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Comparison Of Level Of Misconceptions In Male And Female Students In Mathematics And Their Possible Reasons At Primary Level

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ABSTRACT

Misconception is used to define profound, instinctual misinterpretations about Mathematics. When students get an idea about anything which works that formulate instinctive sense to them. These misconceptions severely affect learner's capability to learn and recall Mathematics in the class and mostly it causes great muddle for the learners. The cause problems until they are detected, provoked and unrestricted. It is observed in many research studies that males have better abilities of learning Mathematics than of female students. The purpose of the study was to compare the level of misconceptions of male and female students and possible causes of gender differences with respect to Mathematics in our local area of tehsil Fateh Jang. 15 male and 15 female students of grade 3 and 50 overall students primary level were sample of the study which were selected from the public schools of Markaz Kot Fateh Khan, Tehsil Fateh Jang. The students were selected through conducting a test from Mathematics books grade three. Two equal groups were formed of both genders i.e. male and female. The test consisted of the concepts addition, subtraction, multiplication, division and fraction. The achievement test was discussed with expert and teachers before execution. The misconceptions of related concepts were identified with help of teachers based on their wrong answers. Findings of the study show that students have fewer misconceptions about the numbers. Level of misconceptions of female students was found slightly high than of male students. It is also concluded that female students were found more anxious than of male students About nervousness, Troubledness, Feel Helpless and feeling confused, talking about confidence, male students were more confident than of female students

KEY WORDS: Misconceptions, learning Mathematics, Troubledness.

INTRODUCTION

Researchers have extensively characterized misconceptions or misunderstandings. They also employ a variety of terms to describe the misconceptions that students have, such as the term "alternative conceptions" (Adadan & Savasci, 2012; Atasoy, Akkus, & Kadayifci, 2009).

Students think in many ways abut mathematics, like formulae, relevancy, enjoyment and boredom too. Problem arises when student has misconceptions that take places due to insufficient teaching, causal thing or may be due to poor memory.

According to Encarta dictionary, a misconception or false idea due to result of misinterpretation of something, Summarizing from the educational literature (Pines, 1985)

Misconception is used to define profound, instinctual misinterpretations about mathematics. When students get an idea about anything which works that formulate instinctive sense to them. These misconceptions severely affect learner's capability to learn and recall mathematics in the class and mostly it causes great muddle for the learners. The cause problems until they are detected, provoked and unrestricted. Unfortunately, society has large numbers of misconceptions about mathematics and its role. They thought that it has inflexible rules and enigmatic actions that appears to be dissimilar to each other and need entire command with slight or no understanding. This subject is considered as a difficult subject and socially it is perceived as a poorly acceptable in the society. They believe that mathematics has its less role for the society

It is thought that misconception rooted once in a student's memory is very hard to eradicate. This is considered very complex situation. It has been established through numerous research studies that researchers are particularly interested in learner conceptions that show how, prior to formal study, people had strongly held, expressive, and illustrative systems for scientific and logical-mathematical phenomena, or, more specifically, systems of acceptance about mathematics. The admission process deviates from what is incorporated into the standard curriculum. These acceptance systems' firm patterns exhibit astounding reliability over a wide range of epochs, capacities, and populations. Acceptance systems are adaptable to change through conventional instruction (Confrey, Jere, 1990; Champagne, Gunstone, & Klopfer, 1983; Osborne & Wittrock, 1983)

Research study occurs which advocates that girl execute not up to snuff in mathematics as made comparison with boys. Likewise, numerous studies reported gender variances in performance in mathematics calculations. As a result of some American and Canadian research studies male students beat female in mathematical problem-solving examinations and in Scholastic Aptitude Tests (SAT) and in Standardized Achievement Tests it is also observed that male did well than of female (Benbow and Stanley 1980; Benbow 1988; Walsh et al. 1999).

Furthermore, generally male learners have a very positive attitude than of female learners in mathematics. Consequently, even for these high achieving pupils, males have a extra positive attitude towards mathematics than of females, even though variances were usually slight they were substantial for the 13-year-olds. differences were found on specific queries, wherever females were more constructive than males, others where males were more constructive. Consequently, though males were to some extent more optimistic in their inclusive attitude, this was not obvious for each matter. This is for young people who are proficient in mathematics, according to research. Terwilliger and Titus (1995) showed that male students exhibited higher levels of drive, poise, and mathematical interest, but that for both female and male students in their sample, this degraded over a two-year period. Jacobs et al. (2002) discovered a comparable general decline in mathematical poise. They noticed that boys often have greater self-confidence than girls in most subjects. While waiting for mathematics "self-belief" for boys and for females to be similar by class 12 (age 17–18), it was found that males' self-belief in mathematics degraded at a faster rate than that of females. These findings support the notion that men would excel over women

in arithmetic and mathematical computation, and this is undoubtedly the case in a number of the nations where these studies were first conducted.

