

**Causes behind gender difference in mathematics: an
exploratory study in BRAC schools**

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Dedication

To my respectable and loving parents

Abstract

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This dissertation explores the causes behind gender difference in BRAC schools. The problem was derived from previous studies, which confirm gender difference in mathematics in BRAC schools. Exploratory as well as qualitative research strategy was used for the purpose. Because, such strategy was thought suitable to find out the causes and the causes behind the causes of the problem from different points of view. The study was conducted in three BRAC schools, situated in a remote rural area of Bangladesh. The data were collected mainly from classroom observation. Besides, the students, parents, teachers programme organizers, teacher trainer and other concerned persons were interviewed. Six case studies were also done. All the data were collected by the researcher. Although overall teaching learning process in BRAC schools was satisfactory towards quality education but evidence of gender discrimination was in place. The main causes of gender difference in mathematics are the deprivation of the girls in family, society and schools, discriminatory attitude to the girls by the teachers and the peer boys, and the inside weaknesses of the BRAC school programme. Gender imbalance against girls is a serious issue in the present day world including Bangladesh. Some recommendations are made in order to remove the gender gap in mathematics in BRAC schools.

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Chapter One: Introduction

The word "gender" has been known to us in grammar as biological difference between men and women but now a days it is being used differently. In its new incarnation gender refers to the socio-cultural definition of men and women, the way societies distinguish them and assign roles (Bhasin, 2000). According to Coltrane (1998), gender refers to what it means to be a man or a woman in a specific time and place. Gender describes how, in a particular culture, the typical man is supposed to present himself (as masculine) and how the typical woman is supposed to present herself (as feminine). The meaning of gender changes significantly from era to era and from culture to culture. For ages it was believed that different characteristics, roles and status accorded to women and men in society are determined by biology or sex, that they are natural and therefore unchangeable. This is not the case in present day.

From the very beginning of the civilisation, women are treated as inferior to men. Aristotle called male principle active, and the female passive. For him a female was a "mutilated male" someone who does not have a soul. In this view, the biological inferiority of a woman also makes her inferior in her capacities, her ability to reason and therefore to make decisions. Because the male is superior and the female inferior, men are born to rule and women born to be ruled. Aristotle said, "The courage of a man is shown in commanding, of a woman in obeying". (Cited in Bhasin, 2000). Sigmund Freud stated that for women, "anatomy is destiny". Freud's normal human was male, the female was a deviant human being (Cited in Bhasin, 2000). At this modern age, civilisation views women have been changed but they are still oppressed all over the world. In Bangladesh, women are not getting opportunities as men are, rather they are oppressed in social, cultural, economical and educational activities (Nath et al, 1997).

1.1 Gender status in Society

For ages, there has been gender difference in social, cultural, economical, religious and educational activities all over the world. The progress of women in these aspects is not as glorious as that of men. They are treated as inferior to men. In course of time the differentiation between men and women are decreasing in some areas but gender status is still unequal against women through out the world.

Over worked and underpaid is an apt discrimination to women all over the world. Women's labor accounts for two-thirds of the world's work hours, yet they receive only 10% of the total income and they are the owner of less than 1% of the property (Cited in Tiano S, 1997). The United Nations declared "1975-1985" the decade for women for the recognition of women's disadvantaged status. The goals of the decade for women still remain largely unfulfilled, so that much of the earth's female population, particularly in the underdeveloped regions of Africa, Asia and Latin America remains poor and powerless. In Africa, 70% of total agricultural production is produced by women. There are tribes in India where women work and men laze around (Singhi, 1998). In South Asia, social and cultural inferiority imposed on women and at present, in almost every area, women lag behind men. In Bangladesh, 48.58% of the population are women and they are situated in a subordinate position in terms of standard measurements of human development. The women in Bangladesh having low literacy rate, wage rate and even life expectancy. They lack access to economic and informational resources because of their low status in the society. Bangladesh and Nepal are the only two countries in the world where women's life expectancy is lower than that of men (Royal Netherlands Embassy, 1996). The disadvantaged situation of women is not only a direct consequence of lack of access to resources, but also more importantly practical ideology, cultural values and attitudes in all levels of society (BRAC,

1998). Although, most of the people in Bangladesh live below the poverty line, the burden of poverty falls disproportionately on women. The female-headed households are the most disadvantaged in our country. Among the female-headed households 96% live below the poverty line. (Royal Netherlands Embassy, 1996). A World Bank study (1996) clarifies the rate of women employment in Bangladesh is one of the lowest in South Asia after Pakistan. Another study of ILO in 1994 has found women employment to occupy 41.1% of the total labor force, 83% of these women are unpaid family workers. (Royal Netherlands Embassy, 1996). Besides, 90% of all economically active women are agriculture workers. The World Bank blames the strong gender discrimination for the low rate of women's employment.

Of all the discrimination and denial of opportunity that women of South Asia suffer, perhaps the most damaging is the denial of the right and opportunity to education (Mahbub Ul Haq Human Development Centre, 2000). Education is the key to breaking the vicious circle of ignorance and exploitation and empowering women and girls to improve their lives. During the last 20 years significant progress has been taken place in education but vast gaps remain between the educational achievement of men and women and of boys and girls. According to Mahbub Ul Haq Human Development Centre (2000), adult literacy rate and enrolment ratio are two indicators measuring gender gaps in education. While in the developing countries the average for female literacy rates has increased from 32 to 63 percent between 1970 and 1997, the South Asian average has increased only from 17 to 37 percent (UNDP, 1999). Among the total illiterate population in South Asia 63% are women and of the total out of primary school children, 71% are girls (Mahbub Ul Haq Human Development Centre, 2000).

Bangladesh, a developing country of South Asia, yet to achieve the minimum target of universal primary education. Moreover, there are gender differences in every levels of education in Bangladesh. In 1997, the primary enrolment rates for boys and girls were respectively 80% and 70%, while the secondary

enrolment rates were respectively 27% and 16%. The adult literacy rates of male and female were respectively 58% and 27%. Sixty nine percent boys and 67% girls completed the primary cycle in 1994 (Mahbub Ul Haq Human Development Centre, 2000). There are invisible and visible inequalities within household. The point is that women and men may experience poverty unequally in different ways. Thus the poor women of Bangladesh represent the most vulnerable and thus marginalised in Bangladeshi society (Jennings, 1990).

1.2 Gender Status in Mathematics

It is well established that there is gender difference in mathematics. A series of studies have shown that the performance of boys in mathematics is better than that of girls. (Sukthankar, 1999; Bero, 1993; Southerland, 1989). The girls are treated as inferior being since their birth and later they are deprived of social, cultural, economical and educational activities. Parents treat boys and girls differently from birth. Even they are more physically active with boys than girls. Boys are given more spatially complex toys as dump trucks and tools, on the other hand the girls are given feminine toys as dolls and dishes. Masculine activities are treated superior to feminine ones (Hilgard et al, 1975). The differences contribute to the well-documented gender gaps in spatial ability. Spatial ability, an important component of math skills, facilitates comprehension of abstract mathematical concepts used in geometry, trigonometry and calculus (Gutbezahl J ERIC/CSMEE database, article ED 380279). Moreover, teachers expect less academic activities from girls than boys. Boys are praised for their ability when they do well and criticised when they don't. Girls are complemented on their hard work and better performance when they succeed in math but they are told dull when they fail. Thus both parents and teachers expect girls to do poorly in Mathematics. Their failures are accepted as a necessary shortcoming of being female. So, girls do not have confidence towards mathematics as the boys have (Gutbezahl J ERIC/CSMEE database, article ED 380279).

Bangladesh, a developing country, having a very low level of literacy. To eradicate the illiteracy, initiatives have been taken both by the government and by the non-governmental organisations (NGOs). The lives of boys and girls are highly differentiated in Bangladesh and unfortunately like other social, cultural, economic and educational activities gender differentiation in mathematics lies here (Nath et al, 1997; Khan, 1995). Generally, the Bangladeshi children start learning mathematics from class I (One) though arithmetic. From the very beginning, mathematics is feared by most of the pupils, but they have to do mathematics as a compulsory subject up to grade X. In early 1992, a survey was conducted in Bangladesh to assess the basic educational level of the children (Chowdhury et al, 1992). The study identified gender differences in mathematical knowledge of Bangladeshi children. It was shown that the performance of the boys in mathematics is significantly better than that of the girls. Another study has shown that after completing primary education, 93.3% boys and 81.5% girls achieved the minimum level of numeracy skills (Nath and Chowdhury, 1999). In Bangladesh, educational research is very poor and until now no study has been undertaken to find out the causes behind gender gap in mathematics education (Nath et al, 1997).

1.3 BRAC and its Education Programme

BRAC, the largest non- governmental organisation in Bangladesh, has been working towards poverty alleviation and empowerment of the people whose lives are afflicted by extreme poverty, illiteracy, diseases and other handicaps since 1972 (BRAC, 1999). As the women are the most disadvantaged section of the Bangladeshi population they are the targeted beneficiaries of all the development programmes of BRAC. BRAC is working along side the government and other non-governmental organisations to achieve 'Education for All' (EFA). For this purpose, BRAC operates two models of education programme. One is Non Formal Primary Education (NFPE) and the other is Basic Education for Older Children (BEOC). The NFPE programme was initiated in 1985 for the children aged 8-10 years, aiming to improve the basic literacy situation

in the country. On the other hand, the BEOC model was initiated in 1988 for the children aged 11-16 years. At the beginning, the NFPE programme was up to grade III, which is updated to grade V two years ago. Today, there are more than 34,000 NFPE schools operating in rural and urban Bangladesh, specially for the children who have either never entered school or have dropped out before acquiring any reading, writing or numeracy skills. BRAC also set up the Education Support Programme (ESP) to support other NGOs providing non-formal system of schooling (BRAC, 1999). To contribute to education more strongly, BRAC is operating a new approach of education called Hard-to-Reach for the urban area. Moreover, BRAC is also contributing in education through Urban school, Pathagar, Gonokendra, Adult Literacy Centers and Schools for Ex-Garments workers. Among all the education programmes of NGOs in Bangladesh, NFPE of BRAC is the largest one and operating all over the country. Over three fourths of the students covered by NGO schools are in BRAC schools (Chowdhury et al, 1999). Over 70% of the students of BRAC schools are girls and 97% of the teachers are female (BRAC, 1997). The NFPE programme of BRAC is called a 'success story' because of its different features (BRAC, 1997). Features that make the BRAC school successful are focused on girls, reasonable class size, active parents and community involvement, flexible school timing, easy accessibility, one room school house, learning through co-curricular activities, regular supervision, regular training of the teachers and female teacher. The teacher-students ratio in BRAC school is 1:33, which is 1:60 in government primary schools (BRAC, 1997). The class is divided into five or six groups with certain names. There is a leader in every group, generally a girl. She inquires after the well being of the students and invites a student from their groups to select a topic for the morning talk session. The student talks for 2-3 minutes. This exercise is to develop her/his articulation and oratory skills. An essential feature of BRAC schools is the involvement of the community through regular parents teacher meetings and through the activities of the school management committee. Besides, the role of POs is very important in running BRAC schools. There are about 10 schools under each PO. They maintain regular communication with the parents to ensure the presence of the students. Moreover, the duties of the POs are to make sure that the schools are running smoothly. Rigidity of school time is a common reason for student dropouts. Most children of BRAC school are needed to work at home or in the fields during the harvest season, which makes regular attendance a problem. To ensure the regular presence of every child, the BRAC school hours are flexible based on agreements

between the teacher and the parents. Many parents are reluctant to send their children, especially girls to schools, because the schools are situated far from their homes. However, the BRAC schools are located near the homes of the students and teachers. It is easier for girls to attend school. On the other hand, parents, children and the teachers develop a sense of security since the schools are located in their own neighborhood. This also enables the children to receive individual attention from the teacher after school hours, if necessary. Generally a BRAC school is a bamboo or mud walled room with thatch or tin roofs. The schoolhouse rented by BRAC for a minimal sum. Another very important features of BRAC schools are its participatory and life related curriculum. If the curriculum is not life related the learners cannot achieve a meaningful education. Thus, the design of the NFPE programme encourages a learner-centered and a participatory approach within a constructive learning environment. The curriculum of BRAC school is designed to be relevant to rural life and to suit the special needs of rural children. There are more ways followed by the BRAC schoolteachers to teach than by just reading a textbook. A good amount of time is spent each day on games and fun activities i. e. singing, dancing, story telling and acting, many of which are related to exercising, articulation, observation skills, co-ordination of the different parts of the body, and clarity of speech. The teachers are given three-day "refreshers training" in every month, so that they can teach effectively. The entire above stated feature has made the BRAC NFPE programme different from other primary education programme. The level of basic education achieved by the graduates of BRAC schools is monitored regularly (Nath et al, 1998, 1996, 1994 & 1992). Studies shown that around 70% of the graduates could pass the minimum criteria of basic education (Nath et al, 1998 & 1996). Another study confirmed that the learners of BRAC schools are more likely to achieve more in basic education test than the learners of formal Schools (Nath, 1997).

1.4 Gender gap in mathematics achievement in BRAC School:

In early 1992, for the first time, a survey was conducted in Bangladesh to assess the basic education level among the children aged 11-12 years. (Chowdhury et al, 1992). The study was repeated in 1993 (Nath et al, 1993). Both the studies identified gender differences in the mathematical knowledge of Bangladeshi children. After that, a series of studies conducted on BRAC school graduates

showed that gender difference was there in numeracy (Nath et al, 2000, 1998, 1996 and 1994).

Table 1: Percentages of BRAC School graduates satisfies minimum requirements in numeracy skills by year and sex

Year	Sex		All	Significance
	Boys	Girls		
1995	98.0	94.5	95.5	p<.001
1997	97.3	91.4	93.5	p<.001
1999	98.7	91.4	89.1	p<.001

Table 1 Presents level of Numeracy skills of the boys and girls in different years. In each year the boys performed significantly better than the girls (p<.001). Another study observed that socio-economic differentiation was there in the mathematics performance of the BRAC school students (Nath, 1998).

