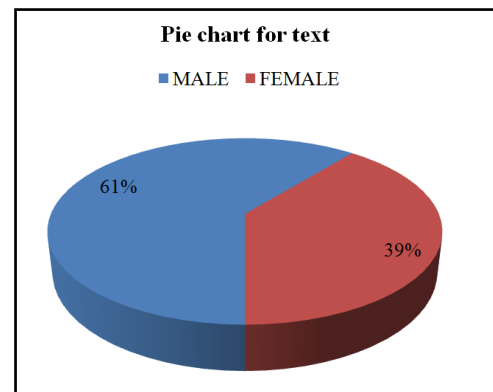


Figure-1.10

Left hand side of the above figure mention the total no of male in text of this book and right hand side denoted the total no of female in text of that book.

Table-1.7 Correlation of male and female in text

	Male	Female
Male	1	
Female	0.938158	1

From the above figure-1.11 and the correlation table-1.7 it was found that number difference of male and female in images of this book was very small.

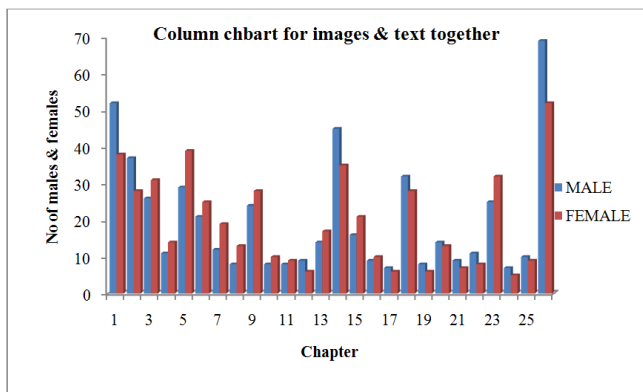


Figure-1.11

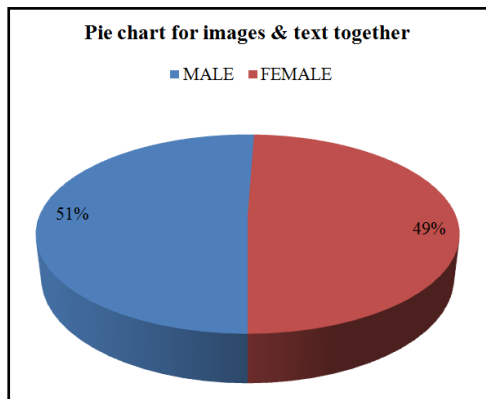


Figure-1.12

Table-1.8 Correlation of male and female in images & text together

	Male	Female
Male	1	
Female	0.921482	1

From the figures 1.11, 1.12 and the table 1.8, over all in the text book of class-X there was no significance difference between number of males and females in images and text both.

Major Findings

The major findings of the above study were as follows

- There was no significant difference between the numbers of male and female images and text in the mathematics text book of class-IX of W.B.B.S.E.
- There was no significant difference between numbers of male and female in images and text in the mathematics text book of class-X of W.B.B.S.E.

DISCUSSION

In the above table-1.1, it has been observed that in the mathematics book of class-IX, the total number of male and female students was 265 and 224, respectively, in images, and in text it was 160 and 113, respectively. From the above column diagram, figure 1.1, it has been seen that the difference in the number of male and female in images of each chapter was very small, and from the pie-chart, figure-1.2, we got a total male of 54% and a total female of 46% in images, and from table-4.2, we got the correlation between male and female in images of 0.875586. So the above results show that

there was no significant difference in the number of males and females in images. From the column graph, figure-1.3, we saw that the number of males and females in each chapter is almost equal. From the pie-chart, figure-1.4, we got the total male in this text book at 59% and the total female at 41%. The table-1.3 shows the correlation between male and female was 0.830117419. So the researcher concluded that there was no significant difference between the number of male and female in text and images in the mathematics text book of class-IX of W.B.B.S.E. Moreover, from figures 1.5, 1.6, and table 1.4, the number of males and females in images and text together was almost the same.

In the above table-1.5, it has been observed that in the mathematics book of class-X, the number of total males and females was 387 and 423, respectively, in images, and in text it was 134 and 86, respectively. From the above column diagram, figure 1.7, it has been seen that the difference in the number of male and female in images of each chapter was very small and, from the pie-chart, figure-1.8, got a total male of 48% and a total female of 52% in images; and table-1.6, got the correlation between male and female in images of 0.889672. So the above results show that there was no significant difference in the number of males and females in images. From the column graph, figure-1.9, we saw that the number of males and females in each chapter is almost equal. From the pie-chart, figure-1.10, we get that the total male in this text book is 61% and the total female is 39%. Table 1.7 shows the correlation between male and female was 0.938158. So the researcher concluded that there was no significant difference between the number of male and female in text and images in the mathematics text book of class-X of W.B.B.S.E. Furthermore, from figures 1.11, 1.12, and table 1.8, the numbers of males and females in images and text together were almost the same.

Limitation of the study

At the time of observation in some places, there were some hazy group photos which were not considered in this above data and also my grandfather, my father, my mother, my sister, my brother, I etc., did not count as a male or female.

Suggestions for the further Researches:-

The prime objective of this study was to find out gender biasness in mathematics text books. The present researcher has been worked only in the mathematics text books of secondary level of W.B.B.S.E. For complete this study that's all researches are needed as follows-

- Study of gender biasness in mathematics text books of upper primary level.
- Study of gender biasness in mathematics text books of primary level.
- Study of gender biasness in mathematics text books of others board etc.

CONCLUSION

Mathematics textbooks are contained with bias in favour of male characters, which affects the self-confidence and self-esteem of female students. The study examines gender biasness in secondary level mathematics textbooks in West Bengal. The Content Analysis approach that includes the Descriptive Statistics tool was used to count the number of

male and female characters. The correlation coefficient and percentage of male and female gender characters were calculated. The findings of the study stated that there is no significant gender bias in the three mathematics textbooks of classes IX and X especially. Depend on the findings of the study, it was recommended that at this time; create awareness of the existence of gender bias in mathematics textbooks through workshops and seminars for teachers, policy makers, curriculum planners, and authors.

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