There are many probable and frequently incompatible motives for these variances regarding gender in subject of mathematics. These contain both reasoning and communal causes. There have been ideas that there are gender variances in the way males and females' development mathematical evidence. According to Fennema and Peterson (1985) and; Kimball (1989), girls are supposed to do mathematics in a more 'memorization' way by means of rubrics, algorithms and additional conformist approaches and males are supposed to be additional self-directed and use a more self-determining method and unusual approaches. As stated by Casey and Brabeck (1989) and (1990), boys are perceived as improved at altitudinal responsibilities, predominantly variation. Associated to this is the acceptance that males and females contrast in the category of enquiry or part of mathematics at which they do finest. Some studies, including those by Beller & Gafni (2000), Penner (2003), and Duffy et al. (1997), have shown that males perform better on the hardest questions while females outperform males on the easiest questions, and similarly that males perform better on word and geometry questions or questions with less precise explanations, or open questions. However, Gallagher and De Lisi (1994) found that females perform better with computer-based questions. In 2005, Hyde's meta-analysis demonstrated that gender differences in a number of factors related to reasoning, as well as "mathematics computation," "concepts," and "problem-solving," were close to zero or negligible.

More recently, it has been explained that research on the development of reasoning 'shows indication that mathematics and scientific understanding arise from a set of biologically grounded thinking dimensions that males and girls share.' (2004) Spelke. This is not to argue that there aren't differences; it just means that the idea that they are unique gender differences in intellectual dimensions is a little out of date. In their early years, girls commonly give up on math activities. As a result, they detest it in their secondary years. As a result, they drop out of school at higher rates than boys do. As a result, there are fewer women working in industries that need high levels of mathematical aptitude (Arnot, David, and Weiner, 1989).

Less mathematical aptitude in women disqualifies them from a large range of occupations because in certain nations having a mathematical education is a need for employment in any field. According to Willis, Cuttance, Barnes and Horne, and others (Willis, 1995), gender differences are a society's thoughtful alarm. Every aspect of life has undergone significant change in this era of science and technology, so it is crucial to compare attitudes and accomplishments in mathematics on the basis of gender. It will help us with our cunning ideas and programs to encourage girls to participate in maths in higher grades. At higher grades, it is generally accepted that female students take mathematics somewhat less seriously than do male students. In the end, males successfully block more scenarios based on mathematical knowledge than females. Women don't want math in higher grades because they think it's a field for men. All professions requiring a higher level of arithmetic proficiency are oppressed by the male community. There are numerous barriers preventing female students from working in mathematics. Sometimes kids feel a preference for attending math classes, but their parents think it would be a waste of time for them. Sometimes, female pupils are less confident in math than their male counterparts. Additionally, their

evaluations of disappointment and success differ (Leder, 1984; Subotnik, 1988; Cohen and Kosler, 1991).

Students' perception about specific subjects are not new phenomena. It is really a matter of concern as it is considered as internal matter and it can't be change easily. According to Ajzen and Fishbein, (1980) one formed attitudes are permanent and difficult to change. Teachers have opinion about the student's failure is their negative attitude about specific subjects. As stated by Yahaya, Ramli and Boon, (2000) the students' achievements in any specific subject based upon their specific attitude, if positive then achievements will be higher and if negative then it causes failure. And according to Osborne, Simon and Collins, (2003), gender, personality of learner and also curriculum influence the attitude.

According to Zukerman, Saim and Talib, (2011), Students' attitude toward any discipline should be looked after to raise the achievement level. It is the measurement of teaching learning process that how can a learner utilize knowledge in the best way. A positive attitude may develop students' critical thinking, activeness in class, group activity and improvement of communication and interaction skills. All these things surely improve the perceptions of students to all subjects especially mathematics. Another major change agent is teacher itself who can change the perceptions of students towards any subject. According to Osborne, Simon and Collins, (2003), teaching strategies can also change the perceptions of students towards any subject. By verity of teaching styles, it can be more effective for changing perceptions of learners. (Heinze, Reiss and Franziska, (2005).