The 1998 study observed equal level of statistically significant gender difference among the graduates of both NFPE and BEOC schools. For the boys the standard deviation of NFPE and BEOC school graduates were 1.2 and 0.8 respectively while that were 1.7 and 1.7 for the girls. The standard deviation of number of correct answers was higher for girls than boys. Thus a significant gender difference was appeared against girls. The mean difference between boys and girls was lower among the currently enrolled children than non-enrolled children and among the younger children than the older. Greater gender difference was also seen among the children of never schooled parents compared to the children of the parents with some years of schooling. The gender difference was varied according to religious belief of the respondents. The difference was higher among the Muslims than non-Muslims. On average, the non-Muslim children showed significantly better performance than the Muslims.

1.5 Rationale of the Study

A series of studies conducted on BRAC school graduates confirmed gender difference in mathematics achievement (Nath et al, 2000, 1998 & 1996). However, it did not make any attempt to explore why such difference exists. Nath (1998) felt the need for further research to find out the causes behind gender difference in mathematics in BRAC schools. This study is dedicated to do so. If the situation is not remedied soon the women will be deprived from every aspects of life-that is badly unexpected by BRAC. In the present day situation, it is an unavoidable demand of time to find out the causes behind gender difference in mathematics. Besides, BRAC is taking further initiatives for primary education and thinking about secondary education (Nath, 1997). So, it is the time to find out the causes of gender differences in mathematics and to take steps to remedy those.

1.6 Aims of the Research

The aims of the study are to:

1. Explore the causes behind gender difference in mathematics education in BRAC schools.
2. Explore whether the teachers and programme organisers are aware of this problem and the steps they considered to resolve the problem.
3. Make some suggestions that may help to remedy the situation.

Chapter Two: Research strategy

This Chapter explores strategies for educational research that are relevant to present study. At the beginning of the chapter the concept of social research is presented. Then exploratory research is discussed as a part of social research. At the end of the chapter the relevance of exploratory approach to educational research is presented. This was done because present study is an exploratory study.

2.1 Social Research

Social Research is a collection of methods for producing systemic scientific knowledge about the social world. It is a process of discovery that requires personal integrity, a tolerance for ambiguity and an effort in doing high quality work. In another word, social research is a process for producing new knowledge about the social world in more structured, organised and systematic ways (Newman, 1991). Social research involves many things. Newman (1991) has stated nine things that may be included in social research. These are: (1) Finding out something new and original, (2) Thinking and communicating clearly, (3) Using imagination and creativity, (4) Repeating many steps over and over, (5) Confining theories or ideas with facts in a systematic way, (6) Following rules and thinking logically, (7) Being Sensitive to ethical and moral ways to treat other people, (8) Organising and planning carefully, and (9) Learning how to select a proper technique to answer a question. However, obviously these are also important in any scientific research.

People conduct social research for multi-purposes. Some want to answer practical questions for instance people who work for newspapers, television networks, market research agencies, schools, hospitals, social service agencies, political parties, consulting firms, government agencies, personnel departments, public interest organisations, insurance companies, or law firms do social

research as part of their jobs. Students, professors, professional researchers, scientists, in universities and research centers and the government also do basic social research. The findings of social researches are usually or more informative that help in making, unbiased decisions rather than taking a decision by guessing, hunches, intuition and personal experience.

There are many kinds of social research. Two broad categories are qualitative and quantitative social research. Social researchers systematically collect and analyses empirical evidence in order to understand and explain social life. Out of two major approaches of research qualitative and quantitative-social research is related more with qualitative approach (Newman, 1991). A qualitative researcher goes about this differently than a quantitative researcher does. The most obvious difference is qualitative data, which tend to be in the form of words, sentences, statements and paragraphs rather than numbers. Qualitative researchers rarely use the tools of quantitative research such as variables, reliability, statistics, hypothesis, replication and scales. The orientation of qualitative research, its assumptions about social life, its objectives for research, and the way it deals with data are often at odds with quantitative approach (Newman, 1991). Such differences can create confusion among students, researchers and the readers of research reports. Those who judge qualitative research by quantitative standards are sometimes disappointed. Nonetheless, more people find reports of qualitative research more enjoyable to read. In lieu of a formal, neutral tone with statistics, qualitative reports often contain rich description, colorful detail and unusual characters. They give a feel for social settings to the reader. Social research is for, about and conducted by people. In spite of all the discussions about its principles, rules or procedures social research has a strong human element.

2.2 Exploratory Research

Of all the approaches of social research, exploratory research is an important one. Exploratory research is generally conducted about a new issue (Newman,

1991). Sometimes it is called as formulative research because sometimes it aims to formulate more precise questions that future researchers can answer. Exploratory research can also be the first stage in a sequence of studies. A researcher may conduct this type of research in order to know enough to design and execute a second research, more systematic, more extensive study. Newman (1991) has described six goals of exploratory research. These are: (1) become familiar with the basic facts, people, and concerns involved, (2) develop a well-grounded mental picture of what is occurring, (3) generate many ideas and develop tentative theories and conjectures, (4) determine the feasibility of doing additional research, (5) formulate questions and refine issues for more systematic inquiry, and (6) develop techniques and a sense of direction for future research.

Newman (1991) mentioned the research on AIDS (acquired immune deficiency syndrome) to illustrate an example of exploratory research. When AIDS first appeared around 1980, no one knew what type of disease it was, or even if it were a disease. No one knew the causes behind the disease, how it was spread, or why it had suddenly appeared. It took many exploratory studies before enough was known to design precise studies about the disease.

Exploratory research rarely yields definitive answers. It is difficult to conduct because there are few guidelines to follow. Every thing about a topic is potentially important. The steps are not defined certainly and the direction of inquiry frequently changes. The exploratory researcher needs to be creative, adopt an investigative stance, have an open mind, be very flexible and explore all sources of information. The researcher must ask creative questions.

Exploratory researchers frequently use qualitative techniques. This is because many qualitative techniques are less wedded to a theory or research question. Qualitative research is more open to using many types of evidence and discovering new issues.

2.3 The relevance of exploratory approach in educational research

Techniques chosen for a particular research depends on the aim of the research. The researcher used exploratory as well as qualitative approaches for the present study. A question may raise at this stage and that is, why did the researcher choose exploratory research approach for the present study? This is because gender difference in mathematics in BRAC Schools was discovered some years ago but no study had ever been conducted to find out the causes behind gender difference. Besides, there is no available literature about it. As a result, the causes are yet to disclose. In this sense, the present study is dedicated to find out the causes behind gender difference in mathematics for the first time. Besides, education itself is a broad discipline and it is an important phenomenon of society. So, education related research or educational research is included in social research. From this point of view, the present study is a social research. As exploratory research is an approach of social research, its application in this study is valid and rational.

Newman (1991) stated that qualitative research is conducted about social phenomenon. For the present study "the causes behind gender differences" is a social phenomenon and the causes are related to the social life of the students. The data were collected through observation, interview and case-study-which are the techniques of qualitative research.

To collect data for the study the researcher observed 36 classes of mathematics in three BRAC schools. During the observation, the researcher observed even every event and listened to every speech. The behavior of the teacher with the students and inter-student behavior was very important for observation. The researcher recorded dialogues of the teachers and the students. He interviewed the teachers, POs and TIC on the basis of the findings of classroom observation.

In the interview session, the researcher spent a good amount of time so that the interviewees become easy with him.

In the case study, the researcher did a simple family behavior with the respondents. He went several times to the houses of the students for collecting data. The data were collected through sentences and dialogues. In this way, the researcher used exploratory and qualitative approach for the present study.

Chapter Three: Methodology

In this chapter the study area, Sampling techniques and Sample, Data Collection Techniques, Ethical Considerations and Strengths and Weaknesses are discussed.

3.1 Study Area

The study was conducted in a remote rural area about 100 Kilometers West of Dhaka city, the capital of Bangladesh. Agriculture is the main source of income of the people in the study area. The study was carried out by a team where there were 72 schools, from which three were chosen for data collection. The selection procedure of these schools is presented after this section. The three schools that were chosen for the field work of the study fall in three different villages under two unions. For confidentiality purpose these villages can be called $U_1 V_1$, $U_1 V_2$ and $U_2 V_1$.

Here, U indicates Union and V indicates Villages. Some basic information about the villages are provided in Table 2

Table 2: Some basic information about the study villages

Union	Village	Are(in acres)	Total population	%of female	Literacy Rate		
					Male	Female	Total
U ₁	V ₁	252.16	339	48.4	60.8	56.8	58.8
	V ₂	786.2	1554	50.2	21.8	14.4	18.0
U ₂	V ₁	400.0	889	48.3	60.0	48.1	54.1

There are four BRAC schools and a BRAC-run community school in village $U_1 V_1$. A strong presence of the NGOs was seen in the village. The people of village

U₁V₂ were very poor. Their main source of income was bamboo and cane made goods. It was a densely populated area and the economic status of the village was as poor as education. There are two BRAC schools in the village, which are not sufficient comparing their demand. There is no government institution here. The villagers lead a traditional and underdeveloped life.

There is an Alia Madrasa and a BRAC school in village U₂V₁. There is a government primary school just near the village. Most of the villagers are farmers. The credit programmes of NGOs are active in this village.

3.2 Sampling Technique & Sample

It was not known to the researcher about the schools where gender difference in mathematics exists. To solve this problem, a test was administered in four randomly selected schools. The students of the schools considered for test were currently enrolled in class III.

The test contains ten mathematical problems (Annex- I). The full marks of the test was 100. The mean of the scores achieved by the students of four schools was calculated separately. From the mean marks of the boys and girls of different schools, it was found that there was gender difference in mathematics in all the four schools. Three schools were selected for the study remaining highest gender difference. The mean scores of boys and girls of the different schools are given in Table 2. Annex 2 provides marks obtained by each of the students of all four schools.

Table 3 : Mean marks obtained by the students by school and sex

School	Sex		Difference
	Boys	Girls	
S ₁	50.3	37.1	13.2
S ₂	40.4	31.4	9.0
S ₃	61.7	52.5	9.4
S ₄	48.9	40.4	8.5

The above table shows gender difference in mathematics existing in all four schools. Among the schools, the lowest mean difference exists in S₄. Thus, schools namely S₁, S₂ and S₃ were selected as samples for the study.

3.3 Data Collection Techniques and Tools

To find the causes behind gender difference in mathematics the following techniques were used.

- (1) Twelve mathematics classes of each school were observed to know the teaching-learning process in mathematics. The observation focused on methods of addressing gender inequalities in mathematics education. A checklist was used for this purpose (Annex-3).
- (2) During the observation the learners were continuously assessed to know their performance and the researcher discussed with the learners to know how they felt in doing maths and what they do when they face any difficulty in solving a problem.
- (3) The respective teachers, Team-in-Charge and POs were interviewed. Different checklists were used in interviewing the teachers and the POs (Annex-4 & Annex-5).

- (4) A 'refreshers training' session, arranged for the teachers, was observed. Twenty-one teachers were present in that training session. After observing the training session, the trainer was interviewed.
- (5) Six children (three good and three poor in mathematics) equally distributed by sex were chosen for case study. These students were selected from all the three schools.

3.4 Field Work

The data were collected in June, 2000. The researcher collected all the data. He stayed in the field continuously for one month. Different checklists were used for classroom observation and interview. Distance among the schools was one kilometer and schooling time was different. The researcher requested the teacher to maintain punctuality for the mathematics classes, which helped not to miss any class. The objective of classroom observation was not disclosed earlier to anybody (teacher, student, PO etc.). However, it was disclosed afterwards and before other interviews. Notebooks were used in collecting data. The teachers were interviewed in their own houses. The researcher explained his objectives to them very clearly. It was possible because the teachers were interviewed after finishing classroom observation. They were motivated to talk with the researcher to solve the problem. They were assured that their name will remain secret and will be used only for the study. Then they felt ease to talk with the researcher. The POs were interviewed at their houses. Each PO was interviewed several times. The researcher went to the houses of every student who were selected for the case study. He talked with their parents, brothers, sisters, grandfathers and grandmothers and with the students. In some cases, the mothers were not interested to talk with the researcher because of their *purdah* system. The researcher went several times to the selected houses for case study. The researcher talked with everybody with due respect (i. e. '*Assalamu Alikum*' for

Muslims and 'Adab' for Hindus) to greet. Then he gave his identity and wanted to know about their family and education in a friendly environment. In this way rapport was built up. The researcher was very careful about accuracy of the collected data. Collected data were checked at researchers base.

3.5 Ethical Consideration

Since World War II ethical issues in the social sciences have become a topic of growing concern. It is because, the researchers tried to ensure their studies to be directed toward worthy goal (Kimmel, 1998). In the current present decades, scientific and societal mechanisms and collective guidelines have evolved to provide assurance both to investigators within social science disciplines and to the general public. In doing research, ethic begins and ends with a researcher. A researchers personal moral code is the strongest defense against unethical behavior (Miles and Huberman, 1994).

Any researcher ponders moral and ethical questions. Am I exploiting people with my "innocent" questions? What about their privacy? Is my methodology of data collection right? Most professions have well-defined codes of ethics. For example, the American Psychological Association (1992), the American Sociological Association (1989) and the American Educational Research Association (1992) have developed codes for their respective association (Miles and Huberman, 1994). The ethical system and structures to which social researchers now subscribe, largely by virtue of voluntary codes, governmental regulations and professional standards, may be said to reflect community attitudes, professional experience and technical standards. Having replaced the so-called unwritten professional ethic that presumed individuals would act in fair, considerate and compassionate ways with regard to the rights of others, the current federal regulation and professional codes of ethics set forth ethical standards for guidance and control within social research discipline (Kimmel,

1998). As far the researcher knows, there are no such codes developed by the associations in Bangladesh working on education or any social science research discipline. Even, no ethical codes have been developed by the government.

At the time of data collection for the present study the researcher was hesitant about the methodology, "whether he is right or wrong?" The teachers, POs and TIC were motivated enough to provide necessary help to the researcher as they were BRAC staff again. and the researcher had proper evidence from the BRAC head office. Nevertheless, many questions raised to the researcher at the time of data collection. For selecting sample schools for the study, a test was conducted in four BRAC schools by the researcher. The respective POs, teachers and TIC were asking the purpose of conducting test. Moreover, they wanted to see the questionnaire. In spite of their curiosity, the researcher didn't express his proper objectives to them. In reply to their question-"what are you seeing" the researcher simply answered, "oh! It is not very serious. I want to see the performance of mathematics of your students". It was not the actual objective of the researcher. He was trying to find out three BRAC schools, where gender difference in mathematics exist. He didn't express the truth to the teachers, POs and TIC. The test was conducted without informing the teachers and students. At the time of conducting test, the students asked the researcher about the same issue. The researcher also kept the truth hidden as before. This was done, because the researcher thought that if the objective is expressed clearly, the respondent could behave decoratedly. At the same time the researcher asked himself, "is it fair not to discuss about the objectives? Do the subjects have no right to know the actual objectives beforehand? Are they bound to provide data without knowing the truth? Am I treating them as opponents?" The researcher was unable to reach a decision, as there is no such codes of social science or educational research in Bangladesh. When the researcher was observing the classrooms, the teachers and students wanted to see the scores of the test but the researcher didn't show them. The teachers, students, programme organisers (POs) and other related authorities were unaware about what the researcher was

observing. In answering their questions during classroom observation the researcher answered simply that he was observing the teaching learning process, however, it was not the real objective. He was trying to find out the causes behind gender difference in mathematics through classroom observation. He was unable to give correct answer due to his methodology. The researcher felt even in every step whether his behavior and that he was talking with the respondents is right or wrong, ethical or unethical. The researcher went to some students' houses for case study. The parents of the students wanted to know the scores the respective students achieved in the test. The teacher didn't inform that to them. By this way, the researcher hid the truth to the respondents. This was because, the researcher was careful in finding the actual truth. The actual names of the field, schools, teachers, students, TIC and POs are not used in this study because the respondents preferred anonymity.

A fundamental ethical principle of social research is, one should be must informed before giving any data. Moreover, anyone never be coerced to participate that is called '*informed consent*' (Newman, 1991). Nevertheless, for the present study, all the data were collected without informing the respondent. Because, the researcher feared that the data may be decorated, if informed. Though it was ethical, it is in vogue. Besides, according to Miles and Huberman (1994), informed consent is impossible in qualitative studies because events in the field and the researcher's actions cannot be anticipated. At the end of data collection, all the respondents were informed clearly about the objective of the research. Moreover, the researcher seeks forgiveness to the respondents as he reminded that ethical codes were not maintained every time. The researcher expects that well documented ethical guidelines should be provided for the social research as well as educational research in Bangladesh.

3.6 Strengths and weakness of the study

In due reasons, it is not possible to maintain all the classical rules and procedures in educational research or any other discipline of Social Science. For this reason, some weakness remains in most of the research. Nevertheless, each study has some strengths. This study is not out of these. This section describes the strengths and weaknesses of the study.

3.6.1 Strengths

The strengths of the present study are stated below:

1. The problem of the study is gender related, which is a growing concern all over the world. At present gender deprivation is a serious issue in Bangladesh. So, from this point of view, the theme of this study is a demand of time.
2. The researcher collected all the data by himself. So there was no scope of missing or changing data.
3. An exploratory qualitative research approach was used for the study. So, it was possible to find out the causes and the causes behind the causes of the studied problem.
4. The study area was chosen in a remote rural area of Bangladesh, which represented actual situation where BRAC schools are mostly run.

3.6.2 Weaknesses

There were some weaknesses of this study, which are stated below.

1. The study was conducted only in three BRAC schools, which were situated in a certain rural area. If the schools were selected in the different areas, the result might be more meaningful.

2. The sample size was very small comparing the total number of BRAC schools.
3. As no study was conducted in our country to find out the causes behind gender difference in mathematics, the researcher was unable to study enough literature about the present study.
4. The knowledge of the researcher is a barrier for every research. In this sense the researcher's knowledge is a limitation for this study.
5. It was not possible to discuss the objectives of the study with the subjects before data collection was over. This violated the right of the subjects.

Chapter Four: Major Finding

This chapter presents the findings of the study. It was already mentioned that various techniques were used in order to collect data for the study. Findings of the study were arranged separately for each technique.

Classroom Observation

The findings gathered through classroom observation are presented in ten sub-headings namely Teacher's attitudes towards students, Competitive and co-operative attitude of the students, Student's participation in classroom activities, Attendance of students, Girls are treated as girls, Curiosity of the students to mathematics, Attitudes of the boys to girls, Teacher's expectation from girls, Wastage of time by the girl and Confidence of the students.

Teachers attitudes towards students

In a classroom, students generally seek teachers' attention. They respect their teacher and consider him/her as a model. The students even believe his/her every word. In their known world the teacher is a very important person. So in a classroom situation the behavior, attitude and word of the teacher should be uniform to every students. However, in BRAC school, the teacher did not behave equally to the students. They preferred the boys by asking more questions and giving more opportunities to participate in classroom activities.

In Gopalpur school, the teacher was reviewing previous knowledge of the students. She began with a boy. While assessing home task of the students she started to see boys one after another. However, out of 33 students of the class, 20 were girls. Despite the girls majority they did not get proper importance. It

was not the case of Gopalpur school only, the similar events were observed in other schools also.

In a review class in Dafaderpara school the teacher asked opening questions to 8 boys and 9 girls. In Rishipara school 7 boys and 4 girls were asked opening questions. In the following day she asked opening questions to 8 boys and 7 girls. These are some examples of discriminatory behavior of the teachers in BRAC Schools. The Partial attitude of the BRAC schoolteachers was also expressed through other behaviors.

In Gopalpur school, the teacher asked Ani to solve an arithmetic on the board. She then asked Rony to make the arithmetic understood by the other students. Here, she might call a girl but did not. The teacher then asked the students to solve a problem. After a while she told Bony to solve it. He did it correctly. The teacher then asked Rubel whether he understands the math. However, no such question was asked to the girls.

Another day, the same teacher was teaching about clock, time etc. The students were very much interested about the content. The teacher told Moni to draw a clock on the board. Then she told Suny to indicate a certain time in that clock. After Suny a girl was called to the board against another three boys. A girl, Rumi, was very much willing to go to the board but the teacher called a boy. Rumi said, "Didi, I wish to go to the board just after this boy" ("দিদি, আমি ওর পরে বোডে যানু"). Surprisingly, the teacher did not allow her to go to the board though she expressed her desire for several times. Being denied by the teacher Rumi looked very gloomy. In that class the teacher called 6 boys and only 3 girls to the board and she asked questions 9 times to boys and 7 times to girls. Proportionately the boys get much attention of the teachers in these classes.

In another class, the same teacher asked a boy to solve a problem of fraction but he couldn't do it correctly. Then she asked a girl to do the same. She also failed to solve that. At this stage, the teacher tried to teach the boy giving practical example taking from his family, she asked the boy about the number of brothers and sisters in his family and total amount of land his father has. However, unfortunately, no such attempt was taken to teach the girl. In Dafadarpara school, the teacher offered a problem to all students. A boy and a girl did it at a time and stood up to attract teacher's attention. Both of them called the teacher, "Apa, look my khata, look my khata first." The teacher went to the boy, not to the girl. ("আপা আমার খাতা দ্যাছেন, আগে আমার খাতা দ্যাছেন।") A similar event occurred in all the observed schools.

In Rishipara school, the teacher told the students to solve a problem. Romesh and Maya Rani didn't do that correctly. The teacher went to Romesh and comprehended him friendly for quite a long time. Then the teacher tried to teach Maya Rani. She reproved Maya Rani loudly and said to all, "It is an ass, exactly an ass. There is nothing in it's head?" ("পাখা, এইডা এইচে আস্ত পাখা- এইডার মাথায় কোন খিলু নাই"). What a partial behavior towards the girls! Monju Rani looked very insulted. This event implies discriminatory attitude of the teacher. The researcher talked with the teachers to find out the causes of such partial behavior. The following conversation with a teacher may help the readers to understand the attitude of the teacher.

Researcher: why do you prefer boys?

Teacher: (Silent for some while) the girls are dull. To teach them I become angry to teach them and it is a very difficult job. To teach the girls Besides, the boys understand mathematics easily ("মেয়েরা কিছুটা কম বোঝে, তাদের শেখানো খুবই কঠিন কাজ-আমি অনেক সময় রেগে যাই। কিন্তুক ছেলেরা অনেক তাড়াতাড়ি বুঝে যায়").

Competitive and co-operative attitude of students

Competitive and co-operative attitude advance the learning of the students and supplies proper enthusiasm to them. When a teacher offer a problem to the students, they try to do quickly and to show it soon to the teacher. The performance of these students becomes richer than the students who don't do it. If the students help each other to solve a problem it increases their learning. The boys were found more co-operative and competitive than the girls.

In Gopalpur school some boys Moni, Suny, Ani, Bony, Toni, Jony, Rony and Robi were sited adjacently in a group. The teacher gave a task to the students. The adjacently sited boys began to solve competitively and did it quickly. They stood up together and tried to attract teacher's attention loudly, "Didi, look my khata, look my khata first" ("দিদি, আমার ডা দ্যাহেন, আমার ডা আগে দ্যাহেন।"). Toni, a boy in the group, failed to solve the problem, but he took help from another boy, Moni. In this way, Toni solve the problem with other boys and stood up with the group. The boys were competitive among themselves and again they helped each other. On the other side, the girls were not seen like as the boys sitting side by side. One girl tried to see the other girl's khata. She at once stood up and complained to the teacher, "Didi, she is copying from my khata" ("দিদি, ও আমার খাতা দ্যাহে।").

In another class, the teacher called Ali to the board but he was unwilling to go. Another boy insisted him to go. He then went to the board. The other boys also helped him to solve the problem on the board. Similar scenario was seen in another schools also. In Dafadarpara school, a problem was offered to the students. Abul did it first. Then he went to Kabul. His dialogues with Kabul were as below.

Abul: Have you not finished yet? ("তোর এহনও করা অয় নাই"?)

Kabul: No. I am trying to do it.

Abul: Show it to me. I can help you.

Abul helped him to solve the problem. Such co-operative behavior of boys was observed in other classes too. In the same school, the teacher was teaching measurement of length to the students. She told them to measure a certain length using appropriate scales. After doing their tasks, the boys came closer and had a discussion whether their measurement was correct or not. At the similar time, a girl was quarrelling with another girl. Both of them were demanding the same scale. Another two girls were gossiping. Suddenly a girl complained to the teacher, "Apa, Shipra is wrong" ("আপা, শিপার অংক ভুল অইচে।"). In Rishipara school a problem was given to the students. After a while some boys and some girls stood up at a time. The boys were demanding that they solved the problem first. The girls also demanded the same. The boys were quite unwilling to consent the girls demand. Surprisingly, the teacher acknowledged the boy's demand, not the girls. By this event, it is understood that the teacher also supports the boys, not the girls-when they demand the same credit.

Following conversation between a teacher and the researcher may helpful in understanding teacher's attitudes about the competitive and co-operative attitudes of the students of BRAC schools.

Researcher : Who are more helpful in your class? The boys or the girls.

Teacher : The boys.

Researcher: Why the girls are not much co-operative like the boys? What do you think?

Teacher: (Silent for some time) Ohm! I don't know the real causes behind this. Their weakness in mathematics might be a factor.

Researcher: Anything more.

Teacher: Because the girls are basically poor in mathematics, they cannot help each other. Thus they try to copy from others (গবেষক শিক্ষককে জিজ্ঞেস করলেন, "কারা পরস্পরকে বেশী সাহায্য করে ছেলেরা না মেয়েরা"? "ছেলেরা"- শিক্ষক বললেন। শিক্ষককে এর কারণ জিজ্ঞেস করলে তিনি বললেন, "আমি এর আসল কারণ জানিনি তবে একটা কারণ এই অবার পারে যে, মেয়েরা অংকে দুর্বল। তারা সবাই অন্যদের থেকে নকল করবার চায়। এই জন্য সাহায্য করবার পারে না")।

Student's participation in classroom activities

There is a common tendency of human being to get attention from others. In the classroom, one of the common ways of getting attention from teacher is to help him/her in taking class properly. This can also be done by doing some works such as taking and distributing khatas and other necessary things, cleaning the blackboard and obeying order of the teacher, generally does in Bangladesh. These activities also help one to get leadership in their peer group.

In Dafadarpara school, after entering into the classroom the teacher told Abul, "Bring out the scales from the box and distribute those to different groups" ("ট্রাংক থেকে স্কেলগুলো বের কর এবং বিভিন্ন দলের মধ্যে বিতরণ করে দাও।"). It was observed that there were only five scales in the box. Abul followed the order of the teacher precisely. A similar event was observed several times in different classes. In that class, it seemed to the researcher that Abul always obeys this duty. Due to Abul's active role in the classroom, the researcher talked with him.

Researcher : Do you open the box everyday?

Abul: (Being elated) Yes sir.

Researcher: Why did the other student not open the box?

Abul: Sir, the key of the box always belongs to me. Except I who can do it? ("তুমিই কি সব সময় ট্রাংক খোল"? এই প্রশ্নে সে খুবই খুশী হলো এবং গবেষককে বললো, "স্যার, ট্রাংকের চাবিইতো আমার কাছে থাকে। আমি ছাড়া আর কে খুলবে"।).

He then showed the key to the researcher. It was seen that the teacher likes Abul very much and he also tries to help the teacher. The other day a girl said, "Apa, my pencil has been finished" ("আপা, আমার পেন্সিল শেষ হয়ে গ্যাছে গা"). The teacher told Abul to bring out a pencil from the box and give it to the girl. He at once followed the order. Abul was found collecting and distributing khatas everyday. Another boy, Kabul also helped him once in a while. He was also preferred by the teacher like as Abul.

Some of the charts in the classroom became solvenly. The teacher called a girl to adorn those. Abul stood up and said, "Apa, ask Kabul to adorn the charts." The teacher agreed and called Kabul to do so. The girl didn't oppose against Abul rather she looked elated. The boys didn't want to give any scope to participate the girls in any activities. Both Abul and Kabul were very much favorite to the teacher as they helped the teacher to a great extend. They were very accessible to her.

At the end of a class Abul willingly told the students to bring out their home tasks. The students followed his instruction. Abul then began to collect those, however, the teacher didn't tell him to do so. Another day, entering the class the teacher told Kabul to write down certain numbers on the board. She added that she would like to take rest for sometime. Kabul followed the order delightedly. The teacher talked with the teacher to know the students' participation in taking class. The conversation was as below.

Researcher: Why do you always prefer the boys but not the girls?
Teacher: Because of the willingness and capability of the boys. The boys are very much willing to do something new. They are faster than the girls. Even if I call a girl, a boy come in place of the girl” (“কারণ তারা খুবই উৎসাহী এবং তাড়াতাড়ি কাজ করতে সক্ষম -তারা কাজ করতে এতবেশী ইচ্ছুক যে, মেয়েদেরকে ডাকলেও তারা বোর্ডে চলে যায়।”).