Quoting a survey report in Bakar, Kamarudin and Tan, (2009)stated teacher physical appearance and method also boosts the perception of students to any subject. according to Madar, Kamaruddin and Puteh, (2005), if perception of teacher about any student is low, automatically student will perform low.

STATEMENT OF PROBLEM

It is observed in many research studies that males have better abilities of learning mathematics than of female students. The purpose of the study was to compare the level of misconceptions of male and female students and possible causes of gender differences with respect to mathematics in our local area of tehsil Fateh Jang.

OBJECTIVES OF THE STUDY:

Objectives of the study were:

1. To compare the level of misconceptions of male and female students.
2. To find out the possible reasons of misconceptions.

HYPOTHESIS OF THE STUDY:

1. There is no significant difference between the level of misconceptions of male and female students.

SAMPLE OF THE STUDY:

15 male and 15 female students of grade 3 and 50 overall students primary level were sample of the study which were selected from the public schools of Markaz Kot Fateh Khan, Tehsil Fateh Jang.

PROCEDURE:

The students were selected through conducting a test from mathematics books grade three. Two equal groups were formed of both genders i.e. male and female The test consisted of the concepts addition, subtraction, multiplication, division and fraction. The achievement test was discussed with expert and teachers before execution. The misconceptions of related concepts were identified with help of teachers based on their wrong answers.

DATA ANALYSIS

For analysis of data, mean score, percentage and t-test were used.

RESULTS OF THE STUDY:

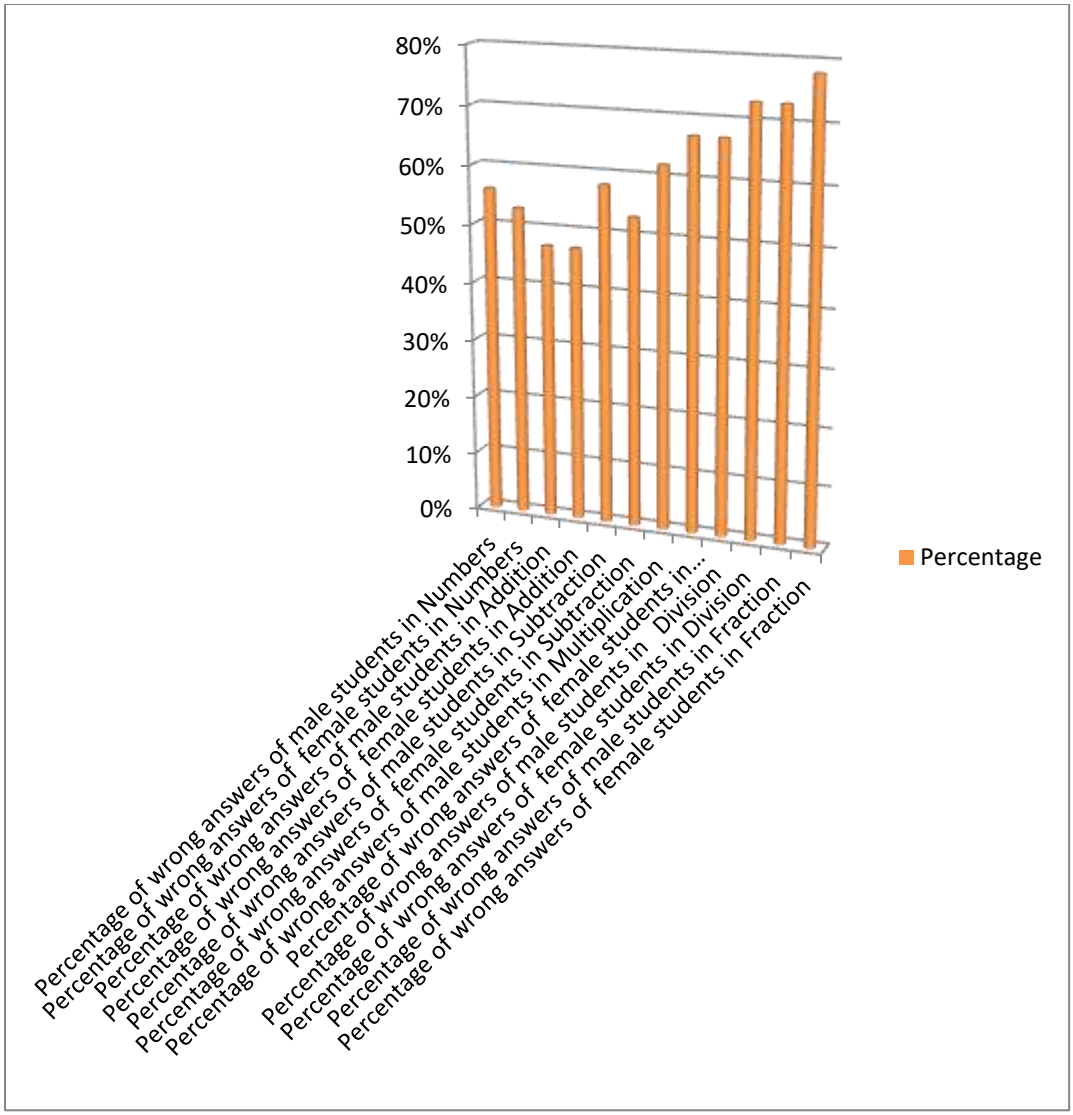
Table: 1.1

Concepts		Numbers	+	-	×	÷	Fractions
Male Students Responses	Correct	20	24	19	17	15	12
	Correct%	44%	53%	42%	38%	33%	27%
	Incorrect	25	21	26	28	30	33
	Incorrect%	56%	47%	58%	62%	67%	73%
Female Students Responses	Correct	21	24	21	15	12	10
	Correct%	47%	53%	47%	33%	27%	22%
	Incorrect	24	21	24	30	33	35
	Incorrect%	53%	47%	53%	67%	73%	78%
Overall Responses	Correct	41	48	40	32	27	22
	Correct%	46%	53%	44%	36%	30%	24%
	Incorrect	49	42	50	58	63	68
	Incorrect%	54%	47%	56%	64%	70%	76%

FINDINGS (table 1.1):

Table: 1.1 shows that:

1. The responses about concept of numbers were54% wrong. Male students produce 56% while female students produced 53% wrong answers
2. The responses about concept of addition were47% wrong. Male and female each gender produce 47% wrong answers
3. The responses about concept of subtraction were56% wrong. Male students produce 58% while female students produced 53% wrong answers
4. The responses about concept of multiplication were64% wrong. Male students produce 62% while female students produced 67% wrong answers
5. The responses about concept of division were70% wrong. Male students produce 67% while female students produced 73% wrong answers
6. The responses about concept of numbers were76% wrong. Male students produce 73% while female students produced 78% wrong answers

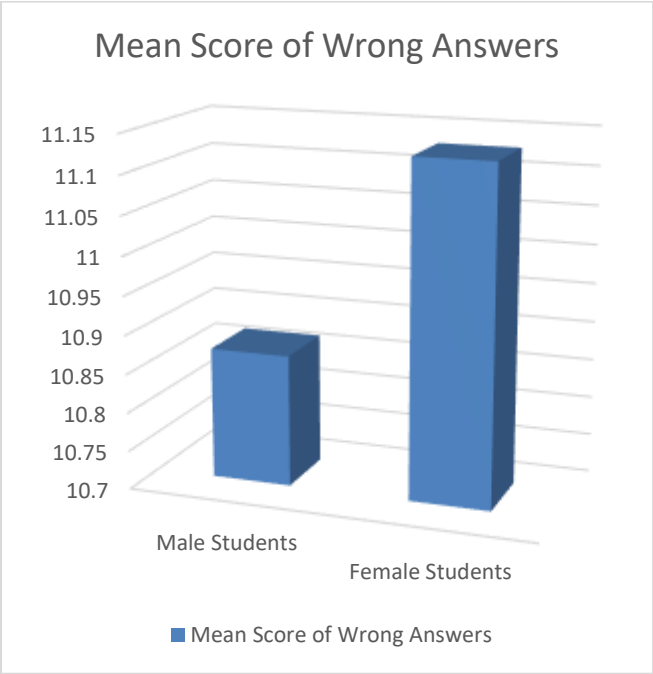

80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of wrong answers of male students in Numbers
Percentage of wrong answers of female students in Numbers
Percentage of wrong answers of male students in Addition
Percentage of wrong answers of female students in Addition
Percentage of wrong answers of male students in Subtraction
Percentage of wrong answers of female students in Subtraction
Percentage of wrong answers of male students in Multiplication
Percentage of wrong answers of female students in...
Percentage of wrong answers of male students in Division
Percentage of wrong answers of female students in Division
Percentage of wrong answers of male students in Fraction
Percentage of wrong answers of female students in Fraction
Percentage