Researcher: Why do you prefer Abul very much?
Teacher: Abul is very active and always wants to help me. If I invite any other to the board surely he will come. Any teacher would prefer such a boy (“আপনি সবসময় আবুলকে বেশী দায়িত্ব দেন। কেন?” - শিক্ষককে জিজ্ঞেস করা হলে তিনি বললেন যে, “আবুল সবসময়ই আমাকে সাহায্য করতে চায় এবং ভালভাবে তাড়াতাড়ি কাজ করতে পারে। আমি অন্য কাউকে ডাকলেও সেই এগিয়ে যায়। যে কোন শিক্ষকই এমন ছাত্রকে পছন্দ করবে।”).

The another scenario was observed in other class. One day in Rishipara school two girls (Sita and Sila) were seen collecting khata, however, they didn't get the chance the next day. That day, Madhob stood up first and declared, “I'm collecting khata today” (“আজ আমি খাতা তুলুম”). He was allowed by the teacher, as he wanted. When a teacher was going to open the box in the classroom the boys helped her always. The boys were very much willing to help the teacher in conducting class properly. So they become closer to teacher.

In Gopalpur school the teacher generally seeks Moni help. Sometimes she ask Bony to join with Moni. Their activities include collecting and distributing khatas, to go to board and solving problems etc. The participation of the girls in classroom activities was very weak in this school. Sumi, the most brilliant student in the class was not seen willing to help the teacher like as Bony or

Moni. She was very quiet. The teacher was taking special care to Moni and Bony.

In BRAC school, the boys were found more interested in helping the teacher in taking class. The teacher also prefers them due to their eagerness. Besides the girls were not willing to help the teacher as boys that decrease their achievement in mathematics comparing to their peer boys.

Attendance of students

Regular attendance in class is an important factor for better learning achievement. If a student keeps him/her absent from classes he/she may not be able to understand or follow lessons. The achievement of a regular student should be greater than an irregular student. However, it was observed in BRAC schools that the girls keep them absent more than the boys.

In Gopalpur school a girl Sumi was absent for consecutive four days. Another girl Rumi was absent one day. Comparatively, the boys were more regular than the girls. The researcher went to Rumi's house to talk to her about absenteeism.

Researcher: Why did you not go to school today?

Rumi: My mother has gone to the nearby village so that I couldn't go to school.

Researcher: Do you miss school off and on?

Rumi: Yes sir. I keep myself absent from school off and on because of my family problem (“তুমি আজ স্কুলে যাওনি কেন? সে উত্তরে বলল যে তার মা পাশের গ্রামে গেছে, এজন্য সে স্কুলে যেতে পারেনি।”).

The boys are not responsible to do such household works. The researcher talked with the teachers to know their opinion about the absenteeism of the students. They acknowledged that the girls were relatively irregular. A teacher explained, "in absence of their mother, the girls have to do the domestic works. Moreover, they help their parents for harvesting crops and they look after their siblings. Besides, the family does not expect the boys to do so. This creates discrimination in attending school regularly. As a result, the girls perform low" ("মায়েদের অনুপস্থিতিতে মেয়েদের বাড়ীর কাজ-কাম করু লাগে। তাছাড়া, তারা বাবা-মাকে ফসলের কাজে সাহায্য করে এবং ছোট ভাইবোনদেরকে লাগন-পালন করে, কিন্তু ছেলেদের এসব কাজ করু লাগে না। এর ফলে মেয়েদের উপস্থিতিতে বৈষম্য ঘটে এবং তারা পিছিয়ে পড়ে।"). She again informed that Rumi and Nipa can not attend school regularly because of their family problem. This was not the problem of Gopalpur school only rather the problem was existed in another schools also.

In Rishaipara school, a boy and two girls were absent. Mina was late. The teacher asked her, "Why do you late?" She replied that she had to cook for her family so that she couldn't maintain the school time. Another girl, Maya Rani was absent too. "My mother forbidden me to come school. I helped her in harvesting nuts all day long-" said Maya Rani while she was asked about her absenteeism in the following day ("আমার মা আমাকে আসপার দয়ায় নাই। আমি মার সাথে সারাদিন বাদাম গুকাইচি").

In Dafadarpara school, two girls were absent. To explain the causes of their absenteeism the teacher said, "Mira is absent today. She keeps her absent from school now and then because she looks after her siblings in absence of her mother" ("সে প্রায়ই স্কুল কামাই করে। কারণ, তার মা বাড়ী না থাকলে সে ছোট ভাই-বোনকে দ্যাখা-শোনা করে"). The programme organiser (PO) was asked about the attendance of the students of BRAC schools. It is notable that one of the important responsibilities of the POs is to ensure the presence of the

students. The respective PO of Rishipara school said that the girls were relatively irregular than boys. When the researcher asked him to state the causes behind the absence of the girls he said, "When a girl is absent from school, I go to her house. I see her involvement in domestic work almost everyday." Then he again said, "Some girls come to school from the other side of the market. Their mothers do not allow them to come to school during market day" ("একটি মেয়ে স্কুলে না আসলে আমি তার বাড়ি যাই। প্রায় সবদিনই আমি তাকে দেখি যে সে বাড়ীর কোন না কোন কাজ করছে এরপর তিনি বশলেন, কিছু মেয়ে হাটের অন্য পাশ থেকে স্কুলে আসে। হাটবারে তাদের মা তাদের কে স্কুলে আসতে দয়াল না").

Girls are treated as girls

Parents treat boys and girls differently from birth (Gutbezahl J, ERIC/CSMEE database article ED 380279). The girls are treated as inferior to the boys. From the birth, they get less importance in every step for being girls. Their mistakes and behavior are not treated as common human behavior rather that are treated as "girls' behavior." The BRAC schools couldn't help them to remedy the situation. In mathematics class, it was seen that girls do not get equal behavior from the teacher. The discriminatory views towards the girls of BRAC schools were expressed through their different behavior in the classroom.

In Rishipara school, a girl was talking to other one. This girl was healthy than other students. The teacher teased the girl for her physical size and reproved angrily, "You have grown up enough physically but you are good for nothing" The girl looked gloomy and insulted. She was silent all the time

When a boy was making noise in the class. The teacher simply forbade him to talk. Maya Rani was laughing in the class. The teacher asked rudely, "Hi girl, as I indulge you so that you do not care about me, do you?"

(“এ্যাই মেয়ে, তোমারে কিছু না কতি কতি মাথায় উঠে গ্যাছে, তাইনা?”). This event implies the partial attitude towards girls, which may lag them behind the boys. After this Maya Rani failed to do a sum. The teacher told her, “You are an ass, totally an ass. You will never be able to do it” (“তুই একটা গাধা, আশু গাধা। তোরে দিয়ে কুনোদিনও অংক করানে যাবিনে।”). Romesh was also wrong but the teacher didn't rebuke him as Maya Rani. The faults of the girls were not treated as normal events of the class. For doing mistakes, the girls were rebuked and insulted in the mathematics class that results their low performance in mathematics. The following event may help the reader to understand partial behavior of the teacher.

Goya Rani gave wrong answer to a question of the same teacher. She told Goya Rani. “You don't go through books at home, and you always move like a vagabond and play with others. You have grown up only but have no brain” (“তুমিতো বাড়ী যায় পড়াশেহা করনা, সারাদিন গালি টো টো করে ঘুরে বেড়াও আর খেলাও, খালি বড়ই অইচো-মাথায় কোন ঝিলু অয় নাই।”).

The other day Goya Rani was silent in the class. The teacher called her but she didn't response. Another student, then, came closer to her and began to tease. A boy told the teacher, “Didi, don't tell her anything otherwise she will start weeping” (“দিদি ওরে কিছু কয়েন না, কান্দে দিবেনে”). Even, a girl added, “it is a mad.” Goya Rani was about to weep but unfortunately, the teacher didn't try to save the poor girl from such an uneasy situation. This was not the situation of one school only, rather the corresponding events were found in the other schools too.

In Dafadarpara school, Mira did wrong in doing a sum. The teacher told, “Mira, you don't understand anything. I am unable to teach you. Are you capable to do mathematics?” (“মিরা, তুইতো কিছুই বুঝিসনে। আমি আর তোরে শিখাবার

পারঙ্গমনা। ভোর না আছে অংকের মাথা না আছে অন্য কিছু।”) The resembling events were observed in some of the classes. This kind of partial behavior ultimately results the low performance of the girls in mathematics.

Curiosity of the students to mathematics

The curiosity of the students towards mathematics plays a vital role in their mathematics achievement.. The boys were found more curious to mathematics in BRAC schools. Their curiosity was expressed through different behavior in the classroom.

In Gopalpur school, the teacher told the students to open the 99th page of their mathematics book. A boy, Suny cried out, “Didi, we shall finish two more pages so that we will reach the page 100” (“দিদি, আজকে দুই পাতা করলাম। তাইলেই ১০০ পৃষ্ঠা খইরা ফালামু।”). The teacher wrote a problem on the board and told, “Anyone come here and do the sum on the board.” A boy then went to the board. The similar event was observed for several times in each school. If the teacher invites anonymously then the boys took the chance. The boys were seen willing to do more than that expected by the teacher.

The teacher offered a sum to the students from their mathematics book. Suny did that quickly and said, “Didi, I have already done it. Can I do more from the next page?” (“দিদি আমার করা অইচে, আমি কি পরের পাতার অংক করলাম”). The teacher didn't allow him to do so but his curiosity to maths knew no bounds. No such curiosity was expressed by the girls. The curiosity of the boys to mathematics was expressed through other behaviors.

In another class, some problems were given to the students. Bony solved all and showed his khata to the researcher. The researcher checked it and found that Bony was all right. When the teacher wanted to see the khata, Bony said, “Didi,

Sir (researcher) has checked my khata and I was correct” (“দিদি, স্যার আমার খাতা দেহে দিছে, আমারে রাইট দিছে।”). Bony was looking very elated and proud. No girl showed her khata to the researcher though they were sited closer to the researcher than the boys. Similar event was occurred for several times. At the end of the class Moni said, “Didi, give us home task now” (“দিদি, এহন বাড়ীর অংক দ্যান”). He then directed to the other students, “All of you open your khata and write down home tasks on it” (“তুমরা সবাই বাড়ীর অংক তুলার জন্যি খাতা বাইর কর এবং বাড়ীর অংক তুলে ন্যাও।”). The teacher didn't tell Moni to do so, however, her silent support to Moni was there.

In Rishipara school, the teacher divided the whole class in to five groups and told them to solve some problems from their books. A boy was good in maths and began to do alone by passing the group members. A girl stood up and complained to the teacher against the boy, “Didi, Robi is doing alone.” The teacher told, “Let him do.” Here the teacher could ask Robi to work with the group. Sometimes the boys were found discussing among themselves about the text of problem solving arithmetic's. However, no such discussion was observed among the girls. In a class, the boys were discussing that the market price of rice is Tk. 12 per kilogram, but is written Tk. 8 in the book. They were asking each other, how does it possible? No such discussions were held among the girls (“বইতে চালের দাম ৮ টাহু কেজি লেকছে, কিন্তুক চালের দাম এহন ১২ টাহা করে।”). In the same class, the teacher asked a boy to teach multiplication table to other students and he began to teach. The other boy who was sited adjacently and learning the table attentively was also very willing to teach multiplication table to his peers. However, sadly, no such eagerness was seen among the girls.

In Dafadarpara school, the students were measuring lengths of some objects in-group. Although most of the students were working in-group one boy was found

doing alone. Even he did the task very quickly than the peers did and again he asked the teacher to allow him to proceed with more problems from the textbook. However, the teacher did not allow him, but attitude of this boy and his curiosity to do more tasks certainly helped him to progress more in mathematics. No such attitude was observed among the girls. After this, the teacher was asking her students to show some numbers with the help of sticks. She was saying the numbers loudly. The teacher said three numbers, however no girl was seen to respond to the teacher and even the teacher didn't notice it. In the same class, three boys were sited adjacently. The teacher asked questions to two of them. The other one felt unlucky and asked the teacher, "Apa, you please ask me a question." At this, the teacher asked him a question. There was no such eagerness was found among the girls.

The teachers were asked about the curiosity of the students to maths. The conversation of the researcher with a teacher was as below.

Researcher: Who are more curious to mathematics?

Teacher: The boys.

Researcher: Why are the girls not curious to maths?

Teacher: The girls are involved with such kind of works those do not require mathematics. The work included cooking, washing, cleaning, caring younger siblings etc. Moreover, they are told that mathematics is a very hard subject from the very beginning. So, they fear mathematics and they are not curious to maths ("মেয়েরা বাড়িতে যে সব কাজ করে তাতে অংক লাগে না। যেমন রান্না করা, ধোয়া-মোছা করা কিংবা ছোট ভাই-বোনদের দেখাশুনা করা। তাছাড়া ছোট বেলা থেকেই তাদেরকে বলা হয় যে, অংক খুব কঠিন বিষয়। এজন্য তারা অংক ভয় পায় এবং অংকের প্রতি তেমন উৎসাহীও হয় না।")

Attitudes of the boys to girls

After birth, the boys get more attention than the girls (Hilgrad et al, 1975). So they can explore their potentialities to a full extent but the girls cannot. The boys see that the girls are deprived of their own family. So, in the Mathematics classroom, they also overlook the girls and participate more in the classroom activities. They rebuke and tease the girls that lessen the mathematical achievement of the girls. Many events were observed in BRAC schools, which expressed partial attitude of the boys to girls.

In Dafadarpara school, the teacher wanted to teach multiplication table to the students. She told to the students, "Anyone come and teach multiplication table loudly." Abul wanted to teach but the teacher called a girl. At this, Abul and other boys became unpleasant. The girl had a low voice. She began to teach multiplication table but the boys didn't participate with her. At this stage, the girl made a mistake. Abul cried out, "You cannot do it, why are you there to teach us?" Go to your seat, go at once" ("তুই যা পারিসনে তা করবার যাস ক্যা? তুই ভোর যাগায় যা, এহনি যা।"). The teacher didn't say anything to Abul. The poor girl went to her seat and Abul took her place and began to teach multiplication table loudly. All the students participated with him. It was notable that the teacher didn't say anything to Abul. Similar scenario was occurred in another classes. By this way, the girl felt deprived and insulted, this might affect her achievement. The event, stated below is another example of discriminatory attitude of the boys to girls.

There were five scale in the class and the scales were distributed among five groups. It was an important observation that in the four groups the scales belonged to the boys and only one scale belonged to a girl. The boys were not consent to give the scales to the girls. After sometime a girl said to a boy, "Give me the scale. You have measured for a long time, let me measure now"

(“স্কেল এহন আমারে দ্যাও । তুমি অনেকক্ষণ ধইরা মাপছো, এহন আমি মাপুম ।”). The boy replied, “Why should I give you my scale? Come to me and participate” (“আমার স্কেল আমি তোমারে ক্যান দিমু? আমার সাথে আইসে মাপো ।”). The girl went to the boy, but he didn't give the scale to the girl. He was measuring the length and telling the results of his measurement to the girl. The teacher didn't help the girl to get a scale. Here, we can see that the boys were dominating the class. Even, the boy mentioned that the scale was his, which was not true. The scales were common property of all the students. However, the boys were not ready to except the truth.

Although Abul tried to comprehend his nearby girl but she didn't understand. Then Abul reproved her, “You are a mad, you have no sense of mathematics” (“তুই তো পাগল, তোৰ অংকে কোনো মাতা নেই”). The boys sometimes helped the girls in order to prove their superiority. The similar events were observed for several times in different schools. Such attitude of the boys cannot help the girls to achieve in maths.

It was seen in Gopalpur school that the teacher asked a question to Salma but she was wrong. A boy, Subash told her, “You are an ass and good for nothing.” The resembling events were observed in another classes also. In a class, the teacher was trying to teach a division to Suma for half an hour but failed. The boys were very unhappy. Also the teacher became tired and annoyed. “You have observed every thing. What can I do for her?”-the teacher told to the researcher. Then the boys began to tease Suma. Suny said, “Didi, if you try all-day long to teach her, she will not understand.” Bony described Suma as an ass. She looked very gloomy. The teacher didn't forbid Suny or Bony (“শিক্ষক আধ ঘণ্টা ধরে সোমাকে একটি অংক বোঝাচ্ছিলেন কিন্তু পারলেন না । অন্য শিক্ষার্থীরা বিরক্ত হচ্ছিল, তাছাড়া শিক্ষকও ক্লান্ত হয়ে পড়েছিলেন । বিরক্ত হয়ে শিক্ষক গবেষকের উদ্দেশ্যে বললেন, আপনি তো সবই দেখলেন ওর জন্য আর কি করবম । এরপর অন্যান্য শিক্ষার্থীরা সোমাকে ঠাট্টা করতে

পাগলো। সুজন বলল, দিদি, আপনি যদি ওরে সারাদিনও বুঝান তাও ও বুঝবেন না। নজরুল তাকে পাগল বলল।”)

“I was trying for a long time to teach Suma and at that time the boys had no task. So, they become annoyed and teased Suma”- said the teacher when she was asked, “Why did you not forbid the boys to tease Suma” - (“সোমাকে বিরক্ত করা থেকে অন্য শিক্ষার্থীদেরকে কেন নিষেধ করলেন না” জিজ্ঞেস করলে শিক্ষক বললেন, “আমি অনেকক্ষণ ধরে ওরে বুঝাতে ছিলাম। সে সময় অন্য শিক্ষার্থীদের কোন কাম ছিল না। তাই তারা বিরক্ত হয়ে সোমারে ঠাট্টা করছে”)। The above stated events reflected the attitude of the boys to girls, which are not congenial for the girls in achieving mathematics.

Teacher's expectation from girls

The teachers expect lesser academic achievement from girls than from boys. In the mathematics classroom, the girls are asked lower level of questions as the teachers expect girls to do poorly in mathematics.(Gutbezahl J, ERIC/CSMEE database article ED 380279). It was seen in BRAC school that the teachers consider the boys more able to do mathematics and offer them some responsibilities of the class.

In Dafadarapara school, the students were measuring lengths with scales. When the students completed measuring, there was not enough time for that class. The teacher checked only Abul's khata and told him, “Check the khata of other students” (“ওদের খাতা একটু দেখো তো ঠিক করছে কিনা।”)। The similar events were observed in several classrooms. The teachers expect more from a boy. Another two events have an analogy with the above, which expresses teacher's higher expectation from the boy.

In Rishipara school, the teacher offered a problem to the students. The teacher found a boy who could not solve the problem timely. She just asked the boy, "Have you not finished it yet?" Her confidence and expectations to the boy reflected to her tone. It was seen in Gopalpur school that the teacher expects a higher level of performance from Moni and Nazrul. The teacher gave a problem to the students. When the students completed the task, the teacher told Moni to come in front of all and to make it understand to the student who failed to solve the problem. In the same class, some boys were making noise. The teacher found Moni in that group. She reproved him, "What are you doing?" Such an expectation was reflected to her voice that a boy like Moni could not make a noise. She takes special care to Moni and expects higher level of performance from him.

Wastage of time by the girls

Time is the most valuable for human beings. The class time is very important for every student. The students should be careful about it. It was seen in BRAC school that the boys were more serious about their class time than the girls, that may create discrimination among boys and girls in mathematics achievement. Different events were observed in the classroom of BRAC schools, which expressed the seriousness of the boys about class time.

In Dafadarapara school, the teacher was teaching a math on the board. A girl was talking to other one. A boy told her to stop talking. The girl didn't stop, however, said, "Do your duties." The girls are not serious about their class time. Moreover, they don't care when they are told to be serious. In Rishipara school, it was seen that two girls were reciting rhyme. Another girl was drawing picture on her slate. The teacher marked it and reproved her, "What are you doing? You have no care about study but you have care about game. Look at the board." The callousness of the girls about class time was reflected through the below stated event also.

In Gopalpur school, a girl was adorning her hand with pen for a long time. The teacher marked it. She told the girl, "Stand up and show your hand to all." The girl stood up but she was unwilling to show her hand. Some other students also told her to show hand. They also claimed that she should show it to them because she was doing it for a long time. The girl fall in a very uneasy situation at this. It was seen in another class that the girls were laughing and gossiping. It was an important observation that the girls quarrel with each other. A girl tried to see another girl's khata. Then they became quarrelling and complained against each other to the teacher.

Girl 1: Didi, she was trying to see my khata.

Girl 2: No. No. I was not.

Girl 1: You are telling a lie.

Girl 2: You are telling a lie, not me.

At this stage, a boy said to the second girl, "If one looks your khata, what's the problem? If one looks my khata, I never mind."

Confidence of the students

Confidence is a very important and effective power of success. However, it grows with the help of ones own family and society. The boys get congenial environment to be confident but the girls do not get that. As a result, in the mathematics class of BRAC school, the boys remain confident in their works, words and in every behavior. Besides the girls are not confident as the boys that lessen their achievement comparable to the boys.

In Gopalpur school, the teacher gave a problem to the students to solve. Two girls finished first but they were not willing to show their khata to the teacher. Because, they were confused about their work. A boy stood up and cried out, "didi, look my khata." The teacher checked his khata and found him wrong. The teacher made him understand. Then the two girls tried to see that boy's khata.

They found that they were correct. Then they called the teacher. They were right but they were not confident to themselves. This was a general picture in BRAC school that the girls copied from the boy. The girls were seen very vigilant whether any boy or girl copies from others. If they notice any event that someone is copying from others, they complain to the teacher pronto. A girl complained against Rony, "Didi, he copied it from others. Rony rejected the complain and said, "I can do it again in front of you." The teacher told, "It is unnecessary." However, Rony did the sum again and showed it to the teacher.

In Dofadarpara school, the students were writing home tasks from the blackboard. The teacher was standing in front of the board and Abul was not able to see the board. He said, "Apa, move a little bit." The teacher laughed and changed her position. In Rishipara school, the teacher offered a problem to the students. When most of them completed the task the teacher said, "Show the khatas to me". A boy said, "Didi, wait a bit. I have not finished it yet." Confidence of the boys was expressed in their every behavior. The girls did not express such confidence in the class.

Refreshes training session observation

Training is an important medium of human resource development. It increases ones skills to show better performance. The teachers of the BRAC schools are given in service training called '*Refreshers Training*' once a month. The main objective of the training is to strengthen motivation in teaching and help them to solve everyday problems faced in classroom. The main objective of observing one of such training session was to find if there was any discussion about gender difference in mathematics.

Starting of the training session was good. The trainer began the session through exchanging greeting to all the participants. He asked the participants about their

health and well being. They exchanged views about the training and weather. Then the trainer asked them whether they faced any problem in mathematics during last month. Showing a specific problem written on her exercise book, one teacher requested the trainer to help her in solving the math. It was observed that the trainer taught her very dearly. Then raised another problem, which she was facing. The training session was very much participatory. The trainer was very helpful, co-operative and jolly minded. It was very good to see that the teachers had a very easy behavior with the trainer. The teachers were trying to solve their problem in doing mathematics. That is they were very busy in improving their skill in respective mathematical problems. However, there was no discussion about gender difference in mathematics, for which the researcher was waiting. Before the end of first session, the researcher talked with the trainer.

Researcher: Do you know whether the boys or the girls are doing better in mathematics in BRAC schools?

Trainer: All are doing equal. There is no difference in mathematics achievement between boys and girls.

Researcher: I have seen it while testing the students and again in doing classroom observation.

Trainer: I have not heard it yet. You told it to me for the first time. Discrimination between male and female in the society is discussed several times but gender difference in mathematics is never discussed in any time.

Researcher: Why the girls are weak in mathematics? What do you mind?

Trainer: For their family and societal status. As the girls are deprived in family and society they cannot explore their potentiality in mathematics. Moreover, they do not practical usability of maths.

Researcher: What steps should be taken to remedy the gender gap?

- Trainer: If BRAC head office takes proper initiatives, then the gender gap could be remedied.
- Researcher: Do you know what steps would be suitable?
- Trainer: Not truly. The steps should come from the head office as a minute and each local organ should follow that. Besides, the teachers and trainers can make aware through basic and refreshers training.

Interview of the programme organiser's (POs)

The PO's play a vital role in the non-formal primary education programme of BRAC. There are some schools under each of them and they visit those schools regularly. Their main task is to ensure smooth operation of the schools. If any school face any problem they take initiatives to solve it. They provide the teachers necessary instructions. They are very much closer to the teachers, students and the local people. To find out the causes behind gender difference in mathematics, the researcher interviewed two PO's who look after the observed schools.

One PO has been working about two years. He was not aware about gender difference in mathematics. He mentioned that the researcher was telling him about the gender difference in mathematics for the first time. There was no discussion about gender difference in mathematics neither is the basic training nor in the refreshers training. Then the researcher informed the PO that during his visit to the schools for last couple of days, he found such difference in their schools. In replying to a question of the researcher he said that none informed him about the gender gap in mathematics. Since there was no formal examination in BRAC school, he was not able to identify the gap between the boys and the girls. Then the researcher asked him, "Why the gap exists?" He kept silent for some time and then mentioned that, the girls were very shy. They do not ask questions and give answers in the class. He again said that the problem starts from the family. The girls are deprived to a great extent in their own families. The researcher requested the PO to explain the nature of

deprivation of the girls with examples. Then the PO said, "One day I went to a school. Two girls were absent. I went their house at once. One girl was cooking rice. I requested her mother to let her daughter to go school. Her mother informed that, the day was local market day. They had to sell the fence in the market. If her daughter goes to school she would not be able to make fence. Then I waited until the rice was cooked and then the girl came school." Then he asked the researcher, "You tell me, is it possible for the girl to maintain her sound concentration is study, particularly is mathematics?" He explained that mathematics demands cent per cent concentration.

The researcher then asked, "What happened to the other girl?" The PO informed that the girl's mother was absent from house and the girl had to look after her siblings. He added that, the boys were never engaged with such type of works. "What is the relation between mathematics achievement and house hold works"- the researcher wanted to know. The PO replied that the girl's were engaged with feminine activities of the family like cooking, washing or looking after babies. In these works there is no requirements of mathematics skills. On the other hand, boys go to market. They sell and buy goods for their families. In doing so, the boys are directly engaged in calculation through such type of activities. The PO again said that the girls were engaged in such type of plays, which do not require calculation. For instance, the girls play golla chut, however, the boys play Ha- du- du, Cricket and Caroms. During these games the boys can't ignore calculation, which help improving their skills in mathematics.

The PO was asked, "What are the other causes behind gender gap in mathematics?" He replied, "The expectation of the parents is an important issue. They send their sons to schools because that may help them in getting a better job in future. Then they will look after their parents. Besides, the parents send their girls to schools to become a good wife. The parents think that ability in writing a letter is enough for a girl, which may help the girls to be able to get a suitable bride. The parents transmit this idea to their daughters in different way.

For this, the girls think them neglected. They do not be serious in their study rather they fall in mental pressure. In this situation the girls cannot give attention to such a hard subject like mathematics” (“বাপ-মার আশা আকাংখা একটা বড় ব্যাপার। তারা ছেলেদেরকে পড়ায় যেন ছেলেরা কামাই করে খাওয়াতে পারে। মেয়েদেরকে পড়ায় যাতে তারা চিঠি লিখতে পারে। এর ফলে তাদেরকে ভাল করে বিয়ে দিতে পারবে। বাবা-মা বিভিন্ন ভাবে মেয়েদেরকে এটা বলে। এজন্য মেয়েরা নিজেদেরকে অব-হেলিত ভাবে। তাদের মধ্যে পড়ালেখার প্রতি কোন সিরিয়াস মনোভাব গড়ে উঠেনা, বরং তারা মানসিক চাপে থাকে। এ অবস্থায় মেয়েরা অংকের মত কঠিন বিষয়ে পরিপূর্ণ মনোযোগ দিতে পারেনা”).