Indicator	S#	Statements	Gender	SA	A	UNC	D	SA	Mean score
Classroom Anxiety	1	Nervousness	Male	14	21	3	8	4	3.66
				28	42	6	16	8	
			Female	18	13	1	10	8	3.46
				36%	26%	2%	20%	16%	
	2	Troubledness	Male	35	12	0	3	0	4.58
				70%	24%	0%	6%	0%	
			Female	27	15	0	6	2	4.18
				54%	30%	0%	12%	4%	
	3	Feel Helpless	Male	30	15	0	3	2	4.36
				60%	30%	0%	6%	4%	
			Female	28	15	0	5	2	4.24
				56%	30%	0%	10%	4%	
	4	Confused	Male	17	21	3	5	4	4.4
				34	42	6	10	8	
			Female	20	20	3	4	3	4.0
				40%	40%	6%	8%	6%	
Confidence Level	5	Learn Quickly	Male	18	27	3	1	1	4.2
				36%	54%	6%	2%	2%	
			Female	25	14	5	3	3	4.1
				50%	28%	10%	6%	6%	
	6	Confident	Male	20	21	2	4	3	4.02
				40%	42%	4%	8%	6%	
			Female	18	21	4	4	3	3.94
				36%	42%	8%	8%	6%	
	7	Easiness	Male	17	24	2	4	3	3.96
				34%	48%	4%	8%	6%	
			Female	18	18	0	10	4	3.72
				36%	36%	0%	20%	8%	
About Subject Matter	8	Interesting subject	Male	8	9	3	23	7	2.76
				16	18	6	46	14	
			Female	5	7	3	20	15	2,34
				10	14	6	40	30	
	9	Learning is difficult	Male	25	20	0	3	2	4.26
				50%	40%	0%	6%	4%	
			Female	25	22	0	1	2	4.34
				50%	44%	0%	2%	4%	
	10	Need hard work	Male	19	17	1	8	5	3.74
				38	34	2	16	10	
			Female	19	20	1	5	5	3.86
				38	40	2	10	10	

Table: 1.2: comparison of gender wise misconceptions

Group		Score	Sum of Squares of Scores	Mean	S_d	N	t_{cal}	t_{tab}
Percentage of wrong answers	Male Students	163	1991	10.87	3.93	15	2.10	1.31
	Female Students	167	2073	11.13				

d.f = 28



From Table 1.2 it is seen that the intended value of t is 2.10 and it is bigger than t-tabulated which is 1.313, therefore the null hypothesis is not accepted. It is seen that Substantial difference lies between the responses of male and female students' wrong answers. The graph among the mean scores of male and female students' wrong answers shows the significant difference. It proves that level of misconception of female students is slightly high than of male students

Table: 1.3: General reasons for students' misconceptions especially female students in Mathematics

FINDINGS (table 1.2):

1. About nervousness, Troubledness, Feel Helpless and feeling confused, female students were found more anxious than of male students
2. About learn quickly, confident and easiness, male students were more confident than of female students
3. About mathematics subject, male students perceived as interesting subject than of female students, to learn mathematics as a subject, female students find mathematics learning is difficult than of male and about hard work required for learning mathematics, female students were in opinion that it needs more hard work t learn mathematics

CONCLUSIONS

Findings of the study show that students have less misconceptions about the numbers. Both male and female students produce equal percentage in answering wrong, while in addition male and female students showed equal wrong percentage. The percentage of concept of subtraction of female students was higher than of male students and in multiplication, division and fraction concepts it raised slightly higher. Level of misconceptions of female students were found slightly high than of male students. These results are same as Ogunkunle (2007) , Fenemma (2000) and Asante (2010).

It is also concluded that female students were found more anxious than of male students students About nervousness, Troubledness, Feel Helpless and feeling confused, talking about confidence, male students were more confident than of female students. In learning quickly, confident and easiness. About mathematics subject, male students perceived as interesting subject than of female students, to learn mathematics as a subject, female students find mathematics learning is difficult than of male and about hard work required for learning mathematics, female students were in opinion that it needs more hard work to learn mathematics. Results are in line with (Giannoulas, & Stampoltzis, 2021; Zukerman, Saim & Talib, 2011)

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