Then the researcher asked the PO, “Do you see any problem in the schools which may cause such gap?” The PO said that in BRAC schools there was no discrimination between boys and girls. Over and above the girls get more facilities than the boys. Besides, a notable matter is that the girls are very inactive in class. They do not ask or answer questions. Sometimes they waste time by gossiping and laughing. He claimed that, the behavior of the teacher in BRAC school is not discriminatory. When the researcher asked, “I have found that the teacher gives importance to the boys into the class. What is your comments?” He replied that he has told the teacher to give equal importance to both girls and boys. He also added that it might happen that the girls get importance when the PO is present in the class. In absence of the PO, the teachers may prefer the boys. One of the causes may be the curiosity and participatory behavior of the boys. They are very active in the class. The researcher asked the PO, “ is it possible to remedy the gap?” The PO opined that the gender gap in mathematics could be remedied. He added, “It is necessary to inform the issue to the POs, the teachers and all others, that is, all persons who are related with NFPE programme. The higher authority can arrange a summit of all the POs and discuss the issue with them. The summit can take step to find out the strategies regarding reducing gender gap. The strategies can be

discussed in the training session, such as basic training and the refreshers training. Training can help motivating the teachers and the POs to do equal behavior to the students of both sexes". Moreover, he added that it is necessary to monitor regularly whether the instructions of higher management are followed or not. The researcher again asked, "How can we find instructions?" He replied that it was a matter of the head office. It is the responsibility of the head office to think and conduct research to find out the way, which should be followed. He also added, "For instant, you are conducting a research and now you know many things about this. You may suggest some instructions to the head office management".

The other PO has been working in BRAC for last six years, however, was ignorant about the gender gap in mathematics. The conversation of the researcher with the PO is presented below.

Researcher: Why do you not aware about the gender gap in mathematics?

PO: No body told me about this, neither in basic training nor in refreshers training or any other time. I have found some weak students in mathematics when I was working in Chittagong as a PO.

Researcher: What steps did you take at that time to bring the weak students up to the mark?

PO: There is a rule in BRAC to take extra classes for the weak students, if necessary. I had arranged extra classes in the afternoon for the weak students.

Researcher: Do you remember who were those weak students?

PO: I did not think like as you. Now I remember, most of those students were girls, yes girls.

Researcher: Could you please explain the causes behind gender gap in mathematics in BRAC schools.

PO: (Being silent for some time) To open a school, we take same aged boys but same aged girls are not available as many as we want.

Then we consider some below aged and some over aged girls. These girls cannot match with their peer boys and girls. The below aged girls cannot understand mathematics, as they are not capable enough to realise. Two problems are raised by the over aged girls. Firstly, they may get marry and they dropout. In their place, new girls are recruited and the newly recruited girls can not match with others and can not perform well in mathematics. Secondly, generally they look older in physical size. When they make any mistake, the teachers and students criticise them for their physical size and merit. Then, they become confused about themselves. They can not ask questions or answer and can not take part in the classroom activities. So they become weak in mathematics.

Researcher: Do the teachers do discriminatory behavior in the classroom?

PO: The teachers prefer the students who are outstanding and willing to participate in all activities. The boys are very much willing to participate in the class. So they get preference by the teachers.

Researcher: Why do the girls not outstanding and participatory?

PO: Because of their family. The girls are deprived in their family such as they do not go to market or shops and their eagerness and courage are not appreciated. So, they can not develop themselves to be able enough to participate in the class actively. In their study time they read Bangla or other subjects and copy mathematics from others khata.

Researcher: Do you think, the causes behind gender difference are removable? If so, how?

PO: Yes, the problem is removable. The teachers, the POs and all the related authorities of BRAC NFPE programme should be aware about the problem. In the basic training and refreshers training, emphasis should be given on gender gap in mathematics. More over, the activities can be followed up through regular monitoring.

Interview of the Team-In-Charge (TIC)

In BRAC NEPE programme, each TIC supervises a number of POs. The main duty of a TIC is to make sure that the POs are playing their role accordingly and the schools are running smoothly. A TIC works as a medium between regional office and the area office. He/ She submits the monthly reports of the schools to the regional office regularly. More over, the TIC solves the problems faced by the POs and some times visits school.

The in-charge of the team has been involved with BRAC NFPE programme since 1995. It was observed that the TIC was ignorant about the problem like the POs. "I come to know it just now from you"-she said. "Nobody told me about this"-she added. In order to explain the causes behind gender gap in mathematics she mentioned that before starting a school, they have to do a survey. They try to find out the non-schooled children through the survey. They are to take all the girls because BRAC schools emphasises girl's education. However, they have flexibility to exercise choice in selecting boys for the schools. They generally consider clever and meritorious boys. As they take all the girls, some dull girls may admit in the school. These girls cannot perform as high as their peer boys do, especially in mathematics. "Their performance is very poor"-she added. "Do the girls become dull from the birth?"-the researcher asked her. "Certainly not"-she replied. "From the birth, all the babies are equal in merit but later, the girls are deprived in the family. So they become dull comparable to the boys"-she also added. The TIC was requested to explain the nature of deprivation in the society. She then said, "In our society, the boys get more importance in the family and the girls are treated as girls. The boys can go out easily and mix with other people but the girls cannot. The parents advice a girl to do some specific things and forbid to do many things. The parents prepare their girl for marry. Their courage and eagerness are not appreciated rather they are told to be shy

and timid, besides, the boys are told to be masculine” (“তাদেরকে বশা হয় - পুরুষ হ, বাটা ছাওয়ার মত হ”).

When the TIC was asked how these deprivation affect in achieving mathematics, she said, “For these deprivation, the girls consider them inferior to the boys. They are not involved in marketing or any other calculation related works. As mathematics is a hard subject they fear it from the very beginning. School doesn't help them to remedy the fearfulness. In the class they are very shy and cannot attract the teacher's attention. They practices Bangla or other subject and copy mathematics from other student's khata”

Like as a PO she also added that to remedy the gap initiatives should be taken from the head office. According to her, if the order comes from head office as minutes, all concerned will be bound to follow that. When she was asked about the steps that can be considered in this regard she said that steps should come out from research studies. She believes that if initiatives are taken from the head office all the regional and local offices would be aware about gender gap in mathematics and would work together to eliminate the gap.

Interview of the teachers

There is only one teacher in each BRAC school. Generally, the teacher is a local woman and she teaches all the subjects. The NFPE schools of BRAC remain only one classroom and the respective teacher remains with the students in every class. So, she becomes very familiar to the students. The three teachers Juhi Rani, Tara Rani and Sahera Begum were interviewed for this study. They have been teaching in BRAC schools for five to six years. At the beginning of the interviews, they were asked about their knowledge about gender difference in mathematics education. All the teachers were found ignorant about the existing gender gap in mathematics achievement of the students of BRAC schools. One

of the teachers acknowledged that the girls might do poorly than the boys. The other added that the girls and boys remain equal merit from their birth but in later the boys get more importance than the girls. So, the girls might become dull, shy and incurious. Other teacher told that nobody told her about gender gap in maths, neither in the training session nor in other sessions. When the researcher asked Juhi Rani to say something about girls doing poorly in mathematics, she replied, "The girls are inattentive and they are weak minded" ("মেয়েরা অমনোযোগী, তাছাড়া তারা দুর্বল মনের"). When she was asked to explain the issue more detail she said, "Because of their weakness in mathematics the girls fear mathematics. They do not go to market or shops. So they do not gather any practical experience of calculation". Then the researcher asked her, "In the school the boys get importance from you. Isn't it true?" The teacher kept silence for some while and then said, "I thought I behave equally to both boys and girls. Now I am feeling that sometimes I prefer boys more because of their curiosity and participatory behavior. They are willing to help me and try to talk more with me. If I rebuke a boy, he doesn't mind. Besides, the girls are very shy and sensitive. If I rebuke a girl, she remains silent."

She also added, "There is another cause. When the parents of a boy meet me, they request me to ask questions to their son and later they monitor whether I asked questions to their son or not. The parents of a girl do not do it generally. So I ask more questions to the boys and give them more opportunities to participate in the classroom activities." ("যখন কোন ছেলের বাপ মার সাথে আমার দ্যাখা হয়, তারা আমাকে কয় যে আমার ছাওয়ালরে বেশি করে পড়া ধরবেন। তারা আবার পরে খুঁজ নেয় পড়া ধরছি কিনা। ম্যায়ার বাপ-মারা এমন করেনা।"). In response to the questions about the steps that should be taken to remedy the gender gap in mathematics she said, "All the teachers should be known about the problem through the basic training as well as in refreshers training. At the same time the POs should be aware so that they can help us. The monitors should follow-up the situation regularly. If I were known

about the problem, I would have remedied gap at any cost. As the same way, if all the teachers try to remedy the gender gap from their own school, the problem should be solved." Moreover, she suggested that the proper instructions should come from the head office.

Another teacher Tara Rani told that because there is no formal examination in BRAC schools, it is not possible for them to identify the gender gap in learning achievement of the students. "Why are the girls poor"-the researcher asked her. She replied that she doesn't know the real causes behind gender gap in mathematics. She thinks that the gap starts from family. She also added, "Generally the parents of the students are illiterate and they can not help their children in doing mathematics. The girls are forbidden to go out and to be socialize, thus they cannot get help from others to solve their mathematical problems. The boys can easily get the help from other educated people of the village. Moreover, the parents of a girl always think that their daughter will get marry very soon and will go to her husband's house. So her study is not important at all. As a result, the girls are not serious about their study". When she was asked, "Why did you rebuke a girl for her physical size and merit?" She felt very uneasy at this question and said, "Yes it happens sometimes in my class. I want to teach them so that I rebuke them. In spite of being a teacher, I am a human being and cannot control myself always. So I rebuke them with their physical size and merit. I know it is quite a wrong process."

In order to remedy the gap she suggested that the POs could give them proper instructions in this regard. She also added that the issue might be discussed in the basic training, refreshers training, office meeting and even in parents meetings. She again said if the steps is taken from the head office all the organ of BRAC Education Programme (BEP) can follow the instructions at a time which may helpful to remedy the problem.

The researcher asked another teacher, Sahera Begum, "Why do you ask more questions to the boys and give them more opportunities?" "Because the boys are curious and quick in doing mathematical problems"-she answered. "Everyday I take five classes continuously, then I become very tired. In this situation, I call boys to the board and ask questions to them. They can answer correctly and quickly. When I get tired, I do not want to hear a wrong answer. Generally the girls do incorrect answer. I cannot control myself and I become angry and threat them. Thus I ask questions to the good students, who are generally boys" ("প্রত্যেক দিন আমি পাঁচটা ক্লাস নেই। একসাথে এতগুলো ক্লাস নিয়ে আমি ক্লান্ত হয়ে যাই। এই অবস্থায় মেয়েদের পড়া ধরলে তারা পারে না, আমার মেজাজ খারাপ হয়ে যায়। এ জন্য ছেলেদেরকে পড়া ধরি তারা ভাল পারে")).

"That means, you agreed that the girls are deprived in your class"- the researcher commented. "Sometimes"-she replied. Then she told an interesting point that the female teachers are not friendly with the girls. When the researcher asked, "Why?" She replied, "the situation of the female teachers are not much different in the society than that of the girls in the classroom. They are also deprived in their own family. So, they bear a feelings that the girls are inferior to the boys." Like the others, the teacher also felt that in order to remedy the gap, instructions should come from the head office.

The Case Studies

Six students were selected for case study. They were different in characteristics. The findings of the case studies are presented below.

Case-1

Moni and Bilkis are siblings. Both of them read in class III in two different BRAC schools. Of them, the brother is the older and he is the best boy in his class but the sister is an average student. The researcher discussed the research issue with their father and grandmother at their presence. The father is about 70 years old. At the beginning the researcher asked him about the education of his children. He seemed very inspired in talking about Moni, "My son Moni is a very good student. I have told him to study regularly so that he can secured the first position in his class" ("আমার মনি খুব ভাল ছাত্র। আমি তারে কইছি, ভালভাবে পড়াশেহা করবি, যাতে কারো পাছে না পড়িস"). The old man also added, "I have also told him that he has no work at all without study." Mozibor acknowledged that he didn't do any work in his family except marketing. "I go to market with my father and brothers"- said Moni.

Then the researcher asked the father about Bilkis. He was found depressed for some while and then said, "She is a girl and growing up. She will be married any time and will be settled to her husband's house. For this, I don't take care of her study but she goes to school" ("সে অইল ময়ান্না ঝি-পুত। সে ডাঙ্গর অয়া উঠতেছে, আমি তার পড়াশেখার তেমন খবর নেইনে, তয় সে ইসকুলে যায়"). Bilkis was asked whether she does any work for her family. Mozibor was trying to reply in favor of Bilkis but she stopped him and said loudly, "I help my mother in all domestic works. I bring water, clean the yard, wash the dishes and help mother in her work but Mozibor doesn't do any work. My parents also don't tell him to do any work" ("আমি বাড়ীর সব কামে মারে সাহায্য করি।

আমি পানি আনি, উঠোন ঝাড় দেই, থালা বাসন ধুই এবং অন্য কামও করি। মনি কোন কামই করেনা। বাপ-মাও তারে কোন কামেই কয়না”)। She was saying again and again that Moni didn't do any house hold work.”

“Why do you tell only to your daughter to do domestic works”-the researcher asked the father. The grandmother was surprised at this question and replied, “What are you telling? She is a girl. If she doesn't learn domestic works, will anyone marry her?” (“এইডা আপনি কি কন? সে অইল ম্যায়া ঝি-পুত, সে যদি সংসারের কাজ কাম না শেহে তালি কি কেউ তারে বিয়ে করবি?”).

Bilkis told that she helped her mother in household works but she was not allowed to go to marketplace. Then the researcher asked Moni, “Who is good in mathematics between Bilkis and you”? Moni said that Bilkis was good in mathematics when she was in class II. She is performing poorer day by day. Bilkis added, “I do not understand mathematics very well. Sometimes Moni tries to teach me but I do not understand.” Moni said that Bilkis generally copies from his mathematics khata. Moni was asked, “Why is Bilkis poor in mathematics?” “I don't know the real causes of it. It may because that she is not involved in shopping. Moreover, I help my father and brother in accounting and budgeting of our family but Bilkis has no involvement in it”-said Moni.

At the time of departure, the old man requested the researcher to pray for his son and also promised to ensure economic support for his study. He had not any such commitment or any expectation for Bilkis.

Case-II

It is a story of a girl named Sumi who is very good in mathematics. She has two brothers but no sisters. She is the only girl in her family who is involved in schooling. Her father is a shopkeeper. She doesn't go to market but goes to nearby shops, if necessary. She has no certain duty in her family. “Sumi doesn't

do any domestic work in the time of her study. I don't impose any duty to her"- said her mother. Sumi's parents cannot help her in study but her father takes care of her study regularly. Sumi was asked, "Who are good in mathematics in your class?" "The boys, the girls fear mathematics. They are not attentive in mathematics class. They laugh, gossip or make noise in the class"-she said. "Why are the girls not attentive in mathematics class?"- she was asked again. She replied that they were inattentive in the class because of their weakness in mathematics.

"What steps should be taken to make the girls good in mathematics"- Sumi was asked by the researcher. She kept silent for sometime and said, "The main problem exists in the family. Most of the parents recognise that there is no necessity of study for their daughters. They don't give proper opportunities for their daughters but the sons get those. Most of the girls of our class can not get proper help from their family. In this situation, if they can manage time to study they read Bangla or other easy subjects but not mathematics. In mathematics, they try to copy from the khata of other students ("বড় সমস্যাডা অয় বাড়ীতে, বেশিরভাগ বাপ-মাই মনে করে ম্যায়াদের পড়ালেহার দরকার নেই, তাই তারা ছাওয়ালগের পড়ালেহার সুযোগ দ্যায়, কিন্তুক ম্যায়াগের দ্যায় না। আমাগের ক্লাশের বেশিরভাগ ম্যায়ারাই বাড়ী থেহে কোন সাহায্য পায়না। এই জনিয় তারা যতটুকু সুমায় পায় তহন বাংলা না হ'লি কোন সহজ বই পড়ে কিন্তুক অংক করেনা। তারা অংক অন্যজনের খাতা দেহে তোলে।")).

Sumi's parents were very much optimistic about her. "We will help her in study as she wants"- said Sumi's father. When the researcher asked him whether he will arrange her marry very soon, he replied that he was not willing to do so. "Sumi is my only daughter. I will help her to study as she desires"-said the man elatedly.

Case-III

It is a tale of another pair of brother and sister named Tapos and Shima who read in class III in a BRAC school. Shima is older than Tapos. The teacher of their school informed that Shima was good in mathematics when she was in class II. Now she is doing bad day by day.

It was discovered with the discussion of their parents that none of them had to work at home. Now their parents find that the daughter is getting older, so she needs to learn some household work for the betterment of her future. She has to obey some rules now. So, in the present day, she is not permitted to go out, but outing is not a problem for the son.

“If Tapos reads attentively, he will get a better job in the long run”-said Tapos’s mother. Then she was asked about her motive on Shima’s education. She said, “If she studies regularly she will be fit for getting a suitable bride”. Shima was present there and she became very angry, “You have nothing to say without this one? I will never marry” (“তোমার মুহে ও কথা ছাড়া আর কোন কথা নাই? আমি বিয়ে বসপো না।”).

It was seen that most of the parents of the female students of BRAC school impose a thinking of marriage to their daughter’s mind from the very beginning of their life. This creates a complex to the girls, which demotivate them not to study much. “I go to market with my father and help him to sell cane-goods”-said Tapos when he was asked, “Do you go to market?”

Case-IV

Era and Ratul are uterine sister and brother. Like the other cases, Era is poorer in maths than Ratul. They read in class III in a BRAC school. Of them, Ratul is elder than Era.

The researcher talked with their mother and the elder sister. Their mother informed that Ratul cut grass for their cows regularly. Moreover, he goes to market and buys and sells necessary goods. "I finish my work first. Then I play with my friends for a very short time. After that I read attentively"-Ratul said. When Era was asked about her study time she was silent, however her mother said that there was no fixed time of her study. The mother, the elder sister and Ratul came to an agreement and said that Era was very much fond of playing and gossiping. Ratul added, "In a mathematics class Era was laughing and gossiping with another three girls. The teacher forbade them but failed to stop them. Then the teacher beat the four girls."

It was known that one girl who is a classmate of Era live next to their house. Era passes her maximum time with that girl. They gossip and play all day long but both of them are very much unwilling to go to market. Era has no barrier to go to the nearby shop.

Ratul told the researcher, "Sir, I will go to Dhaka for my study." The researcher praised him cordially. His mother became very pleasant for his desire. "We will give him money for study by hook or by crook"-she said. "What about Era?"-the mother was asked. She was seen depressed at this question and hesitated to say that they were willing to give money for Era also. At this stage the elder sister of Era became active and said to her mother, "You are not telling true. Some days ago you have told Era that you will give her marry when she will be able to write a letter." The mother became silent. Ratul informed that Era was good in mathematics before but now she is unwilling to do mathematics.

Case-V

It is a story of a girl named Nira, who is very poor in mathematics. She is a student of class III in a BRAC school. She looks younger comparable to her peer group. She has another brother who reads in class II in a different BRAC school. Nira has no barrier to go to market but she has no desire to be there. The researcher wanted to talk to her mother about Nira but she was very much willing to say about her son Shipahi, who reads in class II.

“My Shipahi is very good in study. I go to his school regularly to talk to the teacher. The teacher told me that Shipahi was very good in study”- she was looked very delighted in talking about her son. The mother also mentioned that the teacher didn't say her anything about Nira, whether she is good or not. However, she knows that Nira is not good as Shipahi. Nira was very silent but young Shipahi was very curious to talk to the researcher.

During classroom observation the researcher saw that Nira was very silent in mathematics classes. She didn't talk to the teacher about any mathematical problem. Moreover, she was not willing to go to the board. “Sometimes Nira keep herself absent from the school when I go out”- the mother said. “Moreover, she helps me in domestic works”- she added.

The mother has no tension about Nira's study. She informed that Nira was never good in mathematics, also she had no headache at this. Her attitude reflected in her voice. “Nira is a girl and I am looking for a bride for her. If she were a boy I would have tried to support her study. I expect much to my shipahi, he will study and will earn money for a better future for us”- said the mother.

Case-VI

It is a tale of two uterine brother and sister, Romesh and Rani. They are twins and both of them read in class III in a BRAC School. Like other cases, Rani is poorer in mathematics than Romesh. Rani has no involvement in such kind of activities that requires mathematics knowledge. She washes dishes, clean yards, and sometimes helps her father in making cane-goods. Their mother also acknowledged that her daughter generally help her in domestic works. She also said, "Rani doesn't go to market, because we do not allow her to go there". On the other hand, Romesh goes to market regularly and outing is not a problem for him. Her view was not different from Romesh.

"We expect that Romesh will study regularly and will get a suitable job so that he can look after us in the long run" ("আমরা আশা করি যে, রমেশ ভালভাবে লেহাপড়া শিখে বড় এটা চাকরি পাবি। আমরা বুড়ো অয়ে গেলি আমাগের দেখপি").

At the time of classroom observation, it was seen that Rani was not willing in doing mathematics, rather she has tendency to copy from Romesh. As Rani was not permitted to go outside, she had very little out knowledge. She was not doing a normal behavior with her teacher. On the other hand, Romesh is very cleaver and behaves normally with his teacher. The researcher observed that Romsh was very active in his classroom.

Chapter Five: Discussion and Conclusion

Although the gaps became narrower in many developed countries, like other under developed countries, the lives of boys and girls are highly differentiated Bangladesh. Unfortunately, like many other social, cultural and economical aspects, the girls are lag behind boys in mathematics achievement. A series of studies confirmed that the girls do not score as high as their peer boys do in mathematics (Sukthankar, 1999; Bero, 1993, Chowdhury et al, 1992, Southerland. 1989). Steps have been taken in many developed countries to narrow down the gender gap in science and mathematics. Nevertheless, the problem exists in many countries including Bangladesh. Bangladesh, a developing country of South Asia, remaining a high level of illiteracy. However, the gender gap in enrolment at primary level disappeared recently (Chowdhury et al, 1998).

In early 1992, gender difference in mathematics of the Bangladeshi children was unfolded for the first time (Chowdhury et al, 1992). The study was conducted to assess the basic educational level of the children of aged 11-12 years. After this, the gender difference in mathematical knowledge of Bangladeshi children was identified through many other studies. Some of these portrayed the situation at national level and some on a specific type of school, for instance BRAC's non-formal schools (Nath et al, 2000, 1998, 1996; Khan, 1995). These studies did not make any attempt to find out the causes behind the problem. As the women are the most vulnerable section in our country, they are the targeted beneficiaries of all the development programmes of BRAC. Thus, the gender difference in mathematics in BRAC schools is badly unexpected to its organisers. The present study is dedicated to find out the causes behind gender difference in mathematics in BRAC schools. Being the first study in exploring the causes behind gender difference in mathematics in Bangladesh, there was no much scope of literature review in this regard.

For this study, observation, interview and case study methods were used. These techniques are widely used in qualitative research study. Mathematics classes were observed continuously for two weeks to know the classroom culture. Attitude of the teachers to boys and girls, attitude of the students to mathematics, the curiosity of the boys and girls to mathematics and other related issues were parts of observation. This method was very helpful to know the nature and causes of the problem. The views of the teachers, the Programme Organisers (POs), a trainer and a Team-in-Charge (TIC) were explored through interviews. Different checklists were used for the interviews. Moreover, the researcher asked questions from different points of view according to the discussions with the interviewees. The interviewees were motivated to give suggestions to remedy the gender gap in mathematics according to their experience. Without interview method it was not possible. Case study method helped the researcher to know the inside causes of the problem, existed in the family of the students. The cases were different in nature. So, it was possible to find out the causes from different points of view. Nonetheless, there was a scope to arrange a focus group discussion (FGD) but that was not arranged. FGD method is very much helpful in finding out causes behind any problem through the discussions of the concerned peoples. It also provides suggestions to remedy the problem. However, such technique was not utilised in this study. Observation of the monthly refreshers training session was a technique for collecting data. In that training session, a good number of BRAC schoolteachers were present. If the FGD arranged in that session, that might be fruitful for the study. The researcher felt that the checklists and methodologies, which were used for the classroom observation and interviews might be more appropriate. This was hard to do for the researcher because there were no available literatures in this regard that could help him to indicate proper guidelines for the study. Moreover, it was the first study for the researcher. That was a barrier also. The nature of the study was a qualitative one, although some quantitative data were used here. The quantitative data were used to select the sample schools. The data were recorded through words, sentences and dialogues. The

researcher tried to collect data in local dialect of the respondents. However, the data had to be recorded with much care. The researcher used some of those in the report keeping in minds that it might help the readers to understand the actual expression of the interviewee.

It was assumed previously that the girls would lead the mathematics classes in BRAC schools because of their majority. Again, it is a fact in BRAC schools that the girls are the leaders of small groups of students. Despite, they were not found at all in leading position in the observed BRAC schools. The behavior of the teacher influenced in it. It was seen that the teachers understand mathematics enough to teach the students. Moreover, they have enough qualities to make understand the students. The problem was in different stages. The teachers were very much friendly in teaching the boys but not the girls. Sometimes, they were rude to the girls. As female, they were also deprived in their own families. They bear the concept of the society that the boys are superior to the girls. This might be a probable cause of such behavior of the teachers. Besides, the girls didn't bear the qualities to lead the classes. One possible cause may be the inferiority complex of the girls that they learned from their family. The girls are deprived in their family. So, they can't achieve the mentality to take the leadership. Behavior of the teachers adds with this. It was expected that the teachers would learn how to behave equally and how to make a student active in order to teach equally. However, it was not the case. If the teachers tried to influence the girls to make them active and interested they might be benefited. Sadly, the teachers of BRAC schools were not found doing so. The responsibilities, obeyed by the POs were found uncongenial in eradicating gender gap in mathematics in BRAC schools but it was expected. The POs were working towards smooth operation of the schools and that was appropriate to quality education. They were found ignorant about gender difference in mathematics so they didn't take any step to remove the gender gap. Besides, they were not informed from the head office in this regard. The role of the TIC was not difference from the POs in eradicating gender gap in

mathematics. However, since the BRAC schools were dedicated to ensure quality primary education for the students, who are deprived in the society, the schools couldn't ensure congenial study situation for the girls to do good in mathematics as their peer boys. The girls were found weak in mathematics. Their inferior position in family is a great cause of it and even in school they were deprived. That means, the teachers, the POs, the TIC, the trainer and other authorities of school were found ignorant about gender difference in mathematics. This is why they didn't take any step to remedy the gap. They will be informed precisely to solve the problem.

It was seen that the girls kept them absence from the school, because, they were to involve in household works. The girls cook rice for all members of the family, wash the dishes and take care of their siblings in absence of their mothers. Besides, they help their parents in harvesting crops. As a result, they cannot maintain the regularity in schools. Other studies also found the same (Sudarshan, 2000, Sinha, 1997, and Chowdhury et al, 1997). It was an important finding of this study that the boys deprived the girls in the mathematics classes. The boys didn't want to give any chance to the girls to participate in the classroom activities. Though the girls were the leaders of different groups, the boys dominated the classroom activities. They collected and distributed khata, opened common box, cleaned blackboard and followed every order of the teacher. Sometimes, they made fun with themselves about the girls. Similar findings were found in another study (Relich, 1996). This study found that the boys were more confident than their peer girls, but one study conducted in the southwest region of Sydney did not find any difference of confidence among boys and girls (Relich, 1996). Socioeconomic and educational difference between Bangladesh and Australia might be the cause of such variation. Australia is one of the countries of developed world, besides, Bangladesh, a country of third world lags far behind Australia in every aspects of education. So, both the two findings might be relevant in their respective socio-economic perspectives.

Another important finding of the study is that the girls were deprived in their family to a great extent. The parents preferred their son than daughter in every aspects of life. They took care of the boys by providing enough time for their study. Moreover, money was not a problem for their son. The parents were also ready to continue such help. The situation was totally reverse for the girls. The parents send their daughters to school keeping in mind that they would be able to write a letter, which would help them to get a better bride. This finding has an analogy with another studies (Sudarshan, 2000; chowdhury et al, 1997 and Khan, 1995). It was observed that the teachers admonish the girls more in the classrooms. They rebuke the girls with their physical size and their inability in doing maths.

It was found in this study that the girls were treated as girls in the family as well as in the mathematics classes. They were not permitted to behave as their peer boys did. They were not allowed to go to marketplace and to communicate with people, outside of their family. So, the girls couldnot explore their potentiality to a full extent, which resulted low performance in mathematics achievement. This finding has a consistency with existing literature (Sinha, 2000).

It is reflected in the present study that the teachers expected better performance from the boys. Another study got the same result too (Gutbezahl J, ERIC/CSMEE data base article 380279). When a girl failed to do a math, the teacher invited a boy to correct it. Thus, the girls always found that boys are doing correct, however, there were available girls to do so. This decreased girls confidence (Khan, 1995).

It was found in this study that in the mathematics class the girls did not work gradually in order to solve any mathematical problem rather they waste their time by gossiping and doing unnecessary works. This finding is not analogy with another finding of a study (Rlich, 1996). One possible explanation of the

difference between the two findings can be that the two studies were conducted in two different areas with different socio-economic status. It was found that the difference between boys and girls in achieving mathematics is increasing gradually from elementary level to further level. The girls who were poor in mathematics in grade I, became poorer in grade II and III. This was not happened for the boys, rather they did better day by day. In this way, the difference increased gradually. This finding is supported by another study conducted in BRAC school graduates (Nath, 1998). The teachers were primarily responsible for the elimination of such difference, however, they couldn't do it. The dropout rate was high for the girls. It was another important finding of the present study. Early marriage was the main cause of such drop out. This finding has an analogy with another literature done in India (Sudarshan, 2000). The similarity of the two findings is because of the similar status of girl's education in Bangladesh and India.

In conclusion it can be said that this study explored the specific causes behind gender differences in mathematics achievements in BRAC schools. These causes are as follows:

1. The girls of BRAC schools are deprived in their own family. As a result they can not achieve qualities to behave as their peer boys. They become timid and shy as their parents and society want. The inside weakness of the girls is a big problem in achieving mathematics to a satisfactory level.
2. The BRAC schools can not help the girls to over come their weakness rather the girls are deprived in BRAC schools also. The teachers, POs and other related authorities are still ignorant about the problem. So, they can not help the girls to bring them up to the mark.
3. The girls are involved in such type of activities, which do not require calculation. They are not permitted to go to market. So, mathematics becomes an abstract subject to the girls and they fear it from the very beginning.

4. The parents send their daughters to schools to make them able to write communication letters. If the girls achieve this quality they will get suitable bride – is a common thinking of their parents. They transmit this idea to their daughters off and on. So, the girls do not take mathematics seriously.
5. The girls help their parents in household activities to a great extent. So, they can not manage enough time to study. Moreover, they keep them absent from schools off and on because of their family problem.
6. The BRAC head office didn't take any step to remedy the problem. As a result, the problem exists now and the gap is increasing day by day.

Recommendations

In order to remedy the existing gender gap in mathematics achievement in BRAC schools the following are the recommendations based on the findings of this study.

1. Prepare a guideline that would help the teachers, POs and the trainers to behave equally to the students of both sexes.
2. The issues related to gender imbalance in academic performance should be discussed in the training at all levels. Special emphasis on this issue should be given in the monthly refresher's training. Ask the teachers to find practical strategy for the elimination of such gap.
3. Meeting of the parent-teacher association should be used to create awareness of the parents.
4. It should be a common agenda for the POs during their academic supervision.
5. The Monitoring Department and the Research and Evaluation Division of BRAC can undertake short and long-term studies on the issue. The findings should be disseminated to the POs during their meeting and to the teachers' through monthly refreshers' training.

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Annexures

Annex-1 Questionnaire

ছাত্র/ছাত্রীর নাম:----- ছেলে/মেয়ে

স্কুলের নাম: -----সময়-----

সকল প্রশ্নের উত্তর দিতে হবে।

১। বাজারে গিয়ে তুমি ৬৫ টাকার মাছ, ১৮ টাকার আলু এবং ৩ টাকার মরিচ কিনেছ। তুমি মোট কত টাকা খরচ করেছ?

২। তোমাদের বাড়িতে ১৩০ টি মুরগী ছিল। ৪৬ টি মুরগী বিক্রি করে ফেললে আর কয়টি মুরগী থাকবে?

৩। একটি পেন্সিলের দাম ১৩ টাকা হলে এরূপ ৪ টি পেন্সিলের দাম কত?

৪। ৩২০ টি আম ৮ জনের মধ্যে সমান ভাগে ভাগ করে দিলে প্রত্যেকে কয়টি করে আম পাবে?

৫। সুমির কাছে ১৬৫ টাকা ছিল। বাজারে গিয়ে সে ৩০ টাকার চাল, ২৩ টাকার তেল ও ৩৫ টাকার মাছ কিনল। এখন তার কাছে আর কত টাকা রইল?

৬। তিনটি ঝুড়ির প্রথমটিতে ১৩০ টি, দ্বিতীয়টিতে ৩৬৫ টি এবং তৃতীয়টিতে ২৯০ টি কলা আছে। কলা গুলোকে ৫ জন লোকের মধ্যে সমান ভাগে ভাগ করে দিলে প্রত্যেকে কয়টি করে কলা পাবে?

৭। তোমার কাছে ৮৫ টাকা ছিল। তোমার আবা তোমাকে আরো ৬০ টাকা দিলেন। এখন তোমার কাছে কত টাকা আছে? ওই টাকা থেকে তুমি ৯৫ টাকা দিয়ে একটি জামা কিনেছ। এখন তোমার কাছে আর কত টাকা রইল?

৮। জালালের বাবা দৈনিক ১২ ঘন্টা ৫০ মিনিট কাজ করেন এবং তার মা দৈনিক ১২ ঘন্টা ১৫ মিনিট কাজ করেন। কে বেশী কাজ করেন? কত সময় বেশী কাজ করেন?

৯। মরিয়ম বেগম তার বাগান হতে ৮ কিলোগ্রাম
২০০ গ্রাম শাক, ৪ কিলোগ্রাম ৩০০ গ্রাম বেগুন ও
২ কিলোগ্রাম ৪০০ গ্রাম আলু বিক্রি করলেন। তিনি
মোট কত ওজনের শাক-শব্জি বিক্রি করলেন?

১০। বাড়ী থেকে গীতার স্কুলের দূরত্ব ২ কিলোমিটার
৯০ মিটার। সে ১ কিলোমিটার ৫০ মিটার পথ
রিক্সায় যায় এবং বাকি পথ পায়ে হেঁটে যায়। সে কত
পথ পায়ে হেঁটে যায়?

Annex-2: Marks obtained by each of the students of four schools

Name of the school: S₁

Name of the Boys	Achieved Scores	Name of the Girls	Achieved Scores
S ₁ B ₁	87	S ₁ G ₁	96
S ₁ B ₂	88	S ₁ G ₂	70
S ₁ B ₃	50	S ₁ G ₃	46
S ₁ B ₄	52	S ₁ G ₄	50
S ₁ B ₅	63	S ₁ G ₅	46
S ₁ B ₆	44	S ₁ G ₆	40
S ₁ B ₇	50	S ₁ G ₇	43
S ₁ B ₈	34	S ₁ G ₈	26
S ₁ B ₉	42	S ₁ G ₉	24
S ₁ B ₁₀	37	S ₁ G ₁₀	25
S ₁ B ₁₁	36	S ₁ G ₁₁	33
S ₁ B ₁₂	26	S ₁ G ₁₂	30
S ₁ B ₁₃	46	S ₁ G ₁₃	14
		S ₁ G ₁₄	08
		S ₁ G ₁₅	35
		S ₁ G ₁₆	33
		S ₁ G ₁₇	32
		S ₁ G ₁₈	24
		S ₁ G ₁₉	34
		S ₁ G ₂₀	33

Mean = 50.30

Mean = 37.10

Difference of the means = 13.20

Name of the School: S₂

Name of the Boys	Achieved Scores	Name of the Girls	Achieved Scores
S ₂ B ₁	37	S ₂ G ₁	54
S ₂ B ₂	42	S ₂ G ₂	30
S ₂ B ₃	29	S ₂ G ₃	33
S ₂ B ₄	28	S ₂ G ₄	43
S ₂ B ₅	27	S ₂ G ₅	46
S ₂ B ₆	29	S ₂ G ₆	23
S ₂ B ₇	45	S ₂ G ₇	34
S ₂ B ₈	46	S ₂ G ₈	17
S ₂ B ₉	51	S ₂ G ₉	13
S ₂ B ₁₀	52	S ₂ G ₁₀	25
S ₂ B ₁₁	44	S ₂ G ₁₁	23
S ₂ B ₁₂	43	S ₂ G ₁₂	37
S ₂ B ₁₃	53	S ₂ G ₁₃	46
		S ₂ G ₁₄	36
		S ₂ G ₁₅	30
		S ₂ G ₁₆	07
		S ₂ G ₁₇	36

Mean = 40.40

Mean = 31.40

Difference of the means = 9.00

Name of the school = S₃

Name of the Boys	Achieved Scores	Name of the Girls	Achieved Scores
S ₃ B ₁	74	S ₃ G ₁	60
S ₃ B ₂	75	S ₃ G ₂	36
S ₃ B ₃	35	S ₃ G ₃	61
S ₃ B ₄	60	S ₃ G ₄	44
S ₃ B ₅	78	S ₃ G ₅	45
S ₃ B ₆	90	S ₃ G ₆	62
S ₃ B ₇	45	S ₃ G ₇	37
S ₃ B ₈	58	S ₃ G ₈	51
S ₃ B ₉	34	S ₃ G ₉	23
S ₃ B ₁₀	68	S ₃ G ₁₀	32
S ₃ B ₁₁	58	S ₃ G ₁₁	28
S ₃ B ₁₂	58	S ₃ G ₁₂	96
S ₃ B ₁₃	70	S ₃ G ₁₃	76
		S ₃ G ₁₄	40
		S ₃ G ₁₅	54
		S ₃ G ₁₆	64
		S ₃ G ₁₇	57
		S ₃ G ₁₈	41
		S ₃ G ₁₉	90

Mean=61.70

Mean=52.47

Difference of the means = 9.37

Name of the school = S₄

Name of the Boys	Achieved Scores	Name of the Girls	Achieved Scores
S ₄ B ₁	51	S ₄ G ₁	46
S ₄ B ₂	46	S ₄ G ₂	58
S ₄ B ₃	82	S ₄ G ₃	46
S ₄ B ₄	46	S ₄ G ₄	45
S ₄ B ₅	27	S ₄ G ₅	18
S ₄ B ₆	34	S ₄ G ₆	10
S ₄ B ₇	78	S ₄ G ₇	33
S ₄ B ₈	37	S ₄ G ₈	43
S ₄ B ₉	17	S ₄ G ₉	20
S ₄ B ₁₀	40	S ₄ G ₁₀	52
S ₄ B ₁₁	57	S ₄ G ₁₁	70
S ₄ B ₁₂	66	S ₄ G ₁₂	27
S ₄ B ₁₃	55	S ₄ G ₁₃	56
		S ₄ G ₁₄	24
		S ₄ G ₁₅	37
		S ₄ G ₁₆	48
		S ₄ G ₁₇	49
		S ₄ G ₁₈	46

Mean=48.90

Mean=40.40

Difference of the means = 8.50

*** N.B.

S1B1 indicates Moni ;	S1B2 indicates Bony
S1B3 indicates Jony ;	S1B4 indicates Ani
S1B5 indicates Ali ;	S1B7 indicates Robi
S1B8 indicates Rony ;	S1B11 indicates Subash
S1G1 indicates Sumi ;	S1G11 indicates Rumi
S1G14 indicates Nira	

S2B1 indicates Romesh ;	S2B7 indicates Madhob
S2B13 indicates Tapos ;	S2G3 indicates Sita
S2G7 indicates Goya ;	S2G9 indicates Maya
S2G16 indicates Mira ;	

S3B1 indicates Kabul ;	S3B2 indicates Abul
S3B5 indicates Roki ;	S3G17 indicates Shipra
S3G18 indicates Era	

Checklist for observing the mathematics class

1. Teacher's attitude towards girls:

Whether the teacher treats the girls inferior to boys in general.

2. Presentation skill of the teacher:

- a. Ability of making subject easier to the slow students-is there any discrimination in his/her performance/
- b. Ability of giving examples-is it unbiased in respect of gender?

3. Evaluation skill of the teacher:

Style of questioning, checking class works and home task-is there any discrimination?

4. Participation of the classroom activities:

- a. Who are more participatory in the class?
- b. Who are the leaders in the small group activities?

5. Classroom control:

- a. How the teacher maintains attention of the students?
- b. Uses of reward and punishment -are those biased in respect of gender?

6. Curiosity of the students:

- a. Who are more curious about the mathematical problems-boys or girls? (Proportionately)
- b. Who fears mathematics more-boys or girls?
- c. Are they do home task regularly-number of boys and girls?

7. Attendance of the students:

Is there any difference in attendance of the students?

8. Motivation skill of the teacher:

How teacher praises, inspires or reinforces? Is it unbiased?

9. Overall behavior of the teacher:

- a. Biased/Unbiased (towards).
- b. Friendly/Rude (towards.....).
- c. Autocratic/Democratic (towards.....).

Annex-4: Checklist for the interview of the teachers

1. How long have you been working as a teacher?
2. Do you know that there is gender difference in mathematics in your school?
3. If you know, when did you come to know it and how?
4. According to you, in what level the problem exist?
5. What steps have you taken to solve the problem?
6. What are the obstacles to take steps to tackle the situation?
7. What more steps should be taken?
8. If you do not know about the gender difference in mathematics in your school, why did you not mark it?
9. Are you satisfied with the performance of girl students in the mathematics class?
10. According to you, what are the probable causes behind gender difference in mathematics?
11. How the causes can be remedied?
12. In the refresher training or in the basic teachers training, is there any discussion about a gender difference? Tell about the discussion.
13. Do you think that the inferior position of the girls in mathematics changeable?
14. Specific questions on the observations recorded in the mathematics classes according to checklist.
15. What were the conditions of slow girl students in earlier classes (class I & II)?

Annex-5: Checklist for the interview of the programme Organisers (PO's)

1. How long have you been working as a PO?
2. Do you know about the gender difference in mathematics?
3. When did you come o know it and how?
4. What steps have you been taken to remedy the gap?
5. What more steps should be taken?
6. Are there any obstacles to take steps? What are the problems?
7. According to you, what are the causes behind gender difference in mathematics?
8. How the causes can be remedied?
9. Did you inform your higher authority about the gender difference?
10. If you do not know about gender difference, why have you not marked that?
11. Are you satisfied with the performance of the teachers?
12. In what stage the problem exist?
13. Do you mind that the inferior position of the girls in mathematics unchangeable?
14. In the time of your training, were there any discussions about the gender difference in societal activities, in education and specially in maths? If yes, what were the discussions?